



**The Ramco Cements Limited**

**Amalgamated Periyagalur Limestone Mine**

**Extent - 53.32 Ha**

**Production in Plan Period - 15 Million Tonnes @ 3.00 MTPA Limestone**

**S.F. Nos. 51/2, 51/3, 51/4, 229/1, 267, 268/1, 269, 271, etc.,**

**Periyagalur Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu**

**Amalgamation GO (Ms) No. 126 dated 26.02.2021 with validity till 19.08.2053**

**Mining Plan Approval vide**

**IBM Letter No. TN/ALR/LST/MP-2079.MDS dated 23.07.2021 valid till 31.03.2025**

**ROMP for Plan Period 2025-26 to 2029-30 - submitted for Approval**

**Environmental Clearance under EIA Notification 2006**

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

**Summary Environmental Impact Assessment Report**

**(for Public Hearing)**

**Awarded TOR : SEIAA-TN/F.No.9220/TOR-1215/2022 dated 14.07.2022**

**July 2024**

**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**

**(SI. No. 4 of QCI/NABET List dated 15.07.2024)**

**Lab Accreditation : NABL Certificate No. TC-5770 dated 03.04.2022**

**Lab Recognition : MoEF&CC vide Letter F. No. Q-15018/04/2019-CPW dated 14.10.2019**

The Ramco Cements Limited  
 Amalgamated Periyagalur Limestone Mine  
 Extent - 53.32 Ha; Plan Production - 15 Million Tonnes @ 3.00 MTPA Limestone  
 S.F. Nos. 51/2, 51/3, 51/4, 229/1, 267, 268/1, 269, 271, etc.,  
 Periyagalur Village, Ariyalur Taluk, Ariyalur District, Tamil Nadu

## Summary Environmental Impact Assessment Report

### 1.0 Introduction

#### 1.1 Project Proponent

**Ramco Group** is one of the leading, highly reputed and Second Largest Industrial Group in South India. It is well diversified in the fields of Cement, Ready Mix Concrete, Cement Fiber Products, Cotton and Synthetic Yarn, Software Systems, Wind Farms, Research & Development, Dry Mortar Plants, Cotton Textiles and Surgical. The total employees are about 15,700 and the Turnover of the Group is Rs.8,000 Crores. The main companies of RAMCO Group are:

- ❖ **M/s. The Ramco Cements Limited** (formerly M/s. Madras Cements Limited).
- ❖ M/s. Rajapalayam Mills Limited.
- ❖ M/s. Ramco Industries Limited.
- ❖ M/s. Ramco Systems Limited.

**The Ramco Cements Limited (RCL)** is one of the reputed Cement Companies in India. The Company is the Second Largest cement producer in South India and sixth largest manufacturer of cement in the Country. The cement production of RCL is about 17.70 million tons per annum (MTPA) from their **Cement Plants** in India.

- ❖ Ramasamy Raja Nagar near Virudhunagar, Tamil Nadu (established in 1961) with 3 Lines - 2.7 MTPA Cement.
- ❖ Kumarasamy Raja Nagar, near Jaggayyapeta, Andhra Pradesh (1986)-3.65 MTPA (3 Lines).
- ❖ Alathiyur near Vriddhachalam, Tamil Nadu (1997): 3.0 MTPA (2 Lines).
- ❖ Govindapuram near Ariyalur, Tamil Nadu-5.5 MTPA (2009) (2 Lines).
- ❖ Kolimigundla, Andhra Pradesh (Cement 2.0 MTPA).

RCL is operating **Cement Grinding Units** at:

- ❖ Kolaghat (2.0 MTPA) in West Bengal.
- ❖ Kattuputtur (0.75 MTPA) near Chennai, Tamil Nadu.
- ❖ Valapadi (2.0 MTPA) near Salem, Tamil Nadu.
- ❖ Method near Chithradurga, Karnataka (0.3 MTPA).
- ❖ Vizag (2.0 MTPA) near Anakapalli, Andhra Pradesh.
- ❖ Haridaspur (0.9 MTPA), Jajpur District, Odisha.

It is also operating a **Packing Plant** at Nagercoil.

RCL is producing Ordinary Portland Cement (**OPC**), Portland Pozzolana Cement (**PPC**), Slag Cement (PSC), Composite Cement (CC), etc. The cement produced by RCL is marketed in the brand name of 'RAMCO'. The market centers are mainly in Tamil Nadu, Andhra Pradesh, Telangana, Kerala, Karnataka, Odisha and West Bengal States.

The **Contact information of RCL Corporate Office** is :

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e-Mail : ramcoenv@ramcocements.co.in

## **1.2 Project Profile**

RC) is operating its Govindapuram Cement Plant near Ariyalur for 3.62 MTPA Clinker & 5.50 MTPA Cement production. The Plant requires about 6.5-7.0 MTPA of different grade Limestone and Kankar depending on the production. The existing Captive Mines viz. Periyagalur, Periyagalur-West, Kattupirangium, Reddipalayam, Pudupalayam-North & Usenabad-South Limestone Mines and Illupaiyur & Ottakovil Kankar Quarries in the Ariyalur Region supply the Raw Materials Limestone & Kankar to the Plant.

**Periyagalur Mine (Lease-I; PNR)** over an extent of 36.29.5 Ha in Periyagalur Village was granted to RCL (MCL-Madras Cements Limited at that time) vide GO (3D) No. 2 dated 13.01.2003 for a period of 20 years. Lease Deed was executed for actual worked out Lease Area of **35.960 Ha** on 02.06.2003 with validity from 20.08.2003 to 19.08.2023. Subsequently, extension of mining lease validity upto 50 years has been granted vide GO (Ms) No. 77 dated 26.07.2018 over an extent of 35.96 Ha and is **valid till 19.08.2053**. The supplementary lease deed has been executed and registered on 03.07.2019. First EC dated 26.11.1999 was for 0.105 MTPA Limestone production. The mine was operated for 0.105 MTPA quantity from 2005-06 to 2007-08. Expansion EC dated 10.10.2007 is for 0.90 MTPA (Clean Limestone) production and the mine is operating for this quantity from 2008-09 to till date. Crusher established over an extent of 4.22 Ha in the non-lease area was shifted to RCL Govindapuram Cement Plant. Both Opencast Conventional Mining with controlled Blasting & Non-Conventional Mining Method with X-Centric Rippers are adopted.

