



# MEGHALAYA CEMENTS LIMITED

CIN- U26942ML2003PLC007125



Ref: MCL/ENV/MoEF&CC/Compliance LS-I/2022-23/33

Date:-02/12/2022

To,

The Addl. Director General (Central),  
Ministry of Environment Forest & Climate Change,  
North Eastern Regional Office, Shillong,  
Meghalaya.

Sub: - Submission of half yearly compliance report for limestone mines for an area of 31.05 Ha for the period of April'2022 to September'2022.

Dear Sir,


We are hereby furnishing the half yearly compliance report (hard copy and soft copy) for the period from April'2022 to September'2022 on Environmental Stipulations for limestone mining for an area of 31.05 Ha, at South Khliehri at Village- Thangskai, East Jaintia Hills District, Meghalaya, vide your Environment Clearance letter no SEIAA/ (PR-19/2012) PT/PR-05/2015/444 dated: 9th Jan 2017.

This is for your kind information and perusal. You are requested to kindly acknowledge the receipt of the same.

Thanking You,

Yours Faithfully,

For MEGHALAYA CEMENTS LIMITED

  
(Authorized Signatory)

Encl: As stated above.

Copy to:

- 1) The Member Secretary, Meghalaya State Pollution Control Board, Shillong.
- 2) The Member Secretary, State Environment Impact Assessment Authority, Shillong.



8/12/22



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Registered Office :  
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HELPLINE NO : 18001233666

Half yearly Compliance Report (for the period April'2022 to September'2022) on Environmental Stipulations for limestone mining for an area of 31.05 Ha, at South Khliehjeri, Thangskai Village, Khliehriat, East Jaintia Hills by M/s – Meghalaya Cements Ltd.,(MCL) – Environmental Clearance Letter No. SEIAA/ (PR-19/2012) PT/PR-05/2015/444; Dated 9<sup>th</sup> Jan 2017.

Sl. No. as per letter dated 09.01.2017 of State Environment Impact Assessment Authority.	Compliance Status
<b>A. SPECIFIC CONDITIONS</b>	
(i) The Project proponent (PP) shall obtain the requisite Wildlife Clearance from the National Board for Wildlife before operationlising the project.	<b>Complied With</b> The project area does not fall within the area of Eco Sensitive zone and the Project Proponent (PP) has obtained the requisite Wildlife Clearance from Divisional Forest Officer (Wildlife), Jaintia Hills, Wildlife Division, Jowai, (through office of APCC govt. of Meghalaya, Letter No. FWC/G/278/pt/928, Dated 6 <sup>th</sup> June 2018). Copy of the Wildlife Clearance is attached as an <b>(Annexure-I)</b>
(ii) Mining activities shall be restricted to the 31.05Ha. Which is identified as the 'non – forest area' and shall not be extended to any other area.	<b>Agreed to Comply.</b> Mining activities is restricted to the 31.05Ha, which is identified as the 'non – forest area' and will not be extended to any other area at any condition. The bounded co-ordinates for the 31.05 Ha South Khliehjeri Limestone Mining is as below:- Latitude:- N 25,11,50.0 to N 25,12,21.8 Longitude:- E 92,23,20.8 to 92,23,44.1
(iii) The revised mining plan is valid for 5 years only. After its expiry, The PP shall submit another mining plan duly approved by the authorized agency.	<b>Agreed to Comply.</b> Review of Mining Plan with Progressive Mine Closure Plan has been submitted under Rule 17(2) of MCR, 2016 to the authorized agency (Indian Bureau of Mines) for South Khliehjeri Limestone Mine (Area-31.05 Ha) vide letter no IBM/GHY/MEG/EJNH/MP-81, dated 07/09/2021. The Lease period of Mines is 10/01/2017 to 09/01/2067 and Period of Proposal is 2021-22 to 2025-26. After its expiry, the revises mining Plan will be submitted to the Indian Bureau of Mines.
(iv) The PP shall obtain Consent to Operate(CTO) from the State Pollution Control Board, Meghalaya, within 2 (two) months from the date of issue of the EC and copy of the same shall be forwarded to the SEIAA, Meghalaya and the MoEF&CC, Regional Office, Shillong. The PP shall effectively implement all the conditions stipulated therein in the CTO.	<b>Complied with.</b> The PP has obtained Consent to Operate (CTO) from the State Pollution Control Board, Meghalaya, vide CTO No. MPCB/CON-191-2016/2021-2022/9 dated 11 <sup>th</sup> February'2022 & it is valid upto 28 <sup>th</sup> February 2023 under section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974, as amended and under Section 21 of the Air (Prevention & Control of Pollution) Ac, 1981, as amended (to be referred as Water Act & Air Act respectively). The Consent to Operate granted in favour of the Project vide TO Order no. MPCB/CON-191-2016/2016-2017/15, dated



		24.02.2018 for operating a 31.05 Ha Limestone Mines located at Thangskai, East Jaintia Hills District. The PP has effectively maintaining the General and Specific conditions and submitted to MsPCB. Consent to Operate is valid for 1 (one) year i.e. 28.02.2023, Copy of the CTO is attached as an <b>annexure-II</b> .
(v)	The Project Proponent should ensure that the mining activities shall not disturb the caves existing nearby the mining lease area.	No caves have been observed nearby the mining lease area during the site survey and mining activities.
(vi)	The PP shall ensure that a Biodiversity Conservation Plan with focus on conservation of the schedule –I species in the area, is prepared in consultation with the Forests and Environment Department, Meghalaya. The PP shall ensure adequate budgetary provisions and indicate a timeline for the implementation of the plan. The plan shall be submitted to the SEIAA and the NE regional office of the MoEF & CC, Shillong within a period of 1 year from the date of issue of EC.	Complied with. The company has already doing work on Biodiversity Conservation of Schedule-I species in co-ordination with Environment Department of North Eastern Hill University (NEHU), Shillong since 05 (five) years. The NEHU, officials have already appointed a Project fellow for the Project and they are working at our site on Biodiversity Conservation Plan with focus on conservation of the schedule – I species in the area. The green house already developed and conservation of three flora species namely: Orchidaceae, Cattelya Orchidaceae, Cymbidium Orchidaceae, Gladiolus, Anthurium and Begonia rubrovenia has been initiated. Also Company has approached to Forest and Environment Department for better conservation of Biodiversity. Project report on Biodiversity Inventorization and Conservation through Assisted Regeneration of RET Species is attached as an <b>Annexure-III</b> .
(vii)	The Action Plan as spelt out in the EIA Report and on the issues raised during the Public Hearing dated 17/12/2014 shall be implemented by the PP with adequate budgetary provisions. The PP shall complete all the tasks within 1 (one) year and submit a Report to the SEIAA, Meghalaya, and the NE Regional Office, MoEF&CC.	<b>Agreed to Comply.</b> The PP has undertaken and completed all the tasks related to the EIA Report and issues raised during the Public Hearing dated 17/12/2014 accordingly and submitted the detailed report with action plan and compliance status and its implementation to the SEIAA, Meghalaya, and the NE Regional Office, MoEF&CC. Detailed budgetary report against the individual action taken is attached here as <b>Annex – IV &amp; IV-a</b> .
(viii)	Proponent shall be appoints an Occupational Health Specialist for the medical examination of the workers engaged in the project. Occupational Health check-ups shall be undertaken once in six months for workers and necessary remedial / preventive measures shall be taken. The Recommendations of National Institute for ensuring a good occupational environment for mine workers shall be implemented. The prevention measures for burns,	<b>Complied with.</b> Proponent has appointed Competent Occupational Health Specialist including Medical Officer, Dentist, Nurse, Compounder, Lab Technician & Dresser for the medical examination of the workers engaged in the project. Occupational Health check-ups schedule is being followed as per the guideline and necessary remedial/ preventive measures are taken. The Recommendations of National Institute



	<p>material, and provision of anti-snake venom including all other paramedical safeguards may be ensured before initiating the mining activities.</p>	<p>for ensuring a good occupational environment for mine workers are implemented. The following equipments has setup in Occupational Health for examination of workers:- ECG Machine, Audiometry, Spirometry (PFT), Cardiac Monitor, Oxygen Cylinder, Suction Machine, Nebulizer machine, Semi auto Analyzer, Micro Scope, Incubator, Centrifuge machine, Haemometer, Accu chek machine, Blood cell counter, Homocyto Meter etc. Company has 02 (Two) Ambulance in which one is Advanced life support with Cardiac monitor &amp; Defibrillator and another one is only with Oxygen support. The prevention measures for burns, material, and provision of anti-snake venom including all other paramedical safeguards are already implemented to the workers for mining activities. List of Occupational Health check-ups of mines employees working in the South Khliehjari Limestone Mine (31.05 Ha) and details of Occupational health center including Medical staff, Equipments and testing facilities attached as an <b>(Annexure-V &amp; VI)</b></p>
(ix)	<p>The mining operations shall be restricted to above ground water table and it should not intersect groundwater table. In case of working below ground water table, prior approval of the Ministry of Environment, Forest and Climate Change and Central Ground Water Authority shall be obtained, for which a detailed hydro-geological study shall be carried out; The Report on six monthly basis on changes in Groundwater level and quality shall be submitted to the SEIAA, Meghalaya and the Regional Office of the Ministry.</p>	<p><b>Agreed to Comply.</b> We have done detailed Hydro geological survey by a CGWS approved third party &amp; as per the report no ground water found in our mining lease area. The utilization of ground water has not being done by the Project Proponent for any activities. As per the Hydro geological survey recommendation Company has planning to establish a monitoring well to interface drawn about the depth of ground water level in the mining lease hold area and it will be completed by March-2023. Necessary work order for making bore well has been prepared. Once the installation of bore well will be completed, the Report on six monthly basis on changes in Groundwater level and quality will be submitted to the Ministry of Environment, Forest and Climate Change. Detailed Hydro geological Survey report and Work order for installation of Bore Well are attached as an <b>Annexure- VII &amp; VIII.</b></p>
(x)	<p>The Pollution due to transportation shall be effectively controlled. Vehicles with Meghalaya Pollution Control Board pollution clearance certificate only shall be allowed to ply. The mineral transportation shall be carried out through covered trucks only and the vehicles carrying the mineral shall not be overloaded.</p>	<p><b>Complied with.</b> Pollution due to transportation is being effectively controlled by proper maintenance of haul roads. Installation work for Permanent water sprinklers on Mines haul road has been started and purchase order for required material has been made, work will be completed by March-2023. PUC certified vehicles are being used for transportation &amp; other activities in mining by the PP. The mineral transportation is carried out through covered trucks only and the overloaded vehicles are not allowed for minerals</p>



