DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR

THANGHUNAI LIMESTONE QUARRY PROJECT OF 0.148 MTPA (RATED/PEAK RATED) CAPACITY AT THANGHUNAI, NONGTALANG ELAKA, AMLAREM C&RD BLOCK, DISTRICT: WEST JAINTIA HILLS, MEGHALAYA

EXECUTIVE SUMMARY

Project Proponent: Smt. Plenty K Pyngrope

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NABET Category 'A' Certified Organisation [Sector 1 (a) (i)]
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Executive Summary

1. INTRODUCTION

The applicant for Thanghunai Limestone Quarry - Smt. Plenty K Pyngrope, has obtained the Letter of Intent vide No. **JH/PKP/ML/LS/2018-19/959/B/920**, dated **16/01/2024** over an area of **3.0 ha** at Thanghunai, Nongtalang, West Jaintia Hills, Meghalaya (**Refer Annexure 7**).

The Divisional Forest Officer, Jaintia Hills Territorial Division, Jowai issued letter vide No. **JH/PKP/ML/LS/2018-19/959/B/826** dated **22/12/2023** stating that the proposed project falls under a non-forest land category (**Refer Annexure 6**).

The Modified Mining Plan with Progressive Mine Closure Plan of Thanghunai Limestone Quarry was approved by the Divisional Mining Officer, Directorate of Mineral Resources, Meghalaya, Jowai vide letter No. **DMO-J/78/MM/Mining Plan/2022-23/20** dated **31/01/2024** (**Refer Annex 8**).

The project proponent has also obtained a cluster certificate from the Divisional Mining Officer, West Jaintia Hills, Jowai vide letter No. **DMO-J/78/MM/Mining Plan/2022-23/21** dated **31/01/2024** (**Refer Annexure 9**). As per the cluster certificate, seven limestone projects or mines with a total area of 21.86 ha are lying within 500 m from the periphery of this mining lease area.

State Environment Impact Assessment Authority (SEIAA) of Meghalaya recommended the Terms of Reference ToR for the preparation of the EIA/EMP report and subsequently issued ToR vide File No. **ML/SEAC/SEIAA/PP/WJH/18/2024** dated **3rd July 2024** to Thanghunai Limestone Quarry (**Refer Appendix 1**).

The bounding latitudes of the project area are 25°13'03.48"N to 25°13'12.18"N and bounding longitudes are 92°04'43.48"E to 92°04'50.27"E with a maximum elevation of 719 mRL and minimum

elevation of 709 mRL. The area falls in the Survey of India Toposheet No. 83C/4 (Restricted). The lease area forms a part of the individual owned land taken on lease.

The estimated total balance mineable reserve within the leasehold area is approximately 1621598 Tonnes. Targeted peak production would be 148908 TPA. A few important details of the approved Modified Mining Plan with Progressive Mine Closure Plan are depicted in the **Table 11.1** below:

Table 1.1: Brief details of the project as per the approved Modified Mining Plan with Progressive Mine Closure Plan of Thanghunai Limestone Quarry

Aspect	Value	Aspect	Value
Allotted Mine Lease Area (Ha.)	3.0	**Plan Period (Years)**	5
Total Mineral Reserve (Tonnes)	1621598	**Total Production (T)**	16,21,598
Life of Mine (Years)	12	**Total Working Days/Year**	300
Manpower	37	**Mining Method**	Opencast, Semi-mechanised

1.1. MINING METHOD

- Opencast semi-mechanized mining will be carried out in the area as the deposit is massive and compact in nature.
- Jack hammer drill machine will be deployed for drilling of shot holes ranging from 39 mm to 34 mm diameter. Breaking of limestone at the required site will be done manually.
- For blasting of holes with burden and spacing of 0.8 m x 1.0 m in a staggered grid pattern would be adopted.
- Muffle blasting will be adopted as a precautionary measure to control fly rocks. Excavation and handling of gritty soil will be done by excavator if necessary.
- The benching system 6m x 6m will be practiced in the area in order to comply with the provisions of Metalliferous Mines Regulations, 1961. Bench slope angle for stabilization of the benches will be maintained at 45°.