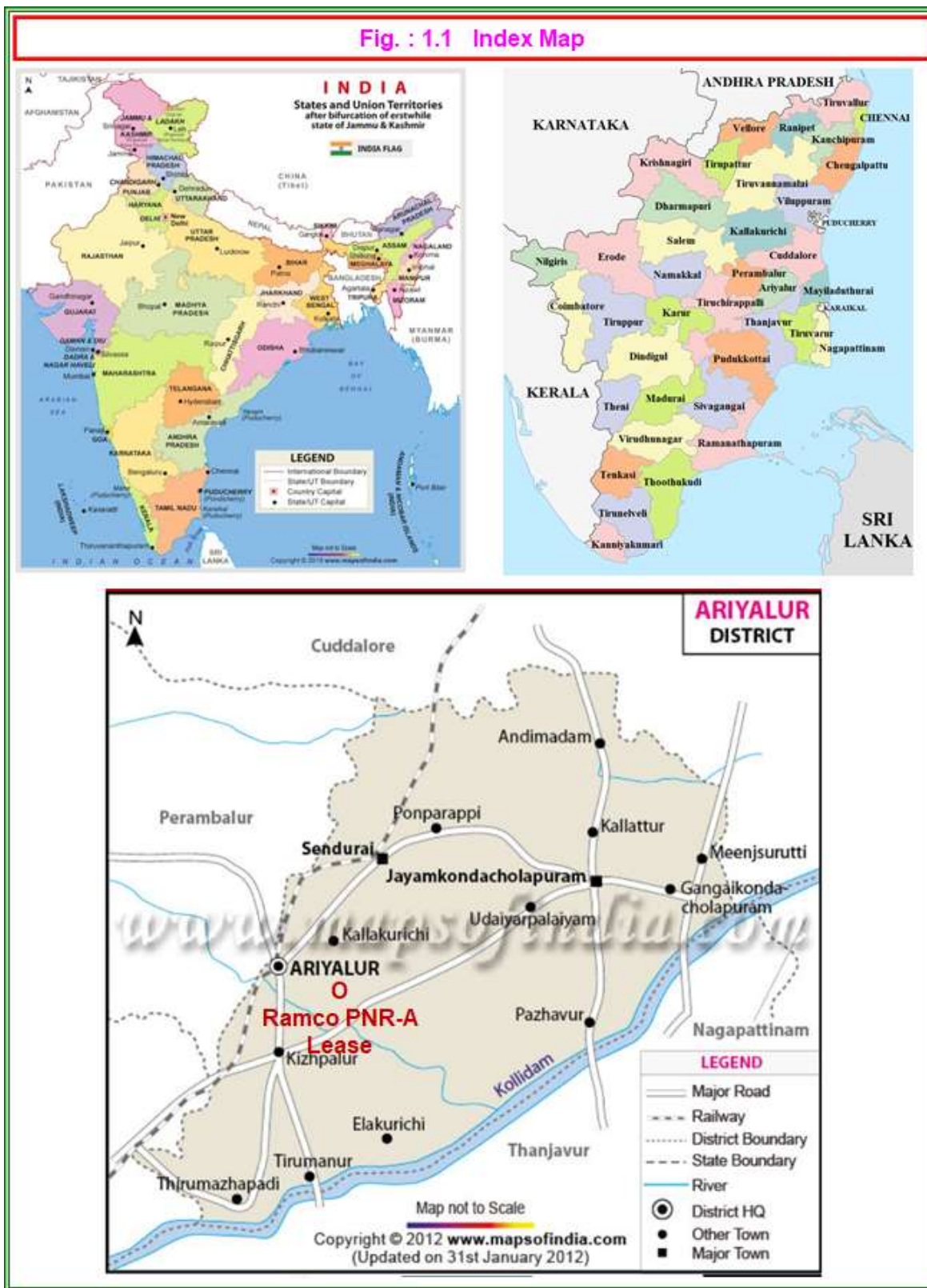
**Periyagalur-West Mine (Lease-II; PNR-W)** over an extent of **17.360 Ha** in Periyagalur Village was granted for Limestone & Marl vide GO (Ms) No. 153 dated 23.12.2016 for a period of **50 years**. EC for the production of **0.3 MTPA Limestone & Marl** over an extent of 17.36 Ha was

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awarded by SEIAA-TN vide Letter No. SEIAA-TN/F.No.-462/2012/EC-45/1(a)/ARY/2016 dated 14.11.2016. Lease Deed is executed on 10.01.2017 with validity from 10.01.2017 to 09.01.2067. Both Opencast Conventional Mining with controlled Drilling & Blasting and Non-Conventional Mining Method with X-Centric Rippers are adopted. Existence of Mineral Marl is not proved.

**Need for Amalgamation :** The two existing Captive Mines in Ariyalur Region are in Conceptual Stage and will be completely exhausted in another 2 years period. Thus, other Limestone sources are being explored for sustained supply of Limestone to Govindapuram Cement Plant. PNR & PNR-W Leases are located adjacent to each other and are in compact & contiguous nature. With long barriers (550 m long & 35 m depth) between the two leases, about 1.50 Million Tonnes of Limestone reserves would be un-exploited. By amalgamation of both the leases, the Mineable Reserves will be enhanced. Also, '**Common Boundary Workings**' with **Dalmia PNR Mine** is now proposed. Thus, it is proposed to amalgamate both these mining leases.

Amalgamated Periyagalur Mining Lease over an extent of **53.32 Ha** is falling in SF Nos. 51/2, 51/3, 51/4, 51/5A, 51/5 B, 51/5C, 51/5D, 51/5E, 51/5F, 51/5G, 51/5H, 224/1, 224/2, 226/1A, 226/1B, 226/2, 226/3, 226/4, 226/5, 226/6A, 226/6B, 226/6C, 226/6D, 226/6E, 226/7, 226/8A, 226/8B, 226/8C, 226/9A, 226/9B, 226/9C, 226/10A, 226/10B, 226/10C, 226/11A, 226/11B, 226/12, 226/13A, 226/13B, 226/13C, 226/14, 226/15A, 226/15B, 226/16, 228/1, 228/2, 228/3A, 228/3B, 228/3C, 228/3D, 228/5, 229/1, 229/2, 229/3, 229/4, 229/7, 229/8, 229/9, 229/11, 230/1A, 230/1B, 230/2A, 230/2B, 230/3, 230/4A, 230/4B, 230/5A, 230/5B, 230/5C, 230/5D, 230/6A, 230/6B, 230/6C, 230/6D, 230/6E, 230/6F, 230/6G, 230/6H, 230/6I, 230/7A, 230/7B, 230/7C, 230/8, 230/9, 230/10, 230/11A, 230/11B, 230/11C, 230/12, 230/13, 230/14, 230/15A, 230/15B, 230/15C, 230/15D, 230/16, 230/17, 230/18, 230/19, 230/20, 231/1A, 231/1B, 231/1C, 231/1D, 231/1E, 231/1F, 231/1G, 231/1H, 231/1I, 231/1J, 231/1K, 231/1L, 231/1M, 231/1N, 231/2A, 231/2B, 231/2C, 231/2D, 231/2E, 231/2F, 231/2G, 231/2H, 231/2I, 231/2J, 231/2K, 231/2L, 231/2M, 231/2N, 231/2O, 231/2P, 231/2Q, 231/2R, 231/2S, 231/2T, 231/2U, 231/2V, 231/2W, 231/2X, 231/3A, 231/3B, 231/3C, 231/4, 231/5A, 231/5B, 231/5C, 231/6A, 231/6B, 231/6C, 231/6D, 231/6E, 231/6F, 231/6G, 231/6H, 231/6I, 231/6J, 231/6K, 231/6L, 231/6M, 231/6N, 231/6O, 231/6P, 231/6Q, 231/6R, 231/7, 231/8, 231/9, 231/10A, 231/10B, 231/10C, 231/11A, 231/11B, 231/11C, 231/11D, 231/12A, 231/12B, 231/12C, 231/12D, 231/12E, 231/12F, 231/12G, 231/12H, 231/12I, 231/12J, 231/12K, 231/12L, 232/1A, 232/1B, 232/1C, 232/1D, 232/1E, 232/1F, 232/2, 232/3, 232/4, 232/5A, 232/5B, 232/5C, 232/5D, 232/5E, 232/5F, 232/5G, 232/5H, 232/6A, 232/6B, 232/6C, 232/6D, 232/7A, 232/7B, 232/8, 232/9A, 232/9B, 232/10A, 232/10B, 232/11, 232/12A, 232/12B, 232/12C, 232/13, 232/14, 232/15A, 232/15B, 232/16, 232/17A, 232/17B, 232/18, 232/19A, 232/19B, 232/19C, 232/19D, 232/20, 233/1, 233/2, 233/3, 233/4, 233/5, 233/6, 233/7A, 233/7B, 233/7C, 233/8A, 233/8B, 233/9, 233/10, 233/11A, 233/11B, 233/11C, 233/11D, 233/11E, 233/11F, 233/11G, 233/11H, 233/12A, 233/12B, 233/12C, 233/12D, 233/12E, 233/12F, 233/12G, 233/12H, 233/12I, 234, 234 Part, 235/1, 235/2, 235/3, 237/1, 267, 268/1, 268/2, 269 & 271 of Periyagalur Village, Ariyalur Taluk & District of Tamil Nadu State (**Fig. 1.1**).



