

***EXECUTIVE
SUMMARY***

for

**“Brishyrnot
Limestone Deposit-
II”**

At

**Village: Brishyrnot,
Tehsil: Khliehriat, District:
East Jaintia Hills, State:
Meghalaya.**

ToR letter no:

IA-J-11015/17/2019-IA-II(
NCM)

dated: 18.06.2024

Mining Lease Area- 65 ha.

Cost of Project - Rs 33.96
Crore

Item & Category - 1(a), B

Maximum Proposed

Production of Limestone -
3.0 million TPA, Shale - 0.2
million TPA & 0.33 million
TPA of waste/OB including
soil.

Baseline Season: March, 2023
to May 2023

Laboratory Assigned: M/s
Perfact Researchers Pvt. Ltd.

Project Proponent

STAR CEMENT MEGHALAYA
LIMITED

Registered Address- Unit No.
DSM, 517-521, 5th floor, DLF
Tower, Shivaji Marg, Najafgarh
Road, Delhi-110015

Contact Person - Mr. Pankaj
Kejriwal

Designation - Director

Phone no. - 9811772451

Email-dbansal@starcement.co.in

Environmental Consultant

Perfact Enviro Solutions Pvt.
Ltd. (PESPL)

NABET Registered List of
Accredited Consultant
Organisations/
NABET/EIA/2225/RA 0284
(Rev. 01)

Registered Address:- 5th Floor,
Sector 3, Rohini, New Delhi-
110085

Email- info@perfactgroup.in

Website-

www.perfactgroup.com

Phone- +91-11-49281360

EXECUTIVE SUMMARY

1.0 Introduction

This is a green field project. The proposal is for mining of limestone & shale from "Brishyrnot Limestone Deposit-II" at maximum production capacity of 3.2 MTPA (3.0 MTPA limestone & 0.2 MTPA shale) (ROM) and maximum excavation will be 3.53 MTPA (including 3 MTPA of limestone, 0.2 MTPA of Shale and 0.33 MTPA of waste/OB including soil) by fully mechanized opencast mining. Mining lease area encompasses 65 ha located at Village: Brishyrnot, Tehsil: Khliehriat, District: East Jaintia Hills, State: Meghalaya. Mining operations will be done by a fully mechanized opencast method utilizing heavy earth moving machinery (HEMM).

2.0 Project Description

The project is located at Village: Brishyrnot, Tehsil: Khliehriat, District: East Jaintia Hills, State: Meghalaya. The study area falls in the Survey of India Topo-sheet no. 83C/8 (Restricted) at Latitude: 25°09'51.010" N to 25°10' 18.600" N and Longitude: 92° 25' 09.717 " E to 92° 25' 55.894" E with maximum contour of 295 mRL and minimum contour of 95 mRL.

Letter of Intent/authorization order for mining lease has been granted in favor of Star Cement Meghalaya Limited vide letter no. MG.8/2023/376 dated 22th September, 2023 issued by the Govt. of Meghalaya Mining & Geology Department. Mining lease deed was executed on 02.05.2024 for 50 years up to 01.05.2074.

Land Holding certificate issued by Jaintia Hills Autonomous District council, Jowai vide holding no. LHC No. 286 of 2008 dated 25.08.2008

Approval of the Mining Plan along with PMCP under Rule 16(1) of MCR 2016 has been obtained from Indian Bureau of Mines, Guwahati vide letter no. MCDR-MPCP0CaFI/11/2023-GUH-IBM_RO_GUH dated 05.02.2024.

Non-Forest land certificate has been issued by Office of the PCCF (HoFF), vide letter No. MFG.39/42/NFLC/MINING/MMMCR /JH/Pt.I/19,130 dated 30.03.2023

Distance certificate of Narpuh Wildlife Sanctuary (ESZ & Boundary) has been issued by Divisional Forest Officer (Jaintia Hills Wildlife Division, Jowai) vide letter No. MWL/JH/299/Mining Plan/2022-23/1225 dated 03.03.2023

Mining Method

Mining of Limestone will be done by mechanized opencast method using HEMM with deep hole drilling & blasting. It is proposed to adopt fully mechanized opencast mining with heavy earth moving machinery (HEMM). The maximum height of benches will be kept at 9 m and working width of the benches will be 24 m. The salient points of mining are as ahead -