1.1.1. Raw Materials Required

Inputs	Approx. quantity required (KLD)
High Speed Diesel Water Requirement	
Diesel	~0.1
Water Requirement	
Water for Drinking and Domestic Purposes	~2.0 Water requirement for drinking & domestic per person is 50 L/day. Therefore, requirement is 37x50 = 1850 L/day (~2 KLD)
Dust Suppression	3.0
Greenbelt Development/Plantation	3.0
Cleaning of HEMMs, and other machinery	2.0
Total	**10.0**

1.2. LOCATION OF THE PROJECT

Thanghunai Limestone Quarry is located in Thanghunai, Nongtalang Elaka, Amlarem C&RD Block, District: West Jaintia Hills, State: Meghalaya. The Location Plan of the project is provided in **Figure 1.1** below:

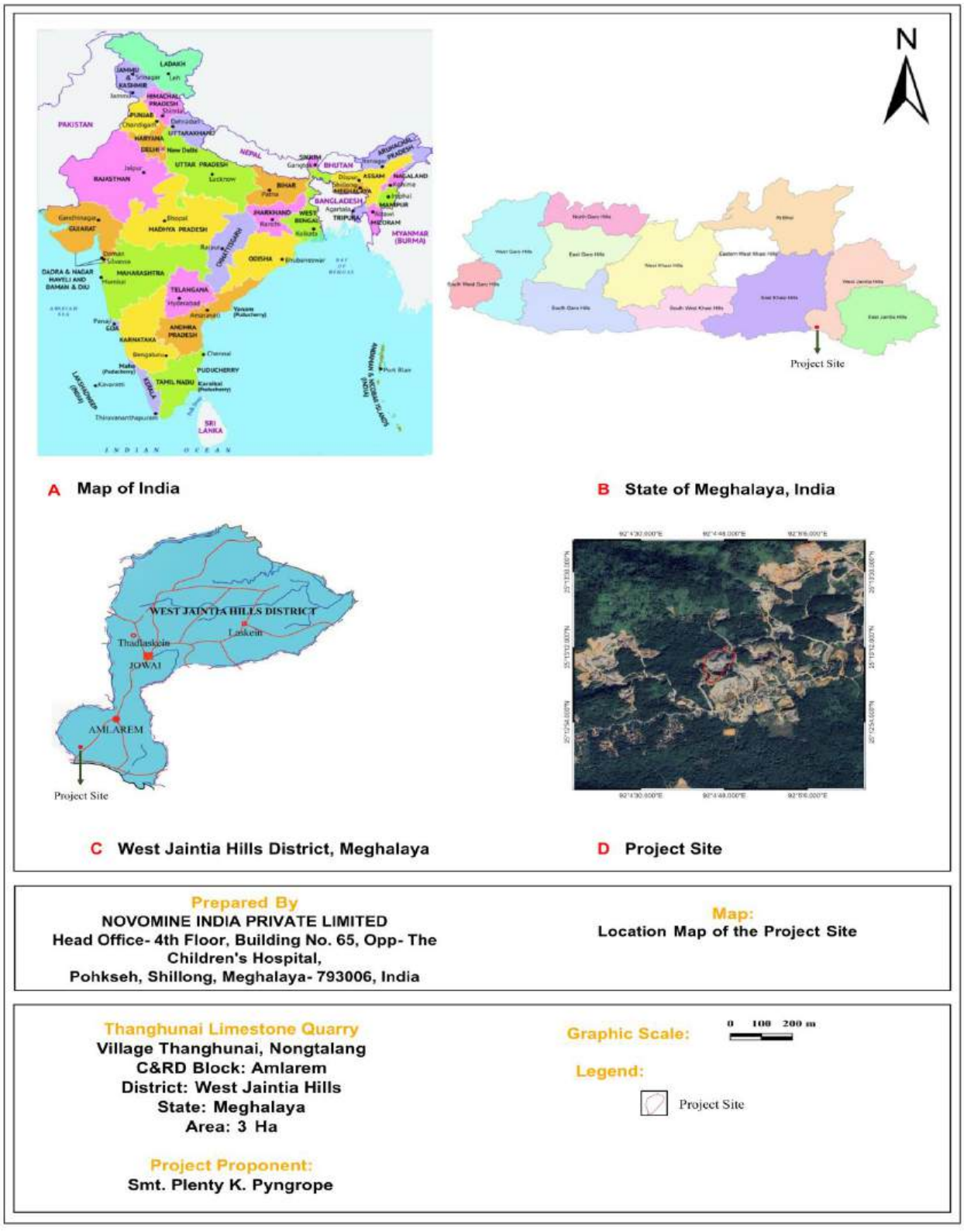

Fig 1.1: Location Plan of Thanghunai Limestone Quarry

2. DESCRIPTION OF ENVIRONMENT

The baseline data has been collected from December 2023 to February 2024. The details area given below:

2.1. MICRO-METEOROLOGICAL PARAMETERS

Temperature: Temperature of the area varied from 8.4°C to 28.1°C.