Out of 53.32 Ha, **Patta Land is 33.28 Ha and Govt. Poramboke Land is 20.04 Ha**. There is **no Forest Land** involved. There is **no Rehabilitation & Resettlement** issue. **There is no litigation/pending case against the Proposal.**

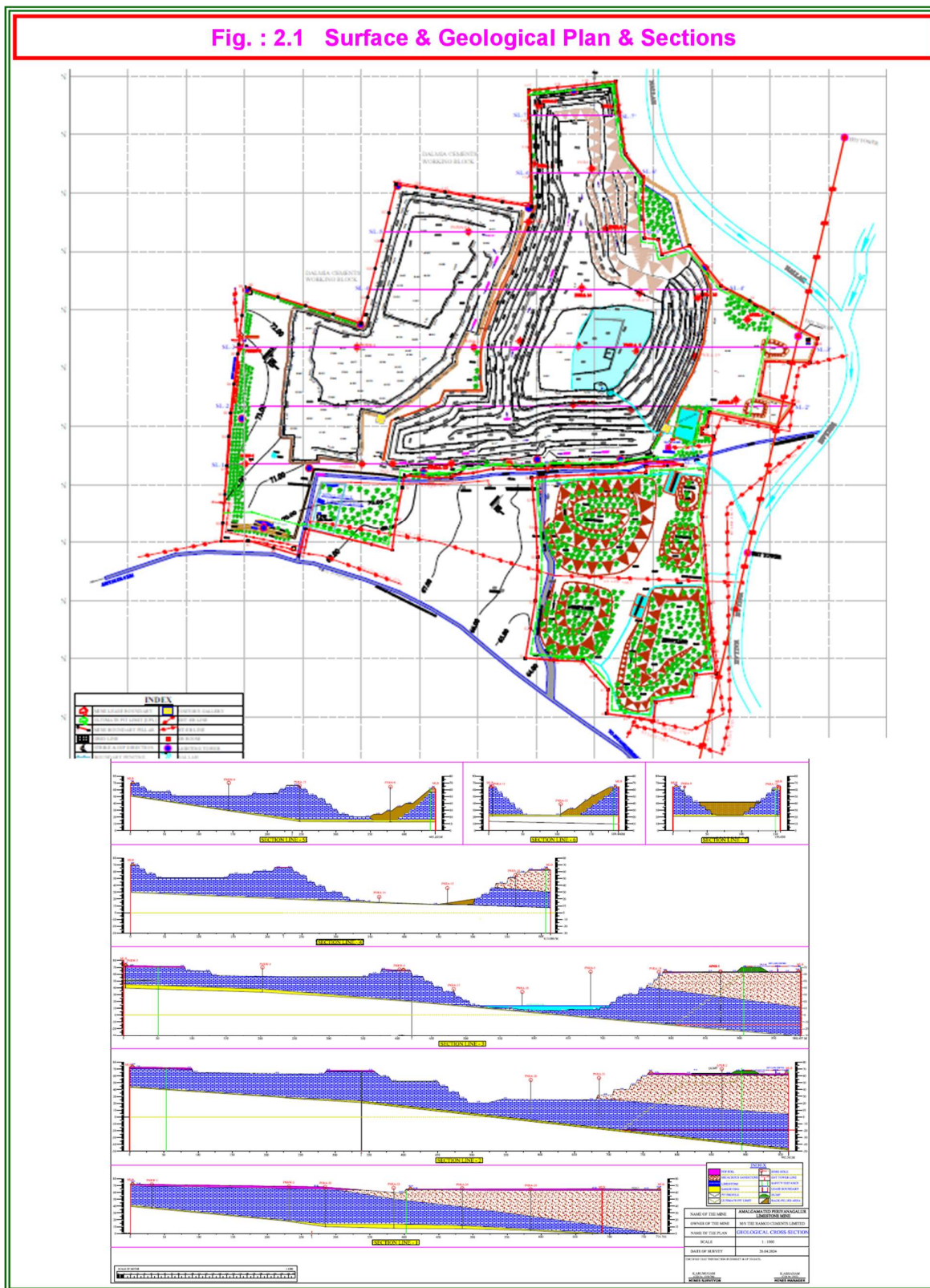
The State Government has granted **permission vide GO (Ms.) No. 126 dated 26.02.2021** for amalgamating the two Periyagalur mining leases totalling over an extent of **53.320 hectares** into a single lease for mining Limestone only, duly co-terminus with the Lease Period ending on 19.08.2053. IBM, Chennai has approved the Mining Plan for amalgamated Lease vide its Letter TN/ALR/LST/MP-2079.MDS dated 23.07.2021 for the Period 2020-21 to 2024-25 with its validity till 31.03.2025. With '**Common Boundary Workings**' with **Dalmia PNR Mine** proposed now, the Review of Mining Plan (ROMP) for Plan Period of **2025-26 to 2029-30 is being submitted with updated data** to IBM for its approval. Surface & **Geological Plan along with Geological Sections** is given as **Fig. 2.1**.

There was no production of 3.00 MTPA in the Amalgamated Lease as scheduled in the approved Mining Plan for want of prior EC. The **existing mining operations are continued** in the Leases (PNR & PNR-W) for respective **consented production quantities**. Subsequently, the **Mineable Reserves** has been reassessed as **15.85 Million Tonnes**, as on 01.04.2024. The Review of Mining Plan (ROMP) for Plan Period of **2025-26 to 2029-30** has been prepared and **submitted with updated data** to IBM for its approval.

The mining operation will be carried out by both Opencast Conventional Mining with controlled Drilling & Blasting and Non-Conventional Mining Method with X-Centric Rippers @ **3.00 MTPA**. Limestone production during ROMP period will be **15 Million Tonnes**. Balance Reserves will be mined out in subsequent Plan Period. **The Life of the Mine is 10 years** based on established Reserves now. **Ultimate Pit Depth** on proposed Plan Period will be **92 m BGL** from 71 m arrived in the earlier Mining Plan. Mining will intersect the Ground water-table. Fragmented limestone will be loaded by Hydraulic Excavators into Tippers. The Tippers transport limestone to Govindapuram Cement Plant. Limestone transportation will be **in all 3-Shifts** as District Administration restricted Limestone transportation during peak hours of the day in Ariyalur. The proposed Production Schedule is given in **Table 1.1**.