		transportation. Purchase order for Permanent water sprinklers and PUC certificates for the vehicle using in mines is attached as an <b>Annexure- IX &amp; X.</b>
(xi)	The PP shall put in place proper rainwater harvesting measures at the site and shall also undertake conservation measures to augment groundwater resources in the area in consultation with the Central Ground water Board.	Preparation of Rainwater Harvesting Scheme has been done and plan has submitted to Central Ground Water Board, Guwahati vide Letter No. - MCL/ENV/CGWB/Comm./2022-23/31, dated: 07.11.2022. After vetting/approval by the Board for efficiency/adequacy, status will be submitted to the Region Office (MoEF) and same will be implemented at site. The acknowledged copy of the Rainwater Harvesting Scheme is attached as an <b>Annexure-XI.</b>
(xii)	The Project Proponent shall adopt Best mining Practices for the giving mining conditions. In the mining area adequate number of check dams, retaining walls / structures, garland drains and settling ponds should be provided to arrest the wash-off with rain water in catchment area.	<b>Complied with.</b> Best mining practices are being adopted by the Project Proponent for the giving mining conditions. Systematic opencast mechanized mining method being implemented to win the limestone minerals which have involved deep hole drilling and blasting, excavator and blasting by slurry explosive. Loading and hauling from the mine face being done mechanically by excavators and tipper combination. The method involves the removal of huge quantities of overburden, dumping, and backfilling of the excavated area. In the mining area adequate number of check dams, retaining walls / structures, garland drains and settling ponds are provided to arrest the wash-off with rain water in catchment area.
(xiii)	Use of effective sprinkler system to suppress fugitive dust on hauls roads and other transport roads shall be ensured, and cleaning of transport vehicles shall not be done outside the project area. Main haulage roads and other roads should be regularly wetted using water tankers fitted with sprinklers. Crusher and material transfer points should invariable be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.	<b>Being compiled with</b> Mitigation measures to control fugitive dust emission are being done through Mobile Water Tankers filled with sprinklers on hauls roads and other transport road. Main haulage roads and other roads always keep wetted to suppress fugitive dust. Installation of Permanent water sprinklers on Mines haul road has been started and purchase order for required material has been made, work will be completed by March-2023. Copy of the Purchase order is attached as an <b>Annexure-IX.</b> Adequate Bag filters and dry fogging system provided at Crushing & material transfer points. Belt conveyors are fully covered with proper shed to avoid air borne dust.



(xiv)	The project Proponent shall ensure that no natural water course and / or water resources shall be obstructed due to any mining operations. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of water scarcity in the area, the Project Proponent shall not use local water for the project and also shall assist in arranging water to the villagers for their use.	<p><b>Agreed to comply.</b> The project Proponent ensures that no natural water course and / or water resources will be obstructed due to any mining operations. In case of water scarcity in the area, the Project Proponent will not use local water for the project also will arrange water to the villagers for their use.</p>																																																							
(xv)	The PP shall ensure that the lights and sounds at night at the project site do not disturb the villages and the also animals. The PP shall must ensure that the biological clock of the village(r)s is not disturbed; by orienting the floodlights / masks away from the villagers and keeping the noise levels well within the prescribed limits for day light / night hours.	<p><b>Being compiled with</b> The PP is operating the mine in daylight hours only and maintaining the noise levels within the prescribed limits for day light / night hours. Monitoring report of the Noise Level is as mentioned below:-</p> <table border="1" data-bbox="889 638 1500 1031"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="3">Day Hrs</th> <th colspan="3">Night hrs</th> </tr> <tr> <th>Min</th> <th>Max</th> <th>Avg</th> <th>Min</th> <th>Max</th> <th>Avg</th> </tr> </thead> <tbody> <tr> <td>April-2022</td> <td>62.1</td> <td>72.1</td> <td>67.2</td> <td>40.9</td> <td>46.4</td> <td>43.33</td> </tr> <tr> <td>May-2022</td> <td>61.7</td> <td>71.7</td> <td>66.8</td> <td>41.3</td> <td>46.8</td> <td>43.73</td> </tr> <tr> <td>June-2022</td> <td>62.5</td> <td>72.5</td> <td>67.6</td> <td>40.5</td> <td>46.0</td> <td>42.93</td> </tr> <tr> <td>July-2022</td> <td>63.2</td> <td>73.1</td> <td>68.2</td> <td>41.2</td> <td>46.7</td> <td>43.60</td> </tr> <tr> <td>Aug-2022</td> <td>64.1</td> <td>74.2</td> <td>69.2</td> <td>41.5</td> <td>47.0</td> <td>43.90</td> </tr> <tr> <td>Sept-2022</td> <td>64.1</td> <td>75.6</td> <td>70.3</td> <td>42.8</td> <td>48.3</td> <td>45.24</td> </tr> </tbody> </table>	Months	Day Hrs			Night hrs			Min	Max	Avg	Min	Max	Avg	April-2022	62.1	72.1	67.2	40.9	46.4	43.33	May-2022	61.7	71.7	66.8	41.3	46.8	43.73	June-2022	62.5	72.5	67.6	40.5	46.0	42.93	July-2022	63.2	73.1	68.2	41.2	46.7	43.60	Aug-2022	64.1	74.2	69.2	41.5	47.0	43.90	Sept-2022	64.1	75.6	70.3	42.8	48.3	45.24
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(xvi)	The PP shall not transport the minerals by road through the village, without their consent. A 'bypass' road shall preferable be constructed for the purpose of transportation of the minerals so that the impact of sounds, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the project.	<p><b>Agreed to comply.</b> The entire Mineral is being transported by our own haul road without using any public/village road. A 'bypass' road has been constructed for transportation of material &amp; mineral to avoid the impact of sounds, dust and mitigation of accidents. The PP are not using existing public road network for the project activates.</p>																																																							
(xvii)	Necessary permission as per Acts & Rules shall be obtained from the Competent Authorities for Storage and use of explosives and detonators. The instructions and Rules specified therein shall be strictly adhering to.	<p><b>Complied with.</b> Necessary permission as per Acts &amp; Rules has already been obtained from the Competent Authorities "Petroleum &amp; Explosives Safety Organization PESO", (Ministry of Commerce &amp; Industries) for Storage and use of explosives and detonators. License for possess for use of Amonium Nitrate from a store house attached to explosive manufacturing unit (ANFO) situated at Survey no.: Umpeh area at East Jaintia Hills district, Meghalaya. Renewal of License no.: A/EC/MG/P3/5(A271) granted in form-3 of Ammonium Nitrate Rules,2012 on Dated 23.03.2022 and valid upto 31.03.2027. The instructions and Rules specified therein are being strictly adhering to by the PP. The copy of</p>																																																							



		License for the same attaches as <b>Annexure-XII</b> .
(xviii)	As per the Companies Act, 2013 and the CSR Rules, 2% of average net profit of last three years shall be made available by the PP for the socio economic development of the neighborhood habitats. This shall be properly planned by the PP with the help of expert institutes and implemented through registered Agency as per the CSR Rules. Compliance report shall be submitted to the SEIAA, Meghalaya, the NE Regional Office of the MoEF & CC, and Shillong on a six monthly basis.	<b>Agreed to comply.</b> 2% of average net profit of last three years is being made available by the PP for the socio economic development of the neighborhood habitats. Compliance report being submitted to the SEIAA, Meghalaya, the NE Regional Office of the MoEF & CC, and Shillong on a six monthly basis. Meghalaya Cements Limited has already engaged socio economic development of the neighborhood habitant. Detailed expenditure of CSR activities attaches as <b>Annexure-XIII</b>
(xix)	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest and Climate Change 5 years in advance of final mine closure for approval, with a copy to Mining & Geology Department, Meghalaya and the SEIAA, Meghalaya.	<b>Agreed to comply.</b> Final Mine Closure Plan with Corpus Fund as approved by IBM shall be submitted to MoEF& CC 5 years in advance of final mine closure for approval.