- Mining operation will be carried out by mechanized opencast method using HEMM with deep hole drilling & blasting.
- The material after blasting will be loaded by hydraulic excavators of about 2.6 m³ bucket capacity into dumpers/tippers of 25 tons carrying capacity for its transportation to crusher and waste dump yards.
- Working width of the benches in minerals will be 24 m for safe operation of mining machinery. The height of the bench will be 9 m.
- Since Limestone is hard rock, the individual benches will be sloped at 90° from horizontal.
- Overall Pit slope will be less than 45°
- Hydraulic drills with 115 mm dia will be used for drilling of blast holes.
- The blast holes will be drilled by keeping 4.5 m spacing and 3.5 m burden.
- Ammonium Nitrate Fuel Oil Mixture & Slurry Explosives (large diameter) will be used for blasting.
- Explosives along with non-electric detonators (NONEL) will be used for blasting.
- The haul road will be constructed with 1:16 gradient.
- Ultimate level of excavation will be 97 mRL in part area.
- There will be two shifts of 08 hours duration each for the mine to operate. Every shift will consist of 7 hours of productive work.

3.0 Description of the Environment

The baseline data has been collected from March 2023 to May 2023. The details are given below:

Micro-meteorological data:

- Temperature:** Temperature of the area varies from 14.13°C to 35.37° C.
- Relative Humidity:** The relative humidity varies from 21.0 to 99.44 %.
- Wind Speed:** Wind speed normally is in the range of 0.10 m/s to 6.43 m/s.

The longest spoke shows the predominant wind direction i.e. the wind blew from the SW.

The different colours of each spoke provide details of the speed of the wind in m/s from each direction.

Thus, most of the time, the wind is blowing at a speed between 0.50- 5.70 m/s.

Ambient Air Quality Results: Samples were collected from 06 sampling locations which are Onsite SW, Onsite NE, Brishyrnot, Sailkan, Umlaper, Lumshnong

Core zone

The mean value of PM₁₀ ranges from (59.27- 61.11 µg/m³) & PM_{2.5} ranges from (26.51-27.33 µg/m³), SO₂ ranges from (5.28-5.44 µg/m³), NO₂ ranges from (14.82 -15.28 µg/m³) & CO ranges from (0.26-0.27 mg/m³) which are within the limits of National Ambient Air Quality Standards (NAAQS). As per the Air Quality Index by CPCB, the air quality of the core zone is found Satisfactory in the Summer season.

Buffer zone:

The mean value of PM10 ranges from (64.77-75.53 µg/m³), PM2.5 ranges from (28.97-34.17 µg/m³), SO₂ ranges from (5.77-7.19 µg/m³), NO₂ ranges from (16.19-19.24 µg/m³) & CO ranges from (0.29-0.34 mg/m³) which are within the limits of NAAQS. As per the Air Quality Index by CPCB the air quality of the buffer zone is found to be Satisfactory during the sampling campaign. Thus, it can be concluded from the above results that all the parameters are within the range of the NAAQS and as per AQI by CPCB the buffer zone falls in the Satisfactory range.

Noise Quality results: Samples were collected from 08 locations which are Onsite SW, Onsite NE, Approach road, Brishyrnot, Sailkan, NH 6, Umlaper, Lumshnong

Core Zone (Industrial Area): N1, and N2: The ambient noise level during day time at the proposed project site varies from 52.60 dB (A) to 53.20 dB (A) which are within the standard limit of Industrial area ~ 75 dB (A). During night the noise level at the project site ranges from 44.40 dB (A) to 45.10 dB (A) which are within than the standard limit of Industrial area 70 dB (A).

Buffer Zone:**Commercial Area:**

N3: The ambient noise level at **Approach road** is 53.40 dB (A) which is within the daytime noise standard limit of Commercial area of ~ 65.0 dB (A). During the night the noise level was recorded 44.80 dB (A) which is within the night-time noise standard limit of ~ 55 dB (A).

N6: The ambient noise level at **NH- 6** is 62.80 dB (A) which is within the daytime noise standard limit of Commercial area of ~ 65.0 dB (A). During the night the noise level was recorded 57.90 dB (A) which is slightly higher than the night-time noise standard limit of ~ 55 dB (A). The increased noise level in night time is due to vehicular movement at the road.

Residential Area:

N4: The ambient noise level at **Brishyrnot** is 53.90 dB (A) which is within the daytime noise standard limit of Residential area of ~ 55.0 dB (A). During night the noise level was recorded 44.60 dB (A) which is within the night-time noise standard limit of residential area ~ 45 dB (A).

N5: The ambient noise level at **Sailkan** is 53.80 dB (A) which is within the daytime noise standard limit of Residential area of ~ 55.0 dB (A). During night the noise level was recorded 45.1 dB (A) which is slightly higher than the night-time noise standard limit of ~ 45 dB (A). The increased noise level is due to residential activity in the village.