After exhaustion of all limestone, part of the pit on the northern, eastern & southern sides will be **reclaimed and rehabilitated** and the remaining exhausted pit will be used as water Reservoir for harvesting the rain water.

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**Table : 1.1 Yearwise Development & Production**

Sl. No.	Plan Period & Year	Top Soil, Tons	OB/SB/IB, Tons	Total Waste, Tons	ROM Limestone, Tonnes	Mineral Reject, Tonnes	Ore:OB Ratio
I	2020-21 to 2024-25 (Non operative period)	3,83,560	12,34,120	16,17,680	92,11,880	0	1:0.18
II	<b>ROMP Period (Commencement of operation)</b>						
1	2025-26	1,42,960	9,24,336	10,67,296	30,00,000	0	1:0.36
2	2026-27	49,760	2,42,288	2,92,048	30,00,000	0	1:0.10
3	2027-28	0	0	0	30,00,000	0	1:0
4	2028-29	1,00,480	13,96,512	14,96,992	30,00,000	0	1:0.50
5	2029-30	31,578	9,71,693	10,03,271	30,00,000	0	1:0.33
<b>Total</b>		<b>3,24,778</b>	<b>35,34,829</b>	<b>38,59,607</b>	<b>1,50,00,000</b>	<b>0</b>	<b>1:0.26</b>

Out of 53.32 Ha, Area of excavation at the end of the life of the mine will be 39.17 Ha, out of which about 14.00 Ha will be Backfilled & Reclaimed and balance 25.17 Ha will be left out as water reservoir.

The Limestone to be mined out from this Amalgamated 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 Environmental Clearance (EC) from the State Level Environmental Impact Assessment Authority, Tamil Nadu (SEIAA-TN). Accordingly, RCL has applied for prior EC to SEIAA-TN vide Online Proposal No. **SIA/TN/MIN/76439/2022 on 02.05.2022**. The Proposal under Sl. No. 1(a), Category B1 was deliberated in State Level Expert Appraisal Committee-Tamil Nadu (SEAC-TN) in its 287<sup>th</sup> Meeting held on 22.06.2022 and in 532<sup>nd</sup> SEIAA-TN Meeting held on 14.07.2022. Terms of Reference (TOR) for carrying out Environmental Impact Assessment (EIA) Study has been awarded vide **Letter SEIAA-TN/F.No.9220/TOR-1215/2022 dated 14.07.2022 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 dated 15.07.2024). 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. EIA Report has been **prepared in compliance with awarded TORs** and submitted. Summary EIA Reports (both in **English and Tamil versions**) along with Draft EIA Report are submitted for Public Consultation & Public Hearing.



## 2.0 Description of the Environment

### 2.1 Environmental Setting

PNR-A Mining Lease Area falls in the Survey of India Topo Sheet No. 58 M/4 (Fig. 1.2). The ML is located inbetween the following geographical co-ordinates :

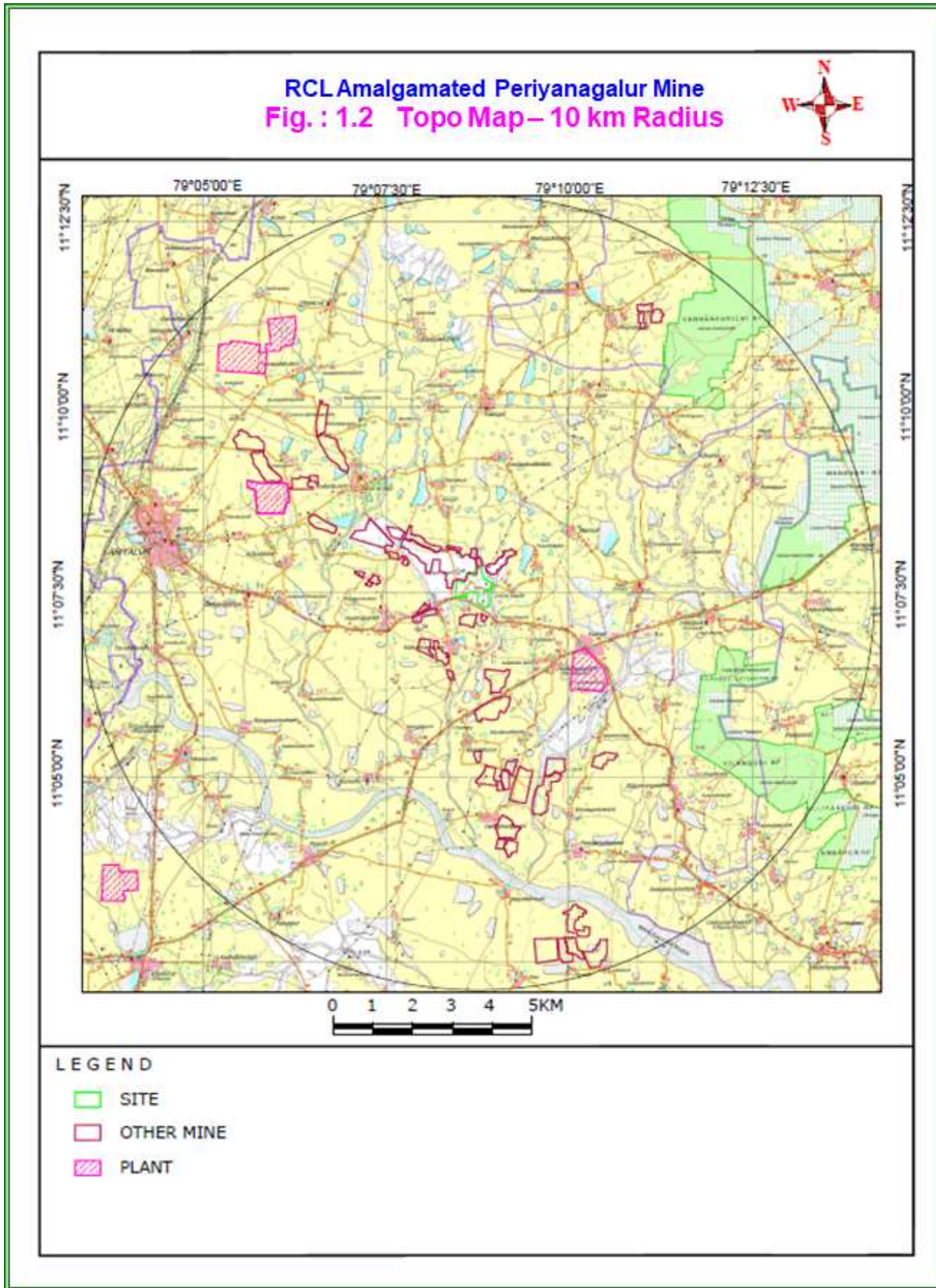
North Latitude	:	11° 07' 15.8'' - 11° 07' 51.4''
East Longitude	:	79° 08' 26.9'' - 79° 09' 01.0''

There is **no Forest Land involved and no Reserved Forest (RF) exists within 1 km** of the Mine. **No grazing land** exist in the study area. The area is having almost a gentle slope topography with an elevation of about 65-73 m above mean sea level (aMSL). The site is free from seismic effects (Seismic Zone-III). There are **no eco sensitive areas like National Parks, Wildlife Sanctuaries, Biosphere Reserves, Elephant Corridor, Mangroves, Archaeological/Historical Monuments, Heritage sites, etc. within 10 km from the Lease boundary**. Parts of **Managethi RF** (6.6 km in east), **Vannankurichi RF** (7.0 km in NE), **Kallankuthu RF** (10.0 km ENE), **Vilangudi Extn. RF** (8.0 km in ESE), **Vilangudi RF** (8.2 km in ESE), **Sundaresapuram RF** (9.5 km in SE) and **Ulliyakudi RF** (10.0 km in SE) fall in the Study Area.