#### B. GENERAL CONDITIONS

(i)	No change in mining technology and scope of working shall be made without prior approval of the SEIAA, Meghalaya. No deviation shall be made in the calendar plan including excavation, quantum of mineral and waste.	<b>Agreed to comply.</b> Mining is being done as per mining plan approved by Indian Bureau of Mines. There will be no change in technology and scope of work without prior approval of MoEF & CC. The PP has follow the calendar plan including excavation, quantum of mineral and waste as per approved mining plan vide letter no IBM/GHY/MEG/EJNH/MP-81, dated 07/09/2021. The Lease period of Mines is 10/01/2017 to 09/01/2067 and Period of Proposal is 2021-22 to 2025-26.
(i)-a	The Project Proponent shall not violate applicable provisions of any Acts, Rules Orders of the Government and judicial orders issued by the Hon'ble Supreme Court/High Courts/NGT, applicable to the project.	<b>Agreed to comply.</b> The Project Proponent is implementing all applicable provisions of any Acts, Rules Orders of the Government and judicial orders issued by the Hon'ble Supreme Court/High Courts/NGT, applicable to the project.
(ii)	Mining shall be carried out as per the provisions outlined in mining plan approved by Indian Bureau of mines (IBM) as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).	<b>Agreed to comply.</b> Mining is carried out as per the provisions outlined in mining plan approved by Indian Bureau of mines (IBM) vide letter no IBM/GHY/MEG/EJNH/MP-81, dated 07/09/2021 as well as by abiding to the guidelines of Directorate General Mines Safety (DGMS).
(iii)	Sufficient number of Gullies / drainage channels shall be provided for better management of water. Regular Monitoring of pH shall be included in the	Sufficient numbers of Gullies / drainage channels are provided for better management of water. Regular Monitoring of pH is being done and reports



monitoring plan and report shall be submitted to the NE Regional Office, MoEF & CC, Shillong and Meghalaya State Pollution Control Board (MSPCB) on six monthly basis.

are submitted to the NE Regional Office, MoEF & CC, Shillong and Meghalaya State Pollution Control Board (MSPCB) on six monthly basis. Testing parameters as below:-

Sl. No.	Parameters	Upstream	Downstream
1	pH	7.15	7.33
2	Dissolved Oxygen (mg/lit)	12.43	11.15
3	Total Dissolve Solids (mg/Lit)	158.50	169.50
4	Conductivity (mg/Lit)	149.17	150.17
5	Total Hardness (mg/Lit)	229.83	216.33
6	Calcium Hardness (mg/Lit)	156.17	149.67
7	Magnesium Hardness (mg/Lit)	73.67	66.67
8	Alkalinity (mg/Lit)	67.50	70.83

**Annexure-XIV**

(iv) Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of PM10 and PM2.5 such as haul road, loading and unloading point and transfer points. Fugitive dust emissions from all the sources shall be controlled regularly. It shall be ensured that the Ambient air parameters conform to the norms prescribed by the Central Pollution Control Board in this regard. Monitoring of Ambient Air Quality to be carried and record should be maintained.

**Complied with.** Effective safeguard measures such as regular water sprinkling being done through Mobile water tankers on the critical areas such as haul road, loading and unloading point and transfer points. Regular monitoring of PM10 and PM2.5 are being done in critical areas. To control the Fugitive dust emissions from all the sources, PP is taking effective safeguard measures such as regular water sprinkling, development of green belts and fogging at unloading point and transfer points. Details of PM10, PM2.5 & Fugitive dust emissions are mentioned below:-

Pollutants	Location	Avg. of Last 06 months
Particulate Matters PM10 (µg/m3)	A1. North -East (Near Soil Dump)	39.24
	A2. North - West(Near Haul Road)	43.14
	A3.Southern side (Near Lease Boundary)	35.12
Particulate Matters PM2.5 (µg/m3)	A1. North -East (Near Soil Dump)	25.37
	A2. North - West(Near Haul Road)	28.14
	A3.Southern side (Near Lease Boundary)	21.07
Fugitive dust emissions (µg/m3)	A1. Drilling	1644.67
	A2. Blasting	1572.17
	A3. Loading	1925.67
	A4. Unloading	1503.17

**Report for the same attached as Annexure-XV**





(v)	The limestone shall be preferably transported by covered conveyor belts to the cement plants which shall be set up by the PP. The vehicles carrying the mineral shall not be overloaded. Vehicular emissions shall be kept under control and regular monitored.	Being complied with The limestone is being transported by covered belt conveyors and the vehicle carrying the mineral maintained under loaded. All the HEMM (Heavy Earth Moving Machinery) are being serviced as per periodical as well as routine maintenance. The results are remained well within the prescribed limit. Smoke density emission testing analyzed by Pollution Testing Station, Ladhlaboh, Jowai, Meghalaya for each HEMM and has been included in the compliance report as an <b>Annexure-X</b>
(vi)	The top soil, if any, shall temporarily be stored at earmarked site (s) only and shall be used for land reclamation and plantation at the earliest. The over burden (OB) generated during the mining operations shall be stacked at earmarked dump site (s) only and it should not be kept active for a long period of time. The maximum height of the dumps shall not exceed 8m and width 20m and overall slope of the dumps shall be maintained to 45°. The OB dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dump. During closure of the time the over circumstances the PP shall bring top soil from other areas to fill the pit. In the partially filled pit, the maintenance of terraces should be strictly followed to allow soil to stabilize on the terraces. It is preferable that the orchard is raised by the PP on the reclaimed. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Status shall be reflected in the six monthly compliance reports.	<b>Complied with.</b> Top soil is being stored at earmarked site as per the mining plan approved by the Indian Bureau of Mines and is utilizing in greenbelt development.  The soil and over burden (OB) generated during the mining operation is being stacked at designated dump site as per the approved mining plan. The height, width and angle of repose of dumps are maintaining as per the condition stipulated in the environmental clearance. OB dumps will be vegetated with native species to prevent erosion and surface run off. Geo textiles will be used by the PP for stabilization of the dump in critical areas. During closure of the time the over circumstances the PP will bring top soil from other areas to fill the pit. In the partially filled pit, the maintenance of terraces will be strictly followed to allow soil to stabilize on the terraces. Monitoring and management of rehabilitated areas will be maintained by the PP until the vegetation becomes self-sustaining.
(vii)	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, mineral and OB dumps to prevent run off or water and flow of sediments directly into the river and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted and maintained properly. The sump capacity shall be designated keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site, and it shall allow adequate retention period for proper settling of silt material.	<b>Complied with.</b> Catch drain and siltation ponds has been constructed around the mine working, mineral and OB dumps to prevent the run-off water and flow of sediments directly into the river. Water collected in mine pits is being used for dust suppression and green belt development. Maintenance of drains is being done as and when required. Sedimentation tank are constructed to ensure that proper retention period for settling of silt. The Sump capacity is being maintained by the PP within safety margin.
(viii)	Plantation shall be raised in a 7.5 m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around water body,	<b>Being complied with.</b> Project Proponent has also being carrying out plantation by maintaining a green belt of 7.5m



along the roads etc. by planting native species, following the CPCB guidelines for green belt plantation and in consultation with the DFO (Social Forestry). Greenbelt shall be developed all along the mine lease in a phased manner and shall be completed within first five years.

safety zone around the mining lease, backfilled and reclaimed area, around water body, along the roads etc by planting native species, following the CPCB guidelines. Greenbelt is being developed all along the mine lease in a phased manner. Detailed report are attached herewith which is earlier submitted to The Indian Bureau of Mines.

Duration	No. of trees planted	Area covered (in Ha.)	No. of trees survived	Survival rate
Apr-June 2022	217	0.1729	167	76.96 %
July-Sept 2022	95	0.0757	68	71.57 %
<b>Cumulative as on 30.09.2022</b>	<b>4106</b>	<b>1.9161</b>	<b>3122</b>	<b>75.59 %</b>

Detailed report attached as an **Annexure-XVI**

(ix) Regular monitoring of water quality, both upstream and downstream of water bodies shall be carried out; records / data shall be maintained and submitted to the NE Regional Office, MoEF&CC, Shillong and MSPCB.

**Complied with.**

Monitoring of water quality both upstream and downstream are being maintained and records are submitted to the NE Regional Office, MoEF&CC, Shillong and MSPCB. The following has been analyzed and average result mentioned as below:-

Sl. No.	Parameters	Upstream	Downstream
1	pH	7.15	7.33
2	Dissolved Oxygen (mg/lit)	12.43	11.15
3	Total Dissolve Solids (mg/L&)	158.50	169.50
4	Conductivity (mg/Lit)	149.17	150.17
5	Total Hardness (mg/Lit)	229.83	216.33
6	Calcium Hardness (mg/Lit)	156.17	149.67
7	Magnesium Hardness (mg/Lit)	73.67	66.67
8	Alkalinity (mg/Lit)	67.50	70.83

Detailed report attached as **Annexure- XIV**

(x) Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by stabling a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to the Regional Office, MoEF&CC, Shillong, and MSPCB.