Relative Humidity: Relative Humidity of the area varied from 23.7% to 100%.

Wind Speed: Maximum wind speed was 40.7 Km/hr with average wind speed was 5.65 Km/hr. Calm wind was 12.73%.

2.2. AMBIENT AIR QUALITY (AAQ) RESULTS

Samples were collected from 6 sampling locations during the baseline data collection period. The results are given below:

Particulate Matter (PM_{10})

The results of PM_{10} of all the locations are showing variations from 48.7µg/m^3 in the Pamtbuh Village to 68.0 µg/m^3 at the project site. Hence, the results are within the limits of the National Ambient Air Quality Standards (NAAQS).

Particulate Matter ($PM_{2.5}$)

The results of $PM_{2.5}$ of all locations are showing variations from 23.5µg/m^3 in the Pamtbuh Village to 41.0 µg/m^3 at the project site. However, the results are within the limits of the National Ambient Air Quality Standards (NAAQS).

Gaseous Pollutants

The results of SO_2 concentration at all locations are showing variations from 6.4µg/m^3 in the Nongtalang College (Permanent Campus) to 14.9 µg/m^3 at the project site. However, the results are within the limits of the National Ambient Air Quality Standards (NAAQS).

The results of NO_2 concentration at all locations are showing variations from 13.2µg/m^3 in the Nongtalang College (Permanent Campus) to 20.8 µg/m^3 in the project site. However, the results are within the limits of the National Ambient Air Quality Standards (NAAQS).

Ambient Noise Level (ANL) Results

Samples were collected from 6 sampling locations during the baseline data collection period.

The results are given below:

The ambient noise level at day time varied from 43.5 dB (A) at Pamtbuh village to 63.1 dB(A) at the project site which is within the standard limits of an Industrial area of 75 dB(A). The night time noise result varied from 37.9 dB(A) at Pamtbuh village to 52.6 dB(A) at the project site which is within the standard limits of an Industrial area of 70 dB(A).

2.3. WATER QUALITY RESULTS

The samples were collected from 4 ground water locations and 3 surface water locations (2 water sources). The results are given below:

Groundwater Results

All results comply with the standard drinking water standards of India, i.e., IS: 10500:2012.

Surface Water Results

The surface water quality results of the upstream and downstream water sampling locations of Wah Umngot and a sampling location of Wah Amkshar are within the IS standard 2296:1992 and prescribed CPCB Water Quality Criteria Class-C.

2.4. SOIL QUALITY RESULTS

Samples were collected from 5 sampling locations during the baseline data collection period. The results are given below:

pH ranging from 6.34 to 6.82 in the study area. Bulk density of the study area ranges between 1.34 gm/cm^3 S3 (Amtapoh) to 1.56 gm/cm^3 at S1 (Project Site). Electrical conductivity of the soil samples is found to be average and ranges from 340 µmhos/cm to 371 µmhos/cm. Organic carbon of the soil samples varies from 1.42% in S2 (Nongtalang) to 1.70% in S5 (Pantbuh). Nitrogen content in the surface soil of the study area varies between 24.8 mg/100g at S4 (Amlarem) to 28.7 mg/100g at S3 (Amtapoh). Available Phosphorus ranges between 0.80 mg/100g at S2 (Nongtalang) to 8.3 mg/100g at S5 (Pantbuh). Potassium content in the study area ranges between 0.53 mg/100g at S1 (Project Site) to 7.0 mg/100g at S2 (Nongtalang).

Based on the provided data, it can be inferred that the soil in the study area has moderate fertility, indicated by sufficient levels of phosphorus and Organic Carbon for plant growth and

foliage development.

2.5. ECOLOGICAL STUDIES

Flora: The flora found in the whole of the study area are representative of mainly Deciduous/Semi-Deciduous Forest and Scrub Forest. The complete list of Flora in the Study area has been given in Chapter 3.