Seasonal **River Marudaiyar** drains the region (flows at 4.9 km in the south). Seasonal Nallah Kallar River flows at 2.9 km in northwest. A seasonal nalla flows in the eastern boundary of the Lease from north to south. High Flood Level recorded in the seasonal nalla is 63.9 m in the north to 62.2 m in the south. The Lease is located in an elevation of 66.8 m to 65.7 m and thus, **no flood hazard due to the nearby seasonal nalla**.

State Highway (SH)-139 (Ariyalur-V.Kaikatti-Jayamkondam Section) is passing in east-west direction in southern boundary of the Lease-II and a **Safety Distance of 50 m has been provided as per GO, approved Mining Plan, Tamil Nadu Mineral Concession Rules 1959 & Anna University Recommendations** and will be maintained till end of the mining.

National Highway (NH)- 81 connecting Trichy-Kilapaluvur-Chidambaram runs at @ 2.5 km (in SE), NH-136 connecting Tanjore-Ariyalur-Perambalur runs at 6.2 km (W). Southern Railway BG Line runs through Ariyalur at a distance of 8.5 km in the west. The nearest Airport Trichy is at 60 km in southwest. The nearest Ports are at Chennai (300 km) and Cuddalore (95 km). ML Area is about 1.0 km from nearby Kattupirangium village. Periyagalur village is at 1.0-1.5 km in the east. RCL Govindapuram Cement Plant is located at a distance of 6.8 km aerial distance (14 km by road) in northwest. From the Lease, Ultratech Cement Plant-Reddipalayam is at 3.2 km (SE), TANCEM Cement Plant-Kallankurichi at 4.7 km (WNW), Dalmia Ariyalur Plant at 7.2 km (NW) and Chettinad Kilapaluvur Cement Plant at 10.6 km (SW). Captive Limestone Mines of these Cement Plants as well as others are located within 10 km radius area.

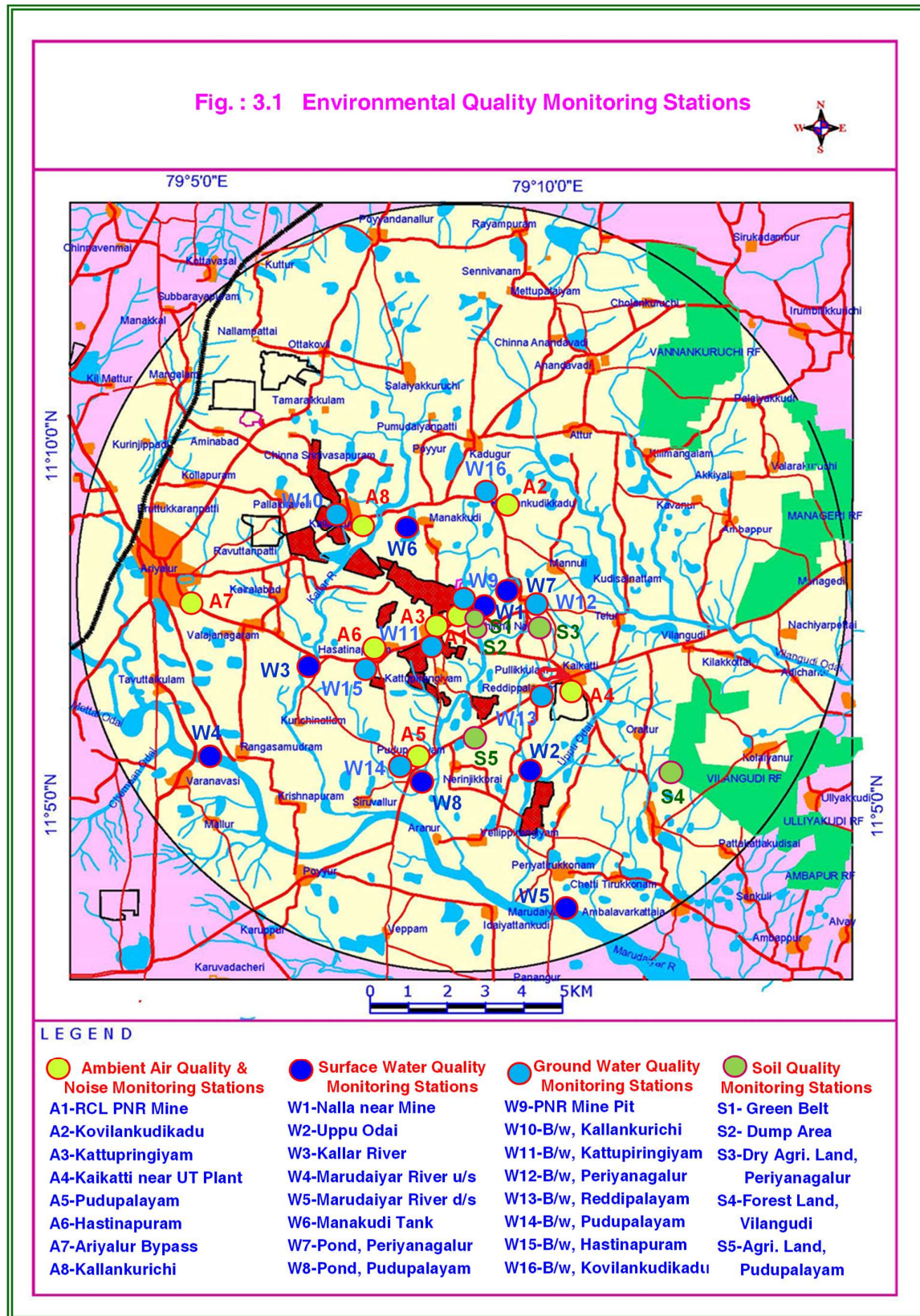


## 2.2 Baseline Environmental Status

The study area of 10 km radius (from 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**. The nearest IMD Station is Trichy Airport. The monitoring stations were selected in such a way that the baseline environmental data reflects the **Cumulative Impact of existing Mines and Industries** in the Study area. The Environmental Attributes covered for the EIA Study is given in Table 2.1.

**Table : 2.1 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		8	Once in the season	For Leq, Lday and L night values
Water	Surface Water Quality Parameters	8	Once in the Season	As per CPCB Norms (including existing Plant Raw Water )
	Ground Water Quality Parameters	8		As per IS:10500 Norms
Land	Soil Quality	8	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.



The summary of baseline status is given in **Table 2.2**.