**Agreed to Comply.**

We have done detailed Hydro geological survey by a CGWS approved third party & as per the report no ground water found in our mining lease area. The utilization of ground water has not being done by the Project Proponent for any activities. As per the Hydro geological survey recommendation Company has planning to establish a monitoring well & installation of piezometer to interface drawn about the depth of ground water level in the mining lease hold area and it will be completed by March-2023. Necessary work order for piezometer has been prepared. Once the installation of bore well and piezometer will be completed, the monitoring will



		be carried out four times in a year pre- monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected will be sent regularly to the Regional Office, MoEF&CC, Shillong, and MSPCB. Detailed Hydro geological Survey Report and Purchase order for Piezometer attached as an <b>Annexure- VII &amp; XVII.</b>																				
(xi)	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered flora and fauna in the project area.	<b>Agreed to comply.</b> The PP has taken all precautionary measures during mining operation for conservation and protection of endangered flora and fauna in the project area.																				
(xii)	Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, creche etc.	No Contract labours are employed in the mines. However, Provision has been made for the housing of company employees involved in mining activities within the site with all necessary infrastructure and facilities such as fuel for cooking, toilets, STP, safe drinking water, medical health care, creche etc.																				
(xiii)	Critical parameters such as PM <sub>2.5</sub> , NO <sub>x</sub> , SO <sub>x</sub> in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per MoEF's notification in 2009. Further, quality of discharged water shall also be monitored (TDS, DO, pH and Total suspended Solids-TSS). The data shall be uploaded on the website of the company and also prominently displayed at the project site. The circular No-J20012/1/2006-IA-II (M) dated 27.05.2009 issued by the MoEF&CC, which is available on the website of the Ministry <a href="http://www.envfor.nic.in">www.envfor.nic.in</a> shall also be referred to in this regard for its compliance.	<p><b>Noted for compliance.</b> Critical parameters such as PM<sub>2.5</sub>, NO<sub>x</sub>, SO<sub>x</sub> in the ambient air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer is being monitored periodically as per MoEF's notification in 2009. Further, quality of ETP discharged water is being also be monitored (TDS, DO, pH and Total suspended Solids-TSS).</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Obtained value in Q1</th> <th>Obtained value in Q2</th> <th>AVG</th> </tr> </thead> <tbody> <tr> <td>BOD</td> <td>19.0</td> <td>22.0</td> <td>20.5</td> </tr> <tr> <td>COD</td> <td>83.0</td> <td>76.0</td> <td>79.5</td> </tr> <tr> <td>pH</td> <td>6.59</td> <td>6.76</td> <td>6.67</td> </tr> <tr> <td>TSS</td> <td>24.0</td> <td>27.0</td> <td>25.5</td> </tr> </tbody> </table> <p>The monitoring data is being uploaded on the company website <a href="https://topcem.in/">https://topcem.in/</a> and displaying at the main gate of the project. Detailed reports are attached as <b>Annexure- XV &amp; XVIII.</b></p>	Parameters	Obtained value in Q1	Obtained value in Q2	AVG	BOD	19.0	22.0	20.5	COD	83.0	76.0	79.5	pH	6.59	6.76	6.67	TSS	24.0	27.0	25.5
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(xiv)	Industrial waste water (workshop and waste water from the mine) shall be properly collected, treated so as to conform to the standard prescribed under GSR 422 (E) dated 19 <sup>th</sup> May, 1993 and 31 <sup>st</sup> December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of effluents.	<b>Agreed to comply.</b> Effluent Treatment Plant (ETP) with 25 KLD Capacity has already been installed at HEMM workshop. Workshop waste water is being reuse in vehicle washing and green belt development after treatment and oil sludge are being properly collected and utilize as alternative fuel in Kiln. The Testing report of Workshop waste water after																				



		<p>treatment mentioned below:-</p> <table border="1"> <thead> <tr> <th>Parameters</th> <th>Obtained value in Q1</th> <th>Obtained value in Q2</th> <th>AVG</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.59</td> <td>6.76</td> <td>6.67</td> </tr> <tr> <td>Temperature</td> <td>25.9</td> <td>24.3</td> <td>25.1</td> </tr> <tr> <td>Total Suspended solid</td> <td>24.0</td> <td>27.0</td> <td>25.5</td> </tr> <tr> <td>BOD (3 days @27°C)</td> <td>19.0</td> <td>22.0</td> <td>20.5</td> </tr> <tr> <td>COD</td> <td>83.0</td> <td>76.0</td> <td>79.5</td> </tr> <tr> <td>Oil &amp; Grease</td> <td>&lt;3.0</td> <td>&lt;4.0</td> <td>&lt;3.5</td> </tr> <tr> <td>Total Residual Chlorine</td> <td>&lt;0.01</td> <td>&lt;0.01</td> <td>&lt;0.01</td> </tr> <tr> <td>Ammonical Nitrogen (as N)</td> <td>13.0</td> <td>15.0</td> <td>14.0</td> </tr> <tr> <td>Total Kjeldahl Nitrogen (as NH3)</td> <td>51.0</td> <td>48.0</td> <td>49.5</td> </tr> <tr> <td>Free Ammonia (as NH3)</td> <td>&lt;0.01</td> <td>&lt;0.01</td> <td>&lt;0.01</td> </tr> </tbody> </table> <p>Detailed testing report is attached as <b>Annexure-XVIII</b>.</p>	Parameters	Obtained value in Q1	Obtained value in Q2	AVG	pH	6.59	6.76	6.67	Temperature	25.9	24.3	25.1	Total Suspended solid	24.0	27.0	25.5	BOD (3 days @27°C)	19.0	22.0	20.5	COD	83.0	76.0	79.5	Oil & Grease	<3.0	<4.0	<3.5	Total Residual Chlorine	<0.01	<0.01	<0.01	Ammonical Nitrogen (as N)	13.0	15.0	14.0	Total Kjeldahl Nitrogen (as NH3)	51.0	48.0	49.5	Free Ammonia (as NH3)	<0.01	<0.01	<0.01
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(xv)	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	<p><b>Complied with.</b> PPEs (like Nose Mask, Safety Goggles and other protective equipments) are being provided to all workers. Safety and health training and Awareness are given to the workers regularly by Safety Officers.</p>																																												
(xvi)	A separate environmental management cell with suitable qualified personnel shall be set-up. The PP shall put in place an administrative mechanism to deal with environmental issues, to ensure compliance to the EC conditions and to implement the EMP, biodiversity action plan, etc. The PP shall inform the details along with the name of such responsible officials, to the SEIAA, MSPCB and the Regional Office of the MoEF & CC, Shillong. In case of any change in respect of the officials responsible, the same shall be intimated by the PP.	<p><b>Complied with.</b> A separate environmental management cell with suitable qualified personnel is already set up and they are reporting directly to the Head of the Plant. The environmental Cell is prepared with the guidance of Indian Bureau of Mines (IBM) and the cell is looking after all the deal with environmental issues, to ensure compliance to the EC conditions and to implement the EMP, biodiversity action plan, CTO conditions of MSPCB and sustainable development of mining activities etc. and also responsible for the said works. The details of the environmental management cell and name of such responsible officials are attached as an <b>Annexure-XIX</b>.</p>																																												



(xvii)	<p>The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purposes. Year wise expenditure shall be reported to the SEIAA, Meghalaya and the Regional Office, MoEF&amp;CC, Shillong.</p>	<p><b>Agreed to comply.</b> The funds earmarked for environment protection measure are kept in the separate account.</p> <table border="1" data-bbox="881 264 1505 764"> <thead> <tr> <th>SL No.</th> <th>Head</th> <th>Total Expenditure (in lakh)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Plantation</td> <td>3.39</td> </tr> <tr> <td>2</td> <td>Dust suppression</td> <td>1.79</td> </tr> <tr> <td>3</td> <td>Preparation of Retaining wall, Checkdam, Siltation Tanks and Garland drains</td> <td>1.44</td> </tr> <tr> <td>4</td> <td>PPE supply to mine workers</td> <td>3.09</td> </tr> <tr> <td>5</td> <td>Water Treatment &amp; Maintenance of Effluent Treatment Plant</td> <td>0.60</td> </tr> <tr> <td>6</td> <td>Dump Compaction</td> <td>1.35</td> </tr> <tr> <td colspan="2"><b>Total</b></td> <td><b>11.66</b></td> </tr> </tbody> </table> <p>Detail of expenditure is being reported to SEIAA, Meghalaya and Regional Office, MoEF &amp; CC, Shillong on Six monthly bases. Detailed expenditures for the period of April-2022 to September-2022 are attached as an <b>Annexure-XX</b>.</p>	SL No.	Head	Total Expenditure (in lakh)	1	Plantation	3.39	2	Dust suppression	1.79	3	Preparation of Retaining wall, Checkdam, Siltation Tanks and Garland drains	1.44	4	PPE supply to mine workers	3.09	5	Water Treatment & Maintenance of Effluent Treatment Plant	0.60	6	Dump Compaction	1.35	<b>Total</b>		<b>11.66</b>
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(xviii)	<p>Environment Statement for each financial year ending 31<sup>st</sup> March in Form – V as mandated shall be submitted to MPSCB with copy of the same to SEIAA, Meghalaya and Regional Office, MoEF&amp;CC, Shillong</p>	<p>Environment Statement for each financial year ending 31<sup>st</sup> March in Form – V as mandated is being submitted to MPSCB with copy of the same to SEIAA, Meghalaya and Regional Office, MoEF&amp;CC, Shillong. Environment Statement in Form-V for FY:2021-22 was submitted to MsPCB vide letter no. MCI/Env./MsPCB/2022-2023/14, dated 23/06/2022. Copy of the Form-V is attached as an <b>Annexure-XXI</b></p>																								
(xix)	<p>The Project Proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Regional Office, MoEF&amp;CC, Shillong, Central Pollution Control and State Pollution Control Board. The certified copy of the same shall be forwarded to the SEIAA and SEAC, Meghalaya.</p>	<p><b>Agreed to Comply.</b> Six monthly reports on the status of the implementation of the stipulated environmental safeguards are being submitted to the Regional Office, MoEF&amp;CC, Shillong, Central Pollution Control and State Pollution Control Board. Also submitting the certified copy of the same to the SEIAA and SEAC, Meghalaya.</p>																								
(xx)	<p>A copy of clearance letter shall be marked to concerned local bodies / NGOs, if any, from whom suggestion / representation has been received while processing the proposal.</p>	<p><b>Complied With.</b></p>																								