Fauna: During study, various types of fishes, amphibians, reptiles, avifauna and mammals along with invertebrates were recorded. A list of the faunal diversity of the study area is given in Chapter 3.

2.6. DEMOGRAPHY AND SOCIO-ECONOMIC STUDY RESULTS

The study area encompasses 66 villages within the buffer zone. The study was conducted using a combination of primary surveys and secondary data sourced from the Census of India 2011. Summarized details are given below:

Population

The study area has a total population of 28902 residing in 5211 households. On average, each household consists of 5.55 members. The gender ratio in the study area was 1009 in 2011.

Social Structure

In the study area, the Scheduled Tribes (ST) population accounts for 89.56% of the total population, while the Scheduled Caste (SC) make up 1.54% of the total population.

Literacy

Within the study area, the overall literacy rate is 59.39% of the total population. Among the literate population, male literacy stands at 49.25%, while female literacy is recorded at 50.75%.

The project will provide direct employment opportunities for 37 individuals, with a focus on hiring local residents in addition to fulfilling any necessary statutory employment requirements.

3. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section summarizes the pollution potential of the proposed project, possible impacts on the surrounding environment during its operational phases and the environment management plan proposed for prevention and control of pollution.

3.1. IMPACTS DUE TO AIR POLLUTION AND THEIR MITIGATION MEASURES

The air borne particulate matter is the main air pollutant contributed by opencast mining with drilling and blasting. Various emission sources are identified from the proposed mining operations. Therefore, water sprinkling and mist spraying via APCEs shall be done and workers will be given protective gears such as Personal Dust Samplers, full PPE which shall include protective goggles, dust masks, gloves, safety helmets, and safety shoes.

3.2. IMPACTS DUE TO NOISE POLLUTION AND THEIR MITIGATION MEASURES

Due to mining operations such as machinery, drilling and blasting for mine development, excavation, transportation and sizing of limestone, it is anticipated that noise levels will increase. Proposed mitigation measures include maintenance of blasting parameters such as burden, spacing, charge per delay, sub-grade drilling, etc. Controlled blasting techniques such as pre-split blast, use of NONEL, etc. will be followed to minimize noise and generation.

Further, engines of HEMM and other mine machinery and transport vehicles shall be properly maintained to reduce noise generation. Provision of incorporating silencers into the dumpers and other vehicles shall be suggested to control noise propagation. Acoustic enclosures shall be provided in the DG sets. All the workers will be provided with personal PPE such as ear plugs and ear muffs for noise attenuation.

The greenbelt development around the ML area shall also act as a noise barrier.

3.3. IMPACTS DUE TO WATER POLLUTION AND THEIR MITIGATION MEASURES

The main sources of water pollution are mine discharge and surface run-off containing suspended solids. The mine discharge water will be passed through settling ponds for removal of suspended solids.

About 10 KLD water is required for various requirements of the mine like dust suppression (3 KLD), HEMM washing at workshop (2 KLD), plantation (3 KLD) and drinking and domestic consumption (2 KLD).

As the system involved is a closed circuit, there is no scope for process wastewater generation. Hence, there will be no wastewater discharge outside the mine premises and no contamination of surface and/or groundwater bodies is anticipated. To augment the artificial recharge of groundwater, a detailed Rainwater Harvesting and Artificial Recharge of Groundwater Plan is included as **Annexure 12** to this report.

3.4. IMPACTS DUE TO SOLID WASTE GENERATION AND THEIR MITIGATION MEASURES

The entire product of limestone will be used as building materials for construction activities. During the project's life, 6519 Tonnes of gritty soil will be removed which will be stacked in a specific stack yard and will be used for haul road dressing and plantation. Moreover, to prevent erosion during rainy as well as windy season, the stack yard will be planted with small varieties of plantation and grasses to prevent such erosion.

3.5. IMPACTS ON LAND AND THEIR MITIGATION MEASURES

The Land Use pattern in the lease area may change as a result of different phases of mining operations. Land reclamation shall be done along with ongoing mining operations in order to minimise the negative consequences. After the end of mining operations, a total area of 0.56 Ha. of land within the safety barrier of the ML area shall be developed into a dense greenbelt area, and the remaining backfilled areas will be revegetated by plantation activities. Any remaining mine void shall be converted into a water body – which may act as a potential source of surface water and recharge for ground water in the future for the neighbouring communities *(Sengupta,*

2015).