**Table : 2.2 Environmental Baseline Status**

Envl. Component	Main Parameters	Minimum	Maximum	Mean	Desirable Norms
Ambient Air Quality, ug/m <sup>3</sup>	PM2.5	10	46	<b>25.1</b>	<b>60</b>
	PM10	20	74	<b>44.6</b>	<b>100</b>
	SO <sub>2</sub>	6	22	<b>10.9</b>	<b>80</b>
	NO <sub>x</sub>	6	26	<b>13.3</b>	<b>80</b>
Ambient Noise, dB(A)	Leq-Day	40.4	49.3	<b>45.1</b>	<b>55</b>
	Leq-Night	36.2	46.8	<b>42.1</b>	<b>45</b>
Surface Waters	TDS, mg/l	320	500	-	<b>500/2100</b>
Ground Waters	TDS, mg/l	360	550	-	<b>500-2000</b>
Soil Status	EC, mmhos/cm	1.50	1.79	-	<b>0.2-0.5</b>
	SAR	1.96	2.79	-	<b>&lt;5</b>

Legend : PM2.5-Particulate Matter size less than 2.5 um; PM10- Particulate Matter size less than 10 um; SO<sub>2</sub>-Sulphur dioxide; NO<sub>x</sub>-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 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.

### 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**. There are Cement Plants and Limestone Mines in the Study Area. Following industrial activities are considered for **Cumulative Impact Assessment** for assessing their contribution (**Table 3.1**). Cumulative Impact has been assessed for the identified Industries and assumed that the **pollution due to other existing Industrial & Mining activities have already been covered under baseline environmental status** and continue to remain same till the operation of the project.

**Table : 3.1 Industrial Activities considered for Cumulative Impact**

Sl. No.	Industry / Mine	Extent & Consented Production	Bearing & Contribution during Study Period
1	Ramco Amalgamated Mining Lease	53.320 Ha (3.00 MTPA)	Study Lease
2	UltraTech Periyagalur Limestone Mine (ML5)	4.985 Ha (0.15 MTPA)	Adjacent Lease in Upwind side & not in operation.
3	Dalmia Periyagalur & AK Limestone Mines	167.605 Ha (1.9 MTPA)	Adjacent Lease in operation. Downwind side & not contributing other than Traffic Volume
4	TANCEM Periyagalur & Khairulabad, Mines	194.165 Ha 66.110 Ha	Adjacent Lease; Not in operation. Downwind side & not contributing
5	TANCEM Kallankurichi Mine	240.610 Ha (expansion 0.2 to 0.7 MTPA)	Downwind side & not contributing
6	Ultratech Cement Plant, Reddipalayam	1.6 MTPA	Plant located near the Lease & not contributing other than Traffic Volume

**Safeguard to State Highway Traffic :** State Highway (SH)-139 (Ariyalur-V.Kaikatti-Jayamkondam Section) is passing in east-west direction in southern boundary of the PNR-West Mine (Lease-II) and a **Safety Distance of 50 m has already been provided as per GO, approved Mining Plan & Tamil Nadu Mineral Concession Rules 1959**. The following Safety/Preventive measures will also be implemented :

- ✓ In addition to 50 m Green Belt developed in the safety barrier, a Galvanium sheet fencing will be erected for 150 m length & 3 m height along SH-139 at a cost of **Rs.13.80 Lakhs**.
- ✓ With the help of State Highway department, safety measures like cautionary signals, speed brakers, sign boards, etc. will be installed and monitored.

- ✓ The existing OB Dumps are being handled for backfilling and the tail end of Lease-II western parts will be backfilled upto 150 m and reclaimed at the end.

**Safeguard to nearby Habitations due to Mining :** There are houses existing in nearby Kattupringiyam Ayyanagar and Chinna Nagalur Villages at a minimum distance of about 175 m from the Mine. RCL had engaged **NITK, Surathkal, a Govt. of India Institute**, for Study out the scientific investigation on "Blasting Parameters & Design of Safe Bench Geometry and Evaluation of Slope Stability. The findings are : Studies with given blast configurations having 10 to 25 holes of 5 m to 10 m average depth and each blasthole charged with 16.02 kg – 40.03 kg of explosive, indicated that there is no effect of ground vibrations and fly rock caused due to blasting operations carried out in the Mine, on the stability of village structures vis-à-vis the present distances. The following Safety measures are be implemented :

- ✓ There is a level difference of 6-25 m between the Mine and the Habitations. All these houses may be assigned with a PPV of 2 mm/s due to their condition as per DGMS Standards. The public road passing through the Lease and other village structures may be assigned a PPV of 25 mm/s during Blastings.
- ✓ Blasting operations in the Periyagalur Limestone Mine should, therefore, be carried out in such a way that the ground vibrations at different structures are always maintained below the assigned permissible PPV values. Fly rock should be controlled to within mine limits, without causing any problems to the structures around and the villagers.

**Scientific Study on Slope Stability :** This is an existing Mines of RCL in operation since 2005 onwards with proper benches in compliance with approved Mining Plans/Schemes. The stability analysis and determination of 'Factor of Safety (FOS)' in the present investigation was carried out using Limit Equilibrium Method which is more than 1.3 and is the minimum recommended value required for stability of rock slopes. The following Safety measures will be implemented :

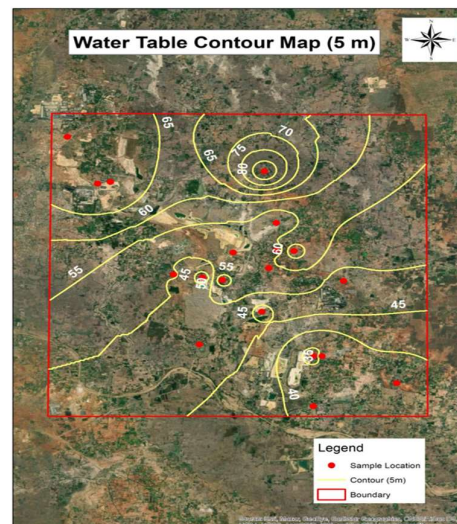
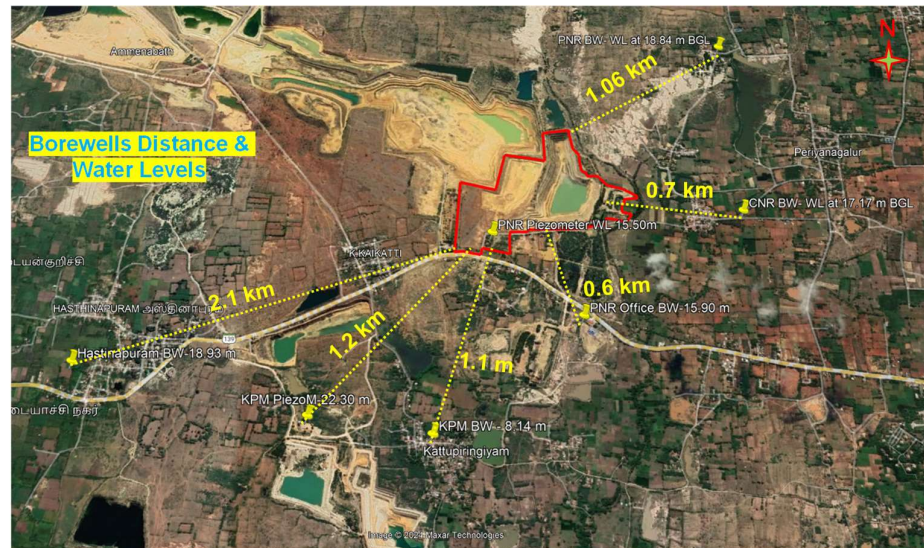
- ✓ The pit should be provided with garland drain/ bund / barrier on the upper surface of pit to divert the run-off of rainwater away. It should be kept effective during the monsoon.
- ✓ The open tension cracks should be filled with permeable material. This filled material should be consolidated by dozer. At the top, any impermeable material has to be spread.