(xxi)	The project authorities shall advertise at least in two local newspapers widely circulated, one of which shall in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance. A copy of the clearance letter shall be made available on the website of the PP.	Complied With. PP has advertised in two local newspapers i.e The Shillong times and Mawphor on dated 30 <sup>th</sup> May 2018 and 26 <sup>th</sup> May 2018 respectively widely circulated regarding the accorded of environmental clearance. A copy of the clearance letter available on the Company website <a href="https://topcem.in">https://topcem.in</a> News paper advertisement are attached as an Annexure-XXII
(xxii)	Official from the Regional Office of MoEF & CC, Shillong, MSPCB or any authorized officials, who would be monitoring the implementation of the conditions mentioned herein, shall be given full cooperation, facilities and documents / data by the PP during their inspection.	<b>Agreed for compliance.</b> Full co-operation are given to the official from Regional Office of the MoEF& CC, Shillong, MSPCB by furnishing the documents / data / information / monitoring reports during their inspection.
(xxiii)	The Project Proponent shall not violate applicable provisions of any Acts, Rules, Orders of the Government and judicial orders issued by the Hon'ble Supreme Court / High Courts/ NGT, applicable to the project.	<b>Agreed for compliance.</b> The PP do not violate applicable provisions of any Acts, Rules, Orders of the Government and judicial orders issued by the Hon'ble Supreme Court / High Courts/ NGT, applicable to the project.
(xxi)	The SEIAA reserves the right to add or delete any conditions or safeguarding measures found necessary, and to take action including revoking the clearance granted, if conditions stipulated are not implemented by the PP or in case of submission of false document / wrong declaration.	<b>Noted.</b> <b>Agreed to compile with.</b>
(xxv)	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green tribunal Act, 2010.	<b>Noted.</b>



Annex-I

Resubmt.  
16/8/18

GOVERNMENT OF MEGHALAYA  
OFFICE OF THE DIVISIONAL FOREST OFFICER JAINTIA HILLS WILDLIFE  
DIVISION ::::::::::: JOWAI.

NO.MWL/JH/228/Cemt.Factory/2017-18/ 307

Dated Jowai, the 14<sup>th</sup> June, 2018.

From: - The Divisional Forest Officer,  
Jaintia Hills Wildlife Division,  
Jowai.

To,  The Meghalaya Cement Limited.

amw  
18/6/18

Sub :- Issue of Wildlife Clearance Certificate regarding South Khliehri lime Stone  
Mine 31.05 ha at Thangskai, east Jaintia Hills, Meghalaya of  
Meghalaya Cement Limited.

Sir,  
With reference to the subject cited above, as per your letter No Ref  
MCL/Comm/DFO (Wildlife)/2018/14 Dt.30/04/2018, please find enclosed herewith the letter from the  
Additional principal Chief Conservator of Forests, Wildlife & Chief Wildlife Warden, Meghalaya, Shillong  
Dt. 06/06/2018 for information and necessary action


Enclosed: - as above.

Yours faithfully,

  
Divisional Forest Officer,

Jaintia Hills Wildlife Division, Jowai.




**GOVERNMENT OF MEGHALAYA**  
**OFFICE OF THE ADDITIONAL PRINCIPAL CHIEF CONSERVATOR**  
**OF FORESTS, WILDLIFE & CHIEF WILDLIFE WARDEN,**  
**MEGHALAYA, SHILLONG**

No. FWC/G/278/Pt/928

Dated Shillong, the 6 June, 2018.

To,

✓ The Divisional Forest Officer,  
 Jaintia Hills WL Division,  
 Jowai.

am  
 18/6/18

Sub :-


Issue of wildlife Clearance certificate regarding South  
 Khliehri Lime Stone Mine 31.05 ha at thangskai, East  
 Jaintia Hills, Meghalaya of Meghalaya cement limited.

Ref:

No. MWL/JH/228/Cemt.Factory/2016-17/20  
 Dt, 18.04.2018.

With reference to your letter cited above, I am to inform  
 you that since the project in question does not fall within a Protected Area  
 or Eco-Sensitive Zone, the approval of Standing Committee of National  
 Board for wildlife is not required.

This is for your information and Necessary action.

  
 Additional Principal Chief Conservator of Forests,  
 Wildlife & Chief Wildlife Warden  
 Meghalaya, Shillong.

**RECEIPT**legd No. 168Date 8.6.18

Rcpt. From \_\_\_\_\_







Meghalaya State Pollution Control Board  
Forests & Environment Department, Government of Meghalaya  
'ARDEN' Lumpyngngad, Shillong-793014  
Website: <http://megspcb.gov.in>



No. MPCB/CON-191-2016/2021-2022/ 9

Dated Shillong, the 11<sup>th</sup> February, 2022

**RENEWAL OF CONSENT TO OPERATE**

15/2/22

**CONSENT TO OPERATE** under Section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974, as amended and under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981, as amended (to be referred as Water Act and Air Act respectively).

The **CONSENT to OPERATE** granted in favour of M/S MEGHALAYA CEMENTS LTD. vide T.O. Order No. MPCB/CON-191-2016/2016-2017/15 dated 24.02.2018 for operating a 31.05 Ha. LIMESTONE MINE and subsequent renewals located at Thangskal, East Jaintia Hills District with a Project cost of Rs. 9.00 (Rupees Nine Crores) only and which expired on 28<sup>th</sup> February 2022 is hereby renewed for a period of 1(one) year i.e upto 28<sup>th</sup> February 2023 under the following terms and conditions under the following terms and conditions:

**I. General Conditions:**

1. This Consent has been accorded based on the particulars furnished by the applicant on behalf of M/S MEGHALAYA CEMENTS LTD. and subject to addition of further or more conditions if so warranted by subsequent developments. The Consent will automatically become invalid if any change or alteration or deviation is made in actual practice;
2. The Consent to Operate is valid for a period upto 28<sup>th</sup> February 2023 unless otherwise suspended or revoked.
3. This Consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to the following:-
  - (a) Violation of any Terms and Conditions of this Consent;
  - (b) Obtaining the Consent by misrepresentation or failure to disclose fully all relevant facts;
  - (c) A change in any condition that require temporary or permanent reduction or elimination of the authorized discharge/emission;
4. This Consent does not convey any property right in either real or personal property or any exclusive privileges, nor does it authorizes any injury to private property or any invasion of personal rights, nor any infringement of Central, State or Local Laws or Regulation;
3. No air, water and soil pollution shall be created by the Industry beyond the prescribed permissible limits;
6. The industry shall take adequate measures for control of noise from its own source so as to comply with the Standards below:

LIMIT in dB (A) LEQ	
DAY TIME (6:00AM-9:00PM)	NIGHT TIME (9:00PM-6:00AM)
75	70

7. The caves should be preserved, in case any cave or cave's routes are encountered in the area the same shall have to be reported to the Board immediately.
8. To maintain the environment and ecology of the area, development of green belt by planting selected species of trees, the height of which should not be less than 5 (five) metres when matured and at a spacing of 1 (One) metre should be made invariably at an area of 15 ha around the Cement Plant and 2.0 ha around the colony;
9. As per the provisions of the Water (Prevention and Control of Pollution) Act, 1974 as amended and the Air (Prevention and Control of Pollution) Act, 1981 as amended that any Officer empowered by the





## Meghalaya State Pollution Control Board

Forests & Environment Department, Government of Meghalaya

'ARDEN' Lumpyngngad, Shillong-793014

Website: <http://megspcb.gov.in>



Board on its behalf shall have without interruption, the right at any time to enter the Plant/factory/for inspection, collection of sample for analysis and may call for any information as deemed necessary. Denial this right will cause withdrawal of the Consent Order;

- The Company shall comply with all the environment protection measures and safeguards recommended in the EIA/EMP;

### II. Specific Conditions:

#### A. Water & Soil Aspect:

The following measures should be taken up by the industry for prevention and control of water pollution:

- Check dams/tailing dams should be provided wherever necessary to prevent the direct discharge of mine's effluent/run off etc. into the natural water courses.
- Facilities should be maintained for utilizing the water collected in the dams for spraying of the mine, haul roads, etc. but not to discharge directly into the natural streams without proper treatments so as to conform to the prescribed effluent standards.
- Dumping of overburden, mine spoils etc. should be properly made in identified and demarcated Sites. Such dumping sites should be on impervious and stable ground to avoid percolation of contaminations into the water table and for prevention of landslides.
- Proper planning should be made so that the dumps are to be done in steps for better stabilization and the dumping sequence should be planned in such a way that plantation over the dumps can be done simultaneously with dumping.
- Continuous compacting of the dumps should be done to ensure its stability.
- Sedimental basin below the overburden dumps including plantation and vegetation over the dumps should be maintained to prevent siltation of the natural water courses.
- Facilities should be maintained for storing the top soil separately so that the same be utilised for afforestation/plantation over the dumps and excavated mines pits.
- Setting up of requisite number of permanent water quality monitoring stations on the natural water courses both upstream & down stream and selection of sampling points/stations should be made in consultation with this Board at the earliest.