N7: The noise level at **Umlaper** is 54.60 dB (A) which is within the daytime noise standard limit of Residential area of ~ 55.0 dB (A). During night the noise level was recorded 47.20 dB (A) which is higher than the night-time noise standard limit of ~ 45 dB (A). The increased noise level in the village is due to proximity to the national highway.

N8: The ambient noise level at **Lumshnong** is 52.10 dB (A) which is within the daytime noise standard limit of Residential area of ~ 55.0 dB (A). During night the noise level was recorded 43.90 dB (A) which is within the night-time noise standard limit of ~ 45.0 dB (A).

Water Quality Results The samples were collected from 11 stations, consisting of 7 groundwater and 4 surface water sites.

Ground water quality-

Water samples from 07 sites were collected from drinking water supplies including Brishyrnot, Sailkan, Umlaper, Lumshnong, Tongseng, Umbadoh and Umlong

Ground water quality- Core zone & Buffer Zone -

- ❖ The Total Hardness of the sampling locations range from 18 mg/l to 70 mg/l. Total Hardness of all sampling locations are found within the drinking water standards (IS:10500) i.e. 200 mg/l.
- ❖ The Alkalinity of all sampling locations are within the drinking water standards (IS:10500) i.e. 200 mg/l which range from 22 mg/l to 52 mg/l.
- ❖ The Calcium of the sampling locations range from 5.4 mg/l to 26 mg/l. The Calcium Concentration is within the drinking water standards (IS:10500) i.e. 75 mg/l.
- ❖ The Magnesium Concentration in the sampling locations range from 0.48 mg/l to 7.2 mg/l. Magnesium levels are found within the drinking water standards (IS:10500) i.e. 30 mg/l.
- ❖ The Total dissolved Solids range from 68 mg/l to 182 mg/l. Total Dissolved Solids of all sampling locations are found within the drinking water standard (IS:10500) i.e. 500 mg/l.
- ❖ The Chloride Concentration of all the sampling locations range from 6.80 mg/l to 42 mg/l. Chloride levels of all the sampling locations are within the drinking water standards (IS:10500) i.e. 250 mg/l.

Surface water quality- 04 locations namely Wah Lukha River (Upstream), Wah Lukha River (Downstream), Pond nearby site, Pond nearby Umlaper

Surface water quality- Buffer Zone -

- Surface water samples were derived from 4 locations in different surface water bodies within study area, analysis results of the same revealed that pH values amongst all samples varied in the range of 7.33 to 7.70, Total Hardness concentration varied in the range of 92 mg/l to 172 mg/l & maximum concentration was recorded at all the sampling location, TDS concentration varied in the range of 162 to 218 mg/l whereas all sample are under permissible limits. Electrical Conductivity was found to be ranging in between 352 to 412 $\mu\text{mho/cm}$.
- The surface water samples falls under class B (Outdoor bathing (Organized)) & D (i.e. Water is suitable for Propagation of Wildlife and Fisheries) as per CPCB surface water criteria.

Soil Quality Results- Samples collected from 08 sampling locations which are Onsite, Brishyrnot, Sailkan, Umlaper, Lumshnong, Tong seng, Umbadoh, Umlong

Core Zone: The samples collected from the core zone sites show that the soil texture Class in the core zone is Clay, Color is 5/3 Dull reddish, pH is 6.87, Amount of primary nutrients like Organic matter is 1.42 %, the available Nitrogen 102.40 mg/kg is low and available Potassium 41.20 mg/kg is low while the available Phosphorus 16.20 mg/kg is in high range. Thus it can be concluded that soil is average fertile in the Core Zone.

Buffer Zone: The samples collected from the buffer zone sites show that the soil texture Class in the buffer zone is Clay & Clay Loam, Color is 5/3 Dark Brown, 5/3 Dull reddish Brown, Brown (3/4), pH ranges from 6.90 to 7.70 and Amount of primary nutrients like Organic matter 0.25 to 2.12 %, the available Nitrogen 82.40 mg/kg to 122.60 mg/kg is lower in range, available Potassium 12.20 mg/kg to 41.20 mg/kg is low in range and the available Phosphorus 8.60 mg/kg - 19.10 mg/kg is medium to high in range, Primary nutrient profile shows that soil is average fertile due to the availability of low amount of nitrogen, available potassium.

Ecology and Biodiversity Results:

Mining can affect vegetation in the core zone. The mining activity will generate dust which may impact the nearby biological environment.