**Land Environment :** Industrial/Mining activities are being carried out in an extent of **766.965 Ha** in the Impact Zone. **There is no additional Land requirement for the Proposal.** There is **Drilling & Blasting** proposed and thus, vibration impact due to mining will be there. Also, as the entire Top Soil & OB Dumps will be rehandled for Backfilling & Reclamation of mined out voids, there will be no Dump in the Lease. Area of excavation at the end of the life of the mine will be 39.17 Ha, out of which about 14.00 Ha will be Backfilled & Reclaimed and balance 25.17 Ha will be left out as water reservoir for recharging the ground water table in the vicinity.

**Traffic Impact :** Limestone Transportation of Ramco Mines, TANCEM Mines and partly Dalmia Mines (meant for Ariyalur Plant) is through SH-139 towards Ariyalur Bypass (in western part). The existing traffic volume in the Project vicinity was found to be **5,445.1 Passenger Car Units**

**(PCUs)/day.** In the Post-Project Scenario, there will be an addition of **468 Vehicle** (in 2 ways) due to the Project. Cumulatively, the traffic volume in the Project vicinity will be **6,410.7 PCU/day**. **The net increase (cumulative) will be 965.6 PCU/day.** The existing Roads/SH are adequate to handle the proposed traffic volume due to the Project. Adequate parking area is provided in the Mine Area. Facilities for **drivers (rest room, toilet, etc.)** are also provided.

**Water - Scientific Study on Hydrogeology :** On the monitoring day, the water level was observed in 6 Borewells in the PNR-A Mine vicinity (within 2 km). The levels were found to be 8.14 m BGL to 22.30 m BGL while it was 15.50 m BGL at PNR Mine. The monitored water levels in the Study Area are brought to Reduced Levels (RLs) for comparison and 'Water Level Contours' are plotted in Google Earth Imagery and appended. Ground Water-table in the District ranges from 23.0 m to 28.7 m with average level at 25.4 m BGL during Post-monsoon and 25.6 m to 31.7 m with average level at 29.2 m BGL during Premonsoon Period. Thus, no impact on the ground water levels of nearby Borewells due to mining on account of poor transmissivity.





There is no nalla crossing in the mine vicinity. Seasonal River Marudaiyar drains the region (flows at 4.9 km in the south). Seasonal Nallah Kallar River flows at 2.9 km in northwest. The entire mine pit water collected & pumped from Settling Tanks, after 20 KLD consumption for Mine use, is being utilised for Irrigation (Agricultural) activities in eastern side for about 46 Ha. There is no impact due to the Surface waters due to mining.

RCL has engaged the **Department of Remote Sensing, Bharathidasan University, Trichy** for '**Integrated Hydrological Investigations-A Geospatial Approach**' in and around their Mine Lease Areas in Ariyalur Region. Also, the EIA Coordinator and Officials of M/s. Thrust Geo-consultants Private Limited, an **Accredited Ground Water Professionals** for 'Hydrogeological Report for Mining Projects' by Central Ground Water Authority (CGWA) have carried out the Hydrogeological Survey including a Pumping Test during 18.12.2023 and submitted the Report. The Transmissivity 'T' value of the Limestone Aquifer is estimated as 2.39 m<sup>2</sup>/day. The limestone aquifer is observed to be very low in terms of transmissibility and hydraulic conductivity. **The radius of zone of influence is 317 m which falls within the mining lease area. The anticipated cone of depression in such aquifers with low T values will be highly localized, and does not spread beyond the Mine due to poor permeability of limestone aquifer.**

Mine Pits dewatering quantity was about 754 KLD during Apr. 2023-Mar. 2024 Period. The pumped out water from Settling Tanks, after 20 KLD consumption for Mine use, is being utilised for Irrigation (Agricultural) activities in eastern side for about **46 Ha. About 26 Families are the beneficiaries.** Thus, **Mine Pits water is gainfully utilized.** On Amalgamation of the Mine, about 1245 KLD mine pit seepage water realization will be there. It is about 65.12% increase to the existing discharge of 754 KLD. As in current practice, the pumped out water from Settling Tanks, after 20 KLD consumption for Mine use, will be utilised for Irrigation (Agricultural) activities in eastern side.

**Ambient Air Quality** : The Drilling & Blasting, Excavating, Loading, Unloading, Transporting and Rehandling activities would generate both fugitive dust emissions and smoke from Heavy Earth Moving (HEM) Machineries and Transporting Tippers. Fugitive emissions are predicted by using standard equations given in 'Indian Mine and Engineering Journal' and suggested by USEPA (Emission Factors as referred in AP-42) for Mining and Allied activities.

**AERMOD View** Software is used for Predicting the maximum Ground Level Concentrations (**GLCs**) including **Transportation Impact**. The predicted maximum GLC-PM10 for cumulative operation of Mining activities is 0.062 ug/m<sup>3</sup> and found to be confined locally i.e. within 1.0 km radius from the boundaries. Also, **adequate Buffer Level available (55.34%)** in the Air Environment for the Proposal. Other pollutants SO<sub>2</sub> and NO<sub>x</sub> emissions due to mining activities and their Predicted values are found to be low and are not reported.

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**Noise Levels :** The mining operations are being carried out by fully mechanized method with the help of Excavators and Tipping Taurus combination. The blast induced ground vibration is controlled & maintained within permissible limits by using milli second delay detonators (MSDD) and NONEL shock tubes. In general, the work force is exposed to <85 dB(A) levels during the 8-hours Shift. Noise level at the nearest Lease boundary will be <55 dB(A) during day times and <45 dB(A) during night times and which will be within the MoEF&CC Norms for Residential and Rural Areas.

**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 Mines & Mineral bearing areas, 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.

**Socioeconomics :** Project employs about 33 persons directly and 50 persons indirectly. The Project Cost is **Rs.9.00 Crores**. Now, about **Rs.21.00 Lakhs** has been allotted as **Corporate Environmental Responsibility (CER) Budget** in compliance with MoEF&CC OM dated 01.05.2018 for execution within 2 years period. Also, as per MMDR Act 2015, 30% of Royalty Amount of **Rs.38.04 Crores will be earmarked for District Mineral Foundation (DMF)** and the amount will be spent for benefit of local villages.

RCL is undertaking various CSR activities, @ **Rs.1.00 Core per annum**, related to health, education, drinking water supply, sanitation, bio-toilets for individual household, infrastructure development activities, construction of bus shelters, road repair work, building class rooms, etc. for the nearby villages which will be continued.

**Occupational Health :** RCL is committed to provide a Safety & Healthy working conditions. RCL's objectives are : to achieve zero accident and safe work environment. The First Aid Box is made available for immediate treatment. First Aid Training is imparted to the selected employees regularly. Personal Protective Equipment (PPEs) are provided for all employees working in the Mines. Adequate training on safety and health aspect has been provided in RCL's Vocational Training Centre. RCL is also providing the ergonomic support in work comfortness with periodical review.