#### B. Air & Noise Aspect:

- A well equipped mechanical workshop should be maintained for proper maintenance of heavy earth movable machineries (HEMM). Fuel/air burning ratio of all the HEMM is to be maintained at an optimum condition so as to reduce air pollution from the exhaust emission of these machineries.
- Regular checking of the exhaust emission from HEMM should be conducted by using requisite instruments for the purpose.
- If dry drilling is to be employed, appropriate dust collectors should be provided to control the concentration of suspended particulate matters in the emission.
- Plantation along the haul roads to reduce dust retention in the air should be maintained.
- Setting up & operation of at least three ambient air quality monitoring station with 120° angle between stations for monitoring the ambient air quality including micro meteorological data should be done immediately. Selection of station should be done in consultation with this Board.





# Meghalaya State Pollution Control Board

Forests & Environment Department, Government of Meghalaya

'ARDEN' Lumpyngngad, Shillong-793014

Website: <http://megspcb.gov.in>

Annex - II



6. Proper maintenance, lubrication etc. of all moving machineries should be maintained and all engines should be provided with high efficiency silencers.
7. Primary blasting methods should be chosen in such a way so as to have a minimum impact of noise and vibration on the environment.
8. Usage of hydraulic rock breaker for boulder breaking instead of conventional secondary blasting to minimize noise pollution should be adopted as far as practicable.
9. Adequate measures taken should be made to minimize the air blast so that the blast size is kept at the optimum for less noise.
10. Periodic monitoring of noise and vibration level should be conducted by following prescribed norms & measuring instruments for the purpose.
11. The optimum stemming column is to be maintained so that explosives are blasted in confinement stage.
12. Monitoring of the Ambient Air Quality including micro-meteorological data in at least three ambient air quality monitoring stations established around the Plant premises should be carried out weekly for 24 hours and submit the report to the MSPCB on monthly basis.
13. A detailed Report of Compliance to all the Terms and Conditions stipulated in this Consent should be submitted annually along with the application for grant of Renewal of Consent to Operate.

  
MEMBER SECRETARY  
Meghalaya State Pollution Control Board,  
Shillong

Copy to:-

1. The Director of Mineral Resources, Meghalaya, Shillong for information and necessary action with regard to Mining Lease issued.
2. ✓ M/S MEGHALAYA CEMENTS LTD., C/o The Director, Thangskai, East Jaintia Hills District - 791200 for information and necessary action.
3. Guard File No. TB-CON-2022-RCTO.



**BIODIVERSITY INVENTORIZATION AND CONSERVATION THROUGH ASSISTED  
REGENERATION OF RET SPECIES IN LIMESTONE MINING AREA OF  
MEGHALAYA CEMENTS LTD**

**PROJECT TEAM**

**Prof. D. Paul Principal, Investigator  
Dr. S. S. Chaturvedi, Co-investigator  
Paka I Yo Suja, Project Fellow**

**Department of Environmental Studies  
North Eastern Hill University, Shillong-793022**

**April, 2019**



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**Biodiversity inventorization and conservation through assisted regeneration of RET species  
in Limestone mining area of Meghalaya Cements Ltd.**

**Final Report**

**Project Team**

**Prof. D. Paul: Principal Investigator**

**Dr. S. S. Chaturvedi: Coinvestigator**

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April, 2019



Dibyendu Paul



### Executive Summary

Meghalaya Cement Ltd. (MCL) is located at Thangskai in District Jaintia Hills, Meghalaya. The area forms a part of the Shillong Plateau characterized by a rugged hilly topography. The geotectonic activities in the past have resulted in the development of deep gorges, valleys & steep cliffs, with several streams dissecting the hilly terrain. The elevation of plant area is 754msl. The plateau area around village Thangskai is dissected by numerous streams which drain the area and ultimately join the rivers Prang and Lubha. The company intended to increase the production capacity of its existing plant from 900 TPD clinker to 2,600 TPD clinker along with a 18 MW captive thermal power plant and captive limestone mines including 33.45ha ML. The plant is based on nearby limestone deposits in the villages of Moing, Kheliegari and New Kheliegari, and proposed mines in South Khlehjeri in Jaintia hills district of Meghalaya. The environmental clearance for the expansion was accorded by the State Environmental Impact Assessment Authority (SEIAA), Govt. of Meghalaya, wherein, it was stipulated that an area not less than 2 ha within the green belt of the project area would be year marked to construct a green house. It was also stipulated that a conceptual plan for raising threatened species would be prepared in consultation with a reputed institution.

The Department of Environmental Studies, North Eastern Hill University (NEHU) was entrusted to undertake the stipulations prescribe by SEIAA through a 3 year project entitled "Biodiversity inventorization and conservation through assisted regeneration of RET species in Limestone mining area Meghalaya Cements Ltd."

An extensive survey of the flora & fauna of the project area was undertaken. Line transect and quadrat sampling revealed that the flora of the project area comprised of 54 tree species and 50 species of shrub, herb and climber and species. A questionnaire survey undertaken for fauna documented the presence of 29 animal species comprising Amphibians, Reptiles, Aves and Mammals. However, camera traps failed to document the presence of animals in the project area. In consonance with the stipulations of SEIAA, several species of herbaceous plants and orchid species were collected for establishment in an installed green house and subsequent planting out





in the designated plots in the project area. Further, seedlings of other indigenous tree species and fruit bearing species have been raised in the green house and/ or procured from the Forest department for planting out in designated plots. The company has been advised to utilize the green house for continuous raising of recommended species which are to be planted out in vacant locations within the project area.

For the eco-development of the project area, it is prescribed that mine spoils are properly stacked and managed with mulches to discourage erosive losses. It is also advised that roads within the project area should have avenue plantations so as to mitigate aerial dispersal of dust due to movement of heavy vehicular traffic within the project area. The mined pits should be appropriately managed for rain water and runoff water harvesting and also as ground water recharge pits. Barren and or open areas should be provided with plant cover through green house raised seedlings of recommended tree and fruit bearing species so as to encourage visitation of fauna.



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**I. Preamble :**

Meghalaya Cement Ltd. (MCL) is located at Thangskai in District Jaintia Hills, Meghalaya. The area forms a part of the Shillong Plateau characterized by a rugged hilly topography. The geo-tectonic activities in the past have resulted in the development of deep gorges, valleys & steep cliffs, with several streams dissecting the hilly terrain. The elevation of plant area is 754msl. The plateau area around village Thangskai is dissected by numerous streams which drain the area and ultimately join the rivers Prang and Lubha.

The climate of the Khasi and Jaintia hills districts is uniquely pleasant. It is warm and humid except in winter. The mean monthly minimum temperatures ranges from 5.77°C in January to 18.15°C in July, and the mean monthly maximum temperatures ranges from 15.13°C in January to 24.38°C in June.

The area enjoys an average annual rainfall of 2415 mm. The water immediately flows down from the higher ranges downwards due to steep slopes. These drainage streams and rivulets hold water during most of the year. However, some of them become dry during summer.

Meghalaya Cement Ltd. (MCL) intended to increase the capacity of its existing plant at Thangskai in Jaintia Hills, Meghalaya, India from 900 TPD clinker to 2,600 TPD clinker along with a 18 MW captive thermal power plant and captive limestone mines including 33.45ha ML. The plant is based on nearby limestone deposits in the villages of Moing, Kheliegari and New Kheliegari and proposed mines in South Khlehjeri in Jaintia hills district of Meghalaya.

The environmental clearance for the expansion was accorded by the State Environmental Impact Assessment Authority (SEIAA), Govt. of Meghalaya, wherein, it was stipulated that an area not less than 2 ha within the green belt of the project area would be year marked to construct a green house. It was also stipulated that a conceptual plan for raising threatened species would be prepared in consultation with a reputed institution.

The Department of Environmental Studies, North Eastern Hill University (NEHU) was approached by MCL to undertake the stipulations prescribe by SEIAA. In response, NEHU submitted a proposal for a 3 year project entitled "Biodiversity inventorization and conservation through assisted regeneration of RET species in Limestone mining area of Meghalaya Cements Ltd.". the same was sanctioned by MCL in April 2016.



2. **Work Components:** The duration of the project and the work components are detailed hereunder:-

**Project Duration :** 3 years ( 2016- 2019)

1. Survey and inventorization of project area : An extensive survey of the project area will be conducted to create an inventory of the flora (tree species) and fauna (mammals).
2. Setting up of nursery for propagation of species as per TOR and recommendations of SEIAA.
3. Afforestation / regeneration / gap filling of the project area as allocated by MCL.
4. Planting and conservation of bird and mammal food plant species (grasses wild fruit trees etc.) based on assessment of camera trap data
5. Formulation of Eco Development Plan and recommendations for medium/ long term upkeep of project area.



### 3. Results:

**Work component 1:** Survey and inventorization of project area: An extensive survey of the flora & fauna of the project area was undertaken.

**Sampling:** Sampling for flora was accomplished using Line transect Method and Quadrat Method.

**Line transect method:** 500 m line transects (Measuring tape) were laid out randomly at different locations in the project area and species in contact with the tape were recorded/collected.