Flora of Core zone

In the core zone of the proposed greenfield project, the initial survey revealed minimal presence of flora and fauna due to the presence of numerous existing industries. Consequently, the variety of tree species was limited, with only a few observed, such as Duabanga grandiflora, Gmelina arborea, Tetrameles nudiflora, Albizzia spp, Betula alnoides, Terminalia spp, Ficus spp, Artocarpus spp, Broomstick grasses, Banana leaves, Bamboo, etc.

Flora of Buffer Zone: On the basis of primary survey and secondary data collected from the forest office a large variety of trees, herbs, shrubs, ornamental plants, weed and grasses found suited to climatic conditions.

Fauna of Study area: The total number of **15 Schedule I species** listed under the Wildlife Protection Act indicates their endangered status and necessitates conservation efforts. These species are Hog Badger (*Arctonyx collaris*), Golden Jackal (*Canis aureus*), Himalayan Serow (*Capricornis sumatrenis*), Leopard Cat (*Felis bengalensis*), Domestic Cat (*Felis catus*), Indian Grey Mongoose (*Herpestes edwardsii*), Hoolock Gibbon (*Hoolock hoolock*), Indian Crested Porcupine (*Hystrix indica*), Pangolin (*Manis pentadactyla*), Slow Loris (*Nycticebus bengalensis*), Indian Python (*Python molurus*), Indian Cobra (*Naja naja*), Indian Peafowl (*Pavo cristatus*), Great Pied Hornbill (*Buceros bicornis*), White-rumped Vulture (*Gyps bengalensis*).

Socio Economic Study Results:

- **Administrative structure of the study area:**

About 28 villages were selected for the secondary study. The total population of the study area is 12858 constituting 2294 households. Average sex ratio is 944 females to 1000 males.

- **Social Structure**

The proportion of Scheduled Caste (SC) population within the study area is 0.05 % and Scheduled Tribes (ST) population is 97.49 % and others are 2.46%.

- **Literacy**

Total literates in the study area are 68.04 % and total illiterates are 31.96%. Out of total literates' males are 68.53% and females are 67.54 %.

- **Occupation and Livelihoods**

Out of the total population, Total Working Population is 36.04% of which the main working population is 81.70 % whereas the marginal population is 18.30 %.

- **Primary Study**

Out of 28 villages in the study area total 05 villages are selected for the primary data collection. As per primary survey, the population of the surveyed villages is 2290 (Male 48.47%, Female-51.53%) as compared to PCA Census 2011 was 1744. Total number of households in the surveyed villages are 432 as compared to PCA Census 2011 were 319. The average occupancy is 5.30 persons per household as compared to PCA Census 2011 was 5.46. Sex ratio (number of females to per 1000 males) in the surveyed area is 1063. as compared to PCA 2011 Census was 1019. Total SC population in the surveyed area 0.40% as compared to PCA Census 2011 was 0.06%. Total ST population in the Surveyed area is (99.60%) as compared to PCA Census 2011 was 99.37%. Overall Literacy in the surveyed villages is 66% as compared to PCA Census 2011 where 48.42%.

Traffic Study Results:

There will be no transportation through public road. The material will be transported up to an existing crusher located at 1.8 km through the private road.

From crusher to cement plant transportation will be done through an already installed conveyor belt of 1.5 km.

4.0 Anticipated environmental impact and mitigation measures

Air Environment: To mitigate the adverse impact of mining requisite measures will be done such as water sprinkling, maintenance of machineries, Personal Protective equipment, regular health checkup of workers, Green belt development, wet drilling etc. Accordingly, Air quality reports have been prepared considering all the activities associated with mining. The development of green belt will be done in an

area of 2.71 ha in a safety zone of 7.5 m in the first five years of mining. Besides, At the end of the conceptual period, out of total 65 ha mining lease area, 61.93 will be mined out area, 2.71 ha will be afforested under 7.5 m statutory boundary, and 0.36 ha undisturbed area will also be afforested. The mined out area of 61.93 ha will be rehabilitated by bench plantation/grassification.

Noise Environment: The mining operation will be done by open cast mechanized mining method with drilling and blasting. Excavators will be used in excavation. To mitigate noise pollution at the mine mining site machinery will be maintained in good condition, mine workers will be given protective gears such as goggles, dust masks, gloves, helmets and earmuffs for protection. Blasting parameters will be optimized to obtain good fragmentation with least noise and vibration.

Water Environment: The water requirement for mine will be approx. 45 KLD which will be mainly consumed for drinking & domestic purposes, sprinkling, and plantation. The requirement of water will be sourced through water tankers from the company's cement plant.