An Occupational Health Centre (OHC), headed by Occupational Health Physician, is run by the Company at Govindapuram Plant. Occupational Health Surveillance Programme is being conducted for the workers periodically and records are maintained. Adequate care is exercised to detect early incidences of Occupational diseases, if any, for prompt treatment and cure.

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#### 4.0 Environmental Monitoring Programme

RCL has **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 accredited external agency. For the Lease, periodical monitoring of Ambient Air Quality (3 locations), Fugitive emissions/Workzone Air Quality (4 locations), Ambient & Workzone Noise Levels (4 locations), Water (4 Surface & 4 Ground waters along with Mine Pit water) and Soil Quality (3 Locations) shall be undertaken and reported to Authorities.

#### 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. RCL management is able to deal with the situation efficiently to reduce confusion keeping in view of the likely sources of danger in the mine. In case of eventuality and sudden occurrence of abnormalities during mining activity leads to any danger for persons and machinery in the mines, the following person will be coordinating to restore the normalcy of the situation.

Mr. Madhusudhan Kulkarni  
Sr. Vice President (Mfg.)  
The Ramco Cements Limited,  
Govidapuram Works,  
Sendurai Road, Ariyalur District  
Ph.No. : 04329-294400.

The possibility of 'Offsite Emergency' situation are ruled out as RCL mine is not likely to pose any offsite emergency and hence does not call for any preparation of an off-site emergency plan.

#### 6.0 Project Benefits

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

**Financial Benefits :** The Project Cost is **Rs.9.00 Crores**. As per MMDR Act 2015, 30% of Royalty Amount of **Rs.38.04 Crores** will be earmarked for **District Mineral Foundation (DMF)** and the amount will be spent for benefit of local villages in the Lease Area.

**Social Benefits :** Project employs about 33 persons directly and 50 persons indirectly. About **Rs.21.00 Lakhs** has been allotted as **Corporate Environmental Responsibility (CER) Budget** in compliance with MoEF&CC OM dated 01.05.2018. Also, DMF amount will be contributed.

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## 7.0 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.

### 7.1 EMP for Construction Phase

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

### 7.2 EMP for Operation Phase

#### Land Use :-

- ❖ No Blastings shall be carried out during night times and overcast conditions.
- ❖ Vibration Studies/Monitoring has to be carried out whenever Blastings are carried out.
- ❖ Vibration Parameters viz. Peak Particle Velocity (PPV) and Noise Levels during Blastings shall comply with DGMS Norms for Residential Areas.
- ❖ There will be no Solid Wastes Dump in the Lease at Conceptual Stage.
- ❖ OB in dumps may be gainfully utilized for reclaiming the mined out voids.
- ❖ Backfilled Mine Voids are to be Afforested with local Tree species and Reclaimed early.
- ❖ Maintenance of garland drains around the Lease boundaries has to be carried out periodically.

#### Traffic Impact :-

- ❖ Regular wetting of haul roads has to be undertaken to arrest the fugitive emissions.
- ❖ Tippers are to be fully covered with Tarpaulin to avoid any spillage on transportation.
- ❖ 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 for the Tippers which has to be checked periodically.
- ❖ Restriction of Truck parking in the Public Road has to be implemented.
- ❖ Regular and preventive maintenance of transport vehicles has to be ensured.
- ❖ Effective Green Belt with thick foliage has to be developed and maintained.
- ❖ Security Guards are to be placed at the Public Road-Mine Haulage Road Junction to handle the inward and outward vehicles.

#### Air Environment :-

- ❖ Controlled Blasting has to be carried out and during day times only.
  - ❖ No Blasting is carried out during overcast conditions.
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- ❖ Water sprinkling on the Mining areas, loading point, haul roads, etc. has to be carried out.
  - ❖ Covering of Trucks/Tippers with tarpaulin shall be ensured during Mineral transportation.
  - ❖ Over loading of Tippers has to be avoided to control the spillages during transportation.
  - ❖ Periodical maintenance and replacement of worn out accessories in the mine equipments.
  - ❖ Tippers are to be maintained periodically.
  - ❖ Periodical check up of vehicles for 'Emission Under Control' Certificate is to be ensured.
  - ❖ Effective Green Belt with thick foliage has to be developed along boundaries and haul roads.
  - ❖ Periodical Air Quality Monitoring shall be carried out and Reports submitted to the Authorities.

#### **Noise Levels :-**

- ❖ The noise and vibration generated due to the blasting operations shall be kept well within the limits by using milli-second delay electric detonators and by using Non-electric initiation system of blasting which completely eliminates air-blasts and thus reduces noise due to blasting.
- ❖ Deploying mining equipments shall be with in-built mechanism for reducing noise.
- ❖ Provision of silencers to modulate the noise generated by the machines.
- ❖ 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 along roads and around lease boundary will act as acoustic barriers.
- ❖ Periodical Noise Monitoring shall be carried out and Reports submitted to the Authorities.

#### **Water Environment :-**

- ❖ The increased Mine Pit Water has to be utilized gainfully by increasing the supply to nearby Villages for Domestic Consumption as well as to agricultural activities nearby as in the current practice.
  - ❖ Mine Pit Water shall not be directly discharged without ensuring its quality.
  - ❖ Ground Water NOC for Dewatering has to be obtained/renewed from SGWA/CGWA Authority.
  - ❖ Periodical Monitoring of Water Level Data from existing Piezometer and nearby Wells in the vicinity has to be carried out along with the water quality.
  - ❖ Effective Afforestation in Backfilled Areas, with native species, is to be done.
  - ❖ Garland Drains and Settling Tanks are to be maintained and desilted periodically. The desilted quantity from the Garland Drains has to be used for Green Belt/Afforestation.
  - ❖ Ground Water Levels and Water Quality are to be periodically monitored at the identified Borewells & Dugwells in the Mine vicinity.
  - ❖ The monitored Water Quality data are to be periodically submitted to the IBM and with half-yearly Compliance Reports to SEIAA-TN & Regional Office, MoEF&CC, Chennai.
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### 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.
- ❖ Afforestation in backfilled & reclaimed areas shall be undertaken.
- ❖ 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. Carbon can remain stored in soils for millennia, or be quickly released back into the atmosphere. Climatic conditions, natural vegetation, soil texture, and drainage all affect the amount and length of time carbon is stored.

### Social 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, conducting free medical camps, etc.

### Occupational Health 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.
  - ❖ Standard operating procedures for all operations with respect to occupational safety and health are to be in place.
  - ❖ Required Personal Protective Equipments for the Mine employees are to be provided.
  - ❖ Provision of ergonomically designed seats for drivers/operators has to be ensured.
  - ❖ Provision of illumination facilities are to be made at proper places of mines for ease of working during night times.
  - ❖ Work comfort and its periodic review by a Committee is to be ensured.
  - ❖ Provision of Rest Shelters at Mines has to be made.
  - ❖ Provision of cool drinking water to employees has to be made.
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**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.9.00 Crores**. Proposed **EMP Capital Budget will be Rs.20,50,000/-** (excluding Budget for addressing PH issues) and **EMP Operating Cost will be Rs.11,27,750/- per Annum**. Also, about **Rs.21.00 Lakhs** has been allotted as **Corporate Environmental Responsibility (CER) Budget** in compliance with MoEF&CC OM dated 01.05.2018 for execution.

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