**Quadrat method:** Quadrats were laid out randomly at different locations in the project area and species falling within quadrats were recorded/sampled. For tree species quadrat size was 10m<sup>2</sup> and for herbaceous vegetation, the quadrat size was 1m<sup>2</sup>

**Preparation of herbaria and identification:** Herbaria were prepared with the collected plant samples and identifications were done using existing herbarium collections of NEHU. Samples which could not be identified at NEHU were referred to the BSI for identification. The samples identified are listed in Tables 1 and 2



Table .I. Tree species in and around the project site

Sl.no	Name	Family	Vernacular name
1.	<i>Actinodaphne obtusifolia</i> (Nees) Blume	Lauraceae	Dieng-lakran (K)*
2.	<i>Aesculus asiatica</i> Griff.	Sapindaceae	Dieng-dola(K)
3.	<i>Alchornea trilobata</i> (Hemsl.) M&L Arj.	Euphorbiaceae	
4.	<i>Asplenium phyllitidis</i> Th. Don.	Asplenaceae	
5.	<i>Bauhinia khansiensis</i> Baker.	Leguminosae	
6.	<i>Callicarpa arborea</i> Roxb.	Verbanaceae	Dieng-lakhoi(J)**
7.	<i>Caryota urens</i> L.	Araceae	
8.	<i>Cascoia</i> sp.		
9.	<i>Castanopsis echinocarpa</i> Miq.	Fagaceae	Dieng-sning(J)
10.	<i>Castanopsis indica</i> (Roxb. ex Lindl.)	Fagaceae	
11.	<i>Castanopsis purpurella</i>	Fagaceae	Deis-solnap (J)
12.	<i>Castanopsis tribuloides</i> (Sw.) ADC	Fagaceae	Dieng-sa-ru (J)
13.	<i>Cinnamomum feysii</i> (Buch.-Ham.) Sweet	Lauraceae	Dieng-pathi (K)
14.	<i>Dioscorea granuliflora</i> (DC.) Walp.	Dioscoreaceae	Dieng-bai (K)
15.	<i>Elaeagnus pycnantha</i> Hook. f.	Elaeagnaceae	Sashang
16.	<i>Eurya acuminata</i> DC.	Theaceae	Diengpyrchin(J)
17.	<i>Ficus hirta</i> subsp. <i>returbidula</i> (King) C. C. Berg	Moraceae	Spuas (J)
18.	<i>Ficus semivivida</i> Buch.-Ham. ex Sm.	Moraceae	
19.	<i>Lithocarpus elegans</i> (Blume) Hotus, ex Soepadma.	Fagaceae	Sarangkhio (J)
20.	<i>Lithocarpus fenestratus</i> (Roxb.) Rehder.	Fagaceae	
21.	<i>Litsea chinensis</i> Blume.	Lauraceae	Sab-syang (J)
22.	<i>Litsea laeta</i> Wall. ex Nees.	Lauraceae	
23.	<i>Litsea lanceifolia</i> (Roxb. ex Nees.)	Lauraceae	
24.	<i>Litsea mangostana</i> (Roxb.) Pers.	Lauraceae	
25.	<i>Litsea thomsonii</i> Hook. f.	Lauraceae	
26.	<i>Macaranga</i> sp.		Lakhar (J)
27.	<i>Macropus dispersa</i> (Bl.) O.	Analiaceae	Dieng-sa-rasi
28.	<i>Mallotus nepalensis</i> Mill. Arg.	Euphorbiaceae	Sia-lakhar khian (J)
29.	<i>Melastoma nepalensis</i> Lodd.	Melastomaceae	Dieng-sidang(J)
30.	<i>Micondela inaequalis</i> (Roxb.) Wight & Arn.	Rutaceae	Dieng-typsi (J)
31.	<i>Morinda angustifolia</i> Roxb.	Rubiaceae	
32.	<i>Oxodes paniculata</i> Blume	Euphorbiaceae	Deis-lakhikhow(J)
33.	<i>Persea kiangii</i> Hook. f.	Lauraceae	
34.	<i>Phyllanthus glaucus</i> Wall.		Saratun(J)
35.	<i>Pinacellodendron montanum</i> Benth.	Mimosaceae	
36.	<i>Protopersea lasiocarpa</i> Roxb.	Sterculiaceae	Dieng-khoi(K)
37.	<i>Quercus serrata</i> Roxb.	Fagaceae	
38.	<i>Rhus javanica</i> (L.) Merr.	Anacardiaceae	Dieng-sama (J)
39.	<i>Sapindus obtusatus/erecta</i> Wall.	Sapindaceae	
40.	<i>Sapota lacustris</i> Roxb.	Euphorbiaceae	Dieng-jalongh (K)
41.	<i>Sarcopoma griffithii</i> Hook. f. ex C.B. Clarke	Sapotaceae	Deis-pai (K)
42.	<i>Schinus molle</i> (DC.) Korth.	Theaceae	Shyngan (J)
43.	<i>Solanum melongena</i> Lam.	Solanaceae	
44.	<i>Solanum torvum</i> Sw.	Solanaceae	
45.	<i>Styris serrulata</i> Linn.	Styracaceae	Dieng-jaltpai (K)
46.	<i>Symplocos glomerata</i> King ex Cl.	Symplocaceae	Tiewdiengpeiang (K)
47.	<i>Symplocos</i> sp.	Symplocaceae	
48.	<i>Syzygium formosum</i> (Wall.) Mez.	Myrtaceae	Sch-shiang (J)
49.	<i>Syzygium macrocarpum</i> (Roxb.) Balak.	Myrtaceae	
50.	<i>Syzygium cumini</i> (L.) Steud.	Myrtaceae	
51.	<i>Syzygium tetragynum</i> (Wt.) Kurz.	Myrtaceae	Dieng-joleyrie (J)
52.	<i>Trevesia palmata</i> (Roxb.) Vis.	Ataliaceae	Dieng-lakhar (K)
53.	<i>Veronica volkamerifolia</i> DC.	Asclepiadaceae	
54.	<i>Wundlandia tinctoria</i> (Roxb.) DC.	Rubiaceae	Chamot (J)

\*K=Khasi,\*\*J=Jaintia



Table.2. Shrubs, Herbs, and climbers in and around the project site

S.No	Name	Family	Vernacular name	Habit
1.	<i>Acacia oryphylla</i> Graham ex Craib.	Leguminosae	Mei-tui(K)	Climber
2.	<i>Acacia parsonsii</i> (Linn.) Willd.	Leguminosae	Jemai-sheih-lyngkshuh (K)	Climber
3.	<i>Ageratina axonophora</i> (Spreng.) R.M.King & H.Rob.	Compositae	Sla-banna(J)	Shrub
4.	<i>Ageratina riparia</i> (Regel) R.M.King & H.Rob.	Compositae		Shrub
5.	<i>Amorphophallus</i>			
6.	<i>Ardisia nerifolia</i> DC.	Myrsinaceae		Shrub
7.	<i>Artemisia nagegata</i> (Cl.) Pamp.	Compositae		Shrub
8.	<i>Asplenium phyllitoides</i> D.Don	Aspliniaceae		
9.	<i>Baccharis glaucrastris</i> Mig.	Urticaceae	Diengsoikhar (K)	Shrub
10.	<i>Baccharis macrophylla</i> D.Don.	Urticaceae		Shrub
11.	<i>Benmontia grandiflora</i> Wall.	Apocynaceae		Climber
12.	<i>Calanthe erectus</i> Roth.	Araceae		Shrub
13.	<i>Caryota urens</i> Linn.	Araceae		
14.	<i>Citrus siamensis</i> (Blume) Merr	Rutaceae	Soh-syrman (J)	
15.	<i>Derris thyrsiflora</i>	Fabaceae		Climber
16.	<i>Desmodium trifolium</i> (L.) DC	Fabaceae		
17.	<i>Desmos longiflorus</i> (Roxb.) Safford	Amisicaceae		Shrub
18.	<i>Dioscorepis linearis</i> var. <i>altornata</i> (Met.) Holttum	Gleicheniaceae	Tyrkhang (J)	
19.	<i>Dioscorea</i> sp	Dioscoreaceae		Climber
20.	<i>Fissistigma serracostum</i> (Hook. f. & Th.) Merr.	Annonaceae	Jyma soh-ran khlaw (K)	Liana
21.	<i>Gonolobus tetrandrus</i> (Wall.) Shumway	Simmonaceae		
22.	<i>Jasminum</i> sp	Oleaceae		
23.	<i>Lantana camara</i> Linn.			shrubs
24.	<i>Leuca alata</i> Edgew.	Legaceae		shrubs
25.	<i>Leuca indica</i> (Burm. f.) Merr.	Legaceae	Riu-ihongpiang (K)	Shrub
26.	<i>Lycopodium paniculatum</i> Desv. ex Pei	Lycopodiaceae	Tmain-khla (J)	
27.	<i>Lycopodium latissimum</i> (L.) SW	Lygodiaceae		
28.	<i>Melastoma nepalensis</i> Ledeb.	Melastomaceae	Diem-slidong (J)	Shrub
29.	<i>Musa indica</i> (Roxb.) Wall.	Myrsinaceae	Diem-pyitien ducta(J)	Shrub
30.	<i>Pardosa foetida</i> L.	Rubiaceae	Rano-oma ait(J)	Climber
31.	<i>Pandanus odoratissimus</i> (Lamk.) Linn.	Pandanaceae	Chlan (J)	Screopine
32.	<i>Pericampylus incanus</i> (Colob.) Miess.	Menispermaceae		Climber
33.	<i>Phlogotheca thyrsiflora</i> (Roxb.) Nees.	Acanthaceae		Shrub
34.	<i>Pinus scandens</i> L.	Pinaceae		
35.	<i>Phytolacca puberula</i> Blume	Marantaceae	Sla-met(K)	
36.	<i>Pithecolobium</i>	Pithecolobiaceae		
37.	<i>Platyphragma villosa</i> Reyle	Rosaceae		Shrub
38.	<i>Pteris</i>	Pteridaceae	Tyrkhang (J)	
39.	<i>Rhaphidophora calophylla</i> Scott	Araceae		
40.	<i>Rourea nitosa</i> (Gaertn.) Leach.	Connaraceae		Shrub
41.	<i>Sarcocolla glabra</i> (Thunb.) Nakai	Chloranthaceae	Soh-kriarua(J)	Shrub
42.	<i>Smilax roxburghiana</i> Wall. Ex A. DC.	Smilacaceae	Soh-krot (J)	Shrub
43.	<i>Sesuvium tuberosum</i> Lutz.	Simmonaceae		Climber
44.	<i>Talernastomata alveticata</i> (Linn) B. Br.	Apocynaceae		Shrub
45.	<i>Tetrastigma obtusatum</i> (Lour.) Cognep.	Vitaceae	Soh-sarjung (J)	Climber
46.	<i>Tetrastigma bracteatum</i>	Vitaceae		Climber
47.	<i>Thysanotus maxima</i>	Poaceae	Saro (J)	Grass
48.	<i>Triumfetta pilosa</i> Roth.	Liliaceae	Soh-bythid (K)	Shrub
49.	<i>Uncaria sessiliflora</i> Roth.	Rubiaceae		Climber
50.	<i>Urena lobata</i> L.	Malvaceae	Soh-rhi (J)	Shrub
51.				