Land Environment: Mining lease encompasses a total area of 65 Ha. Mining will be opencast mechanized with drilling and blasting. The maximum production capacity of 3.2 MTPA (3.0 MTPA limestone & 0.2 MTPA shale). The maximum excavation will be 3.53 MTPA (including 3.2 MTPA of limestone, shale and 0.33 MTPA of waste/OB including soil) from this mine. At the end of the conceptual period, out of total 65 ha mining lease area, 61.93 will be mined out area, 2.71 ha will be afforested under 7.5 m statutory boundary, and 0.36 ha undisturbed area will also be afforested. The mined out area of 61.93 ha will be rehabilitated by bench plantation/grassification.

Biological Environment:

- ❖ Green belt will be developed in the mining lease area to minimize the impact on flora and fauna.
- ❖ Fencing around the mine lease boundary will be done to restrict the entry of stray animals.
- ❖ For Wildlife Conservation plan the Chief Wildlife warden had a meeting with Industries and Government departments for preparation of Regional Conservation plan for the East Jaintia Hills district under the supervision and guidance of CWLW, Meghalaya and the cost for preparation and implementation of the Regional Conservation Plan may be shared by various project proponents on a proportionate basis keeping in view the likely impacts of each project on the wild life and their habitat. We also confirmed that we shall be part of the regional conservation plan and will pay the fee as determined for our project.

Socio- Economic environment: The project will enhance indirect employment in the area. Therefore overall economic development is much likely after the commencement of the project.

- **Impacts due to transportation:** Impact of transportation will be minimal as ROM will be transported by dumper/tipper to existing crusher at the cement plant by the private road which is outside the mining lease area.

5.0 Environmental Monitoring Programme

Environmental monitoring at various locations, within the mining lease area and in the study area of 10 km radius will be carried out on a periodic basis. A comprehensive network for monitoring has been prepared. Sampling locations have been identified by considering the source of pollution due to mining operations, drainage pattern, topography of the area and biological environment.

6.0 Additional Studies

Risk Assessment & Disaster Management Plan. Mining will be carried out by mechanized opencast mining, with drilling and blasting. Mining equipment such as excavators, dumpers/tippers etc will be used. Mining will be done under strict supervision hence the rate of operational risks is minimal.

Rehabilitation and Resettlement- This 65-hectare land is owned by Star Cement Meghalaya Limited. There are no residential structures or habitation on this land, therefore Resettlement and Rehabilitation (R&R) is not applicable.

Occupational Health & Safety:

The company will concern and will take responsibility for the protection of the workers and will adapt occupational health services by establishing and maintaining a safe and healthy working environment. The following control measures will be adapted in the proposed mine to maintain the Occupational health and safety:

- Use of safety/protective gears like rubber gloves, safety shoes, helmet, dust mask etc. will be a must. Routine check-ups to develop habits will be made by an environmental cell.
- Regular training and refresher follow-ups on this regard will be given continuously to build the capacities of the mine workers.
- Monitoring of quality of water, air, noise, and occupational health status of project personnel and surrounding habitations.
- Planned monitoring program to evaluate the effectiveness of various /specific aspects of technological / mitigation measures.
- Plantation monitoring programme to ensure survival and growth rate of plantations.
- A plan for monitoring the health of workers and the community in vicinity will be drawn and submitted along with financial allocation.

7.0 Project Benefits

The proposed mining project has a significant positive impact on the socio-economic environment and it will help sustain the overall development of the area. The proposed project significantly contributes to economic development by providing total direct employment to 94 and indirect employment to many more people in the area. By organising health check-up camps, awareness programs about rural development of the locals in the field of education, personal health care and skill development campaigns to improve standards of living in the area.

Approx. Rs 24 Crores of royalty, Rs 2.4 crore of DMF, Rs 48 Lakh of NMET and Rs 18 crores of Cess will be paid to the State Government in a year.

8.0 Environment Management Plan

Environmental Management plans giving the environmental protection measures for mine to meet the stipulated norms of IBM/MoEF&CC.

The effective management system involves proper and regular monitoring of the environment components for continual improvement. Based on the project descriptions and the activities associated, the Environment Management plan has been prepared for all the valued Components for which the Budget proposes Rs. 647.27 lakhs as capital cost & Rs.24.88 lakhs as recurring cost has been proposed by the Star Cement Meghalaya Limited. Environment Monitoring shall be carried out as per EC/CTE/CTO conditions.

9.0 Conclusion

Thus, it can be concluded on a positive note that after the implementation of the mitigation measures and Environmental Management Plan, the normal operation of the project will have minimal impact on the environment.