3.6. IMPACTS ON ECOLOGY AND BIODIVERSITY

As the mining activity is restricted to the core zone, no significant impact on the surrounding ecology of the area is anticipated. With the development of greenbelt around the mine, aesthetics of the area shall be improved.

3.7. IMPACT ON THE SOCIO-ECONOMIC ENVIRONMENT

The project will enhance direct and indirect employment in the area. Therefore, overall economic development is likely to improve after the commencement of the project.

4. ENVIRONMENTAL MONITORING PROGRAMME

A systematic environmental monitoring programme will be implemented within the mining lease area and a 10 km radius study area. A comprehensive network for monitoring has been developed, considering factors such as pollution sources from mining operations, wind direction, drainage pattern, topography, and the biological environment. Sampling locations have been identified accordingly to ensure comprehensive coverage and accurate assessment of environmental parameters. The Environment Monitoring Cell (EMC) will be responsible for successful implementation of the monitoring program.

5. ADDITIONAL STUDIES

Risk Assessment & Disaster Management Plan: Mining will be carried out by semi-mechanized opencast mining, with mining equipment as Jack Hammers, Hydraulic Excavator, Air Compressor, Rock Breaker, tippers etc involving drilling and blasting. Mining will be done under strict supervision hence the rate of operational risks is minimal.

Rehabilitation and Resettlement: There is no human habitation at the project site. So, there will be no rehabilitation and resettlement issue.

6. PROJECT BENEFITS

The mining project has a substantial positive impact on the socio-economic environment, supporting the overall development of the area. It contributes significantly to economic growth by generating direct employment for 37 individuals and creating numerous indirect employment opportunities for the local community.

7. ENVIRONMENT MANAGEMENT PLAN

An EMP is a site-specific plan developed to ensure that the project is implemented in an environmentally sustainable manner. An effective EMP should ensure the application of best practice environment management to a project. Hence, to ensure effective environmental protection measures throughout and after the commissioning of the proposed mining project, the preparation of an Environmental Management Plan (EMP) is necessary. The EMP serves as a comprehensive framework for formulating, implementing, and monitoring environmental safeguards.

By the end of the lease period, green belt development programme will be carried out over an area of 0.56 ha. Native species will be considered for the plantation purpose.

The following objectives have been incorporated into the design of the EMP in order to mitigate the adverse environmental effects which will be caused due to mining:

- Biological reclamation and rejuvenation of the mined-out areas and active points of the mine lease area to the maximum possible extent possible, in line with the economy of mining operations, the drainage pattern, geological stability, vegetation, etc.;
- Minimal disturbance to the water environment and existing ecological status of the area and conservation of the same;
- Efforts towards improvement of the air quality, water quality and the land during and post mining activities; and
- Establishment of an environment which is conducive to improve the socioeconomic situation in the area.

7.1. ESTIMATED COST OF THE PROJECT

The proposed Thanghunai Limestone Quarry over an area of 3.0 Ha. is privately owned by the applicant Shri Plenty K Pyngrope. The estimated project cost is around **₹25 Lakhs**. The project proponent will bear 5% of the total estimated Project Cost (approx. ₹25 L) as mentioned in the Pre-Feasibility Report, which comes to **₹1.25 L** to be spent under **Corporate Social Responsibility (CSR) plan** annually to mitigate impacts due to this mining project and concerns raised during public consultation. A tentative breakup is given in **Table 1.2** below:

Table 1.2: Estimated Budget and Break-Up of Activities proposed for CSR

S. No.	Particulars	Expenditure (in ₹ Lakhs)
1	Organization of quarterly (every 3 months) health check-up camps for the mine workers and villagers of the nearby villages of Nongtalang, Amjajer Roko, and others	0.65
2	Tree plantation drive for avenue plantation works on both sides of the roads and in community areas in the nearby village areas	0.6
Total		**1.25**

8. CONCLUSION

From the detailed analysis of the environmental impacts and the mitigation measures proposed in the EMP, it is anticipated that no significant deterioration in the eco-system is likely to occur due to this limestone mine. On the other hand, the project is likely to have several benefits like improvement in indirect employment generation and economic growth of the area, by way of improvements in the infrastructure facilities and better socio-economic conditions.