(K- Khasi and J - Jaintia)





the fauna are listed in Table 5. Additionally, camera traps were installed within the project area to record and document the movement of mammals and other fauna in the project area.

**Work component 2 : Setting up of nursery for propagation of species as per TOR and recommendations of SEIAA.**

For the nursery, a polyhouse with a metal framework was installed and covered with polythene sheet. Soil preparation for the nursery bed was undertaken and soil amendments in the form of dried and powdered cowdung was used. (Plate 1)

The selection of species as per the TOR and recommendations of SEIAA was initiated. The Meghalaya Biodiversity Board was approached for permission to collect *Nepenthes khasiana* but the same was denied. Therefore natural populations of other selected species in accordance to the list provided in TOR was undertaken.

Specimens of *Fimbristylis nigrobrunnea* were collected from Dainthlen, Sohra, East Khasi Hills after detailed reference from the herbarium of Botanical Survey of India, Shillong. The specimens was then transferred to TOPCEM for plantation and rejuvenation and the specimens are being nursed by the concerned Department of Meghalaya Cement limited for acclimatization, before transplanting in the designated area in the project site (Plate 1).

Orchids species were collected from Moopun falls, Mukhaialong, East Jaintia Hills, Meghalaya and Mawsawa, Sohra, Meghalaya. The collected species were then brought to TOPCEM for replantation in green house. Jack fruit seedlings for plantation were also collected from Umsning, Ri bhoi, Meghalaya but failed to survive.

**Other endemic species :** *Phyllanthus emblica* (Amla) seeds were germinated for planting out in the project area.

**Seed extraction:**

*Amla* fruits were collected from local market. The seeds were extracted by alternate boiling and drying. The fruits were thoroughly cleaned under tap water to remove dust, it was then boiled for about 15 min for easy removal of fleshy parts.

After removing the fleshy pulp, the seeds were sun dried for 2-3 days. When the seed coat broke along the ridges, seed coat and seeds were separated out manually. Seeds were then collected and stored for planting.

A Survey was carried out in Nongwet village, Pynursla and Nonthymmai, Tyna village East Khasi Hills for locating natural populations of two of the listed rare and endangered species



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i.e. *Argostemma khasianum* and *Begonia rubrovenia*. *Begonia rubrovenia* was spotted in both the surveyed sites and specimens have been collected for replantation in the project area (TOPCEM). The species that were being nursed and hardened in the greenhouse have survived, and appropriate nursery operations are being undertaken. *Begonia rubrovenea* is being propagated through stem cutting outside green house. Orchids were also transplanted from green house to trees outside the green house (Plate 1).



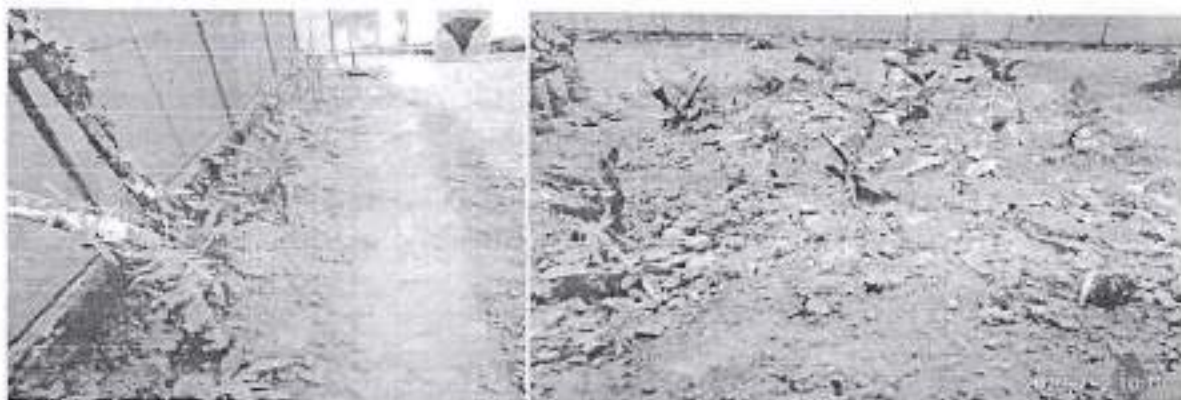


Plate I : The installed Green house and the different species being raised at MCL



**Work Component 3. Afforestation / regeneration / gap filling of the project area as allocated by MCL.**

The following species (Table 3) are recommended for plantation and gap filling in the project area (as reported earlier).

**Table.3 Some of the tree species that are proposed for planting in the project area.**

Sl.no	Scientific name
1.	<i>Alnus nepalensis</i>
2.	<i>Syzygium cumini</i>
3.	<i>Rhus javanica</i>
4.	<i>Schima wallichii</i>
5.	<i>Syzygium formosum</i>
6.	<i>Grevillea robusta</i>
7.	<i>Dauhanza grandiflora</i>
8.	<i>Phyllanthus emblica</i>
9.	<i>Sapium baccatum</i>
10.	<i>Actinodaphne obovata</i>
11.	<i>Lithocarpus fenestratus</i>
12.	<i>Castanopsis tribuloides</i>

200 saplings of indigenous tree species and fruit species were introduced in the project area. The saplings were collected from the Forest Department Social Forestry, Jowai Range. These saplings were propagated by planting out nursery raised seedlings at a spacing of 1m in 30 cm deep pits (Plate 2). The plantation area has been fenced to ensure that the seedlings/saplings are established without disturbance. Some of the species that were introduced are listed below (Table 4)

**Table4. List of species introduced in the project area for gap filling**

Sl.no	Scientific name	Family	Common name
1	<i>Alnus nepalensis</i> D.Don	Betulaceae	Alder
2	<i>Chukrasia tabularis</i> A.Juss	Meliaceae	Indian mahogany
3	<i>Castanopsis tribuloides</i> (Sw.) A.DC.	Fagaceae	
4	<i>Syzygium sp</i>	Myrtaceae	
5	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn	Combretaceae	Arjun
6	<i>Grevillea robusta</i> A.Cunn. ex R.Br.	Proteaceae	Silver oak
7	<i>Excoecaria populnea</i> (R.Br. ex Griff.) R.W.Br.	Hamamelidaceae	Pipli tree
8	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Neem



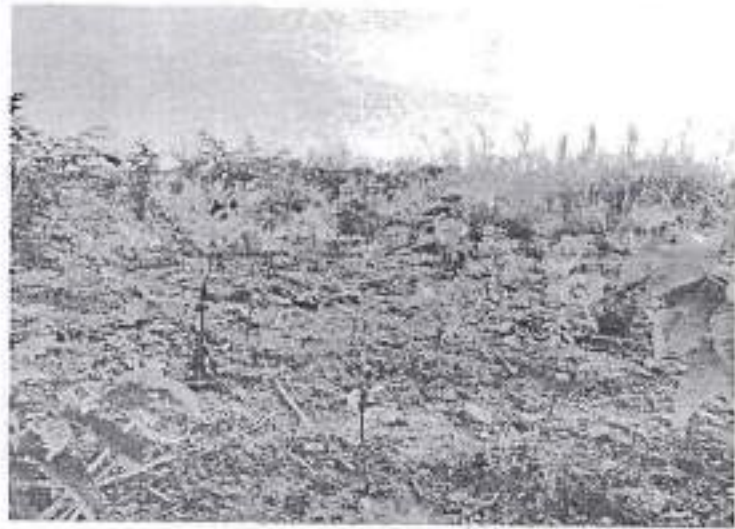


Plate II: Nursery raised seedlings planted out in designated areas within the project site



**Work component 4:** Planting and conservation of bird and mammal food plant species (grasses wild fruit trees etc.) based on assessment of camera trap data

A questionnaire survey to account for the existing fauna in the project area and its surrounding area was undertaken and is presented in Table 5. In addition to the questionnaire survey, Camera traps have been installed in the project area (Plate 3) to document the presence of different faunal elements. Till the completion of the project, the camera traps failed to record any movement of wild animals. The authorities at MCL have been advised to raise fruit bearing plants in the nursery for planting out in the project area on a regular basis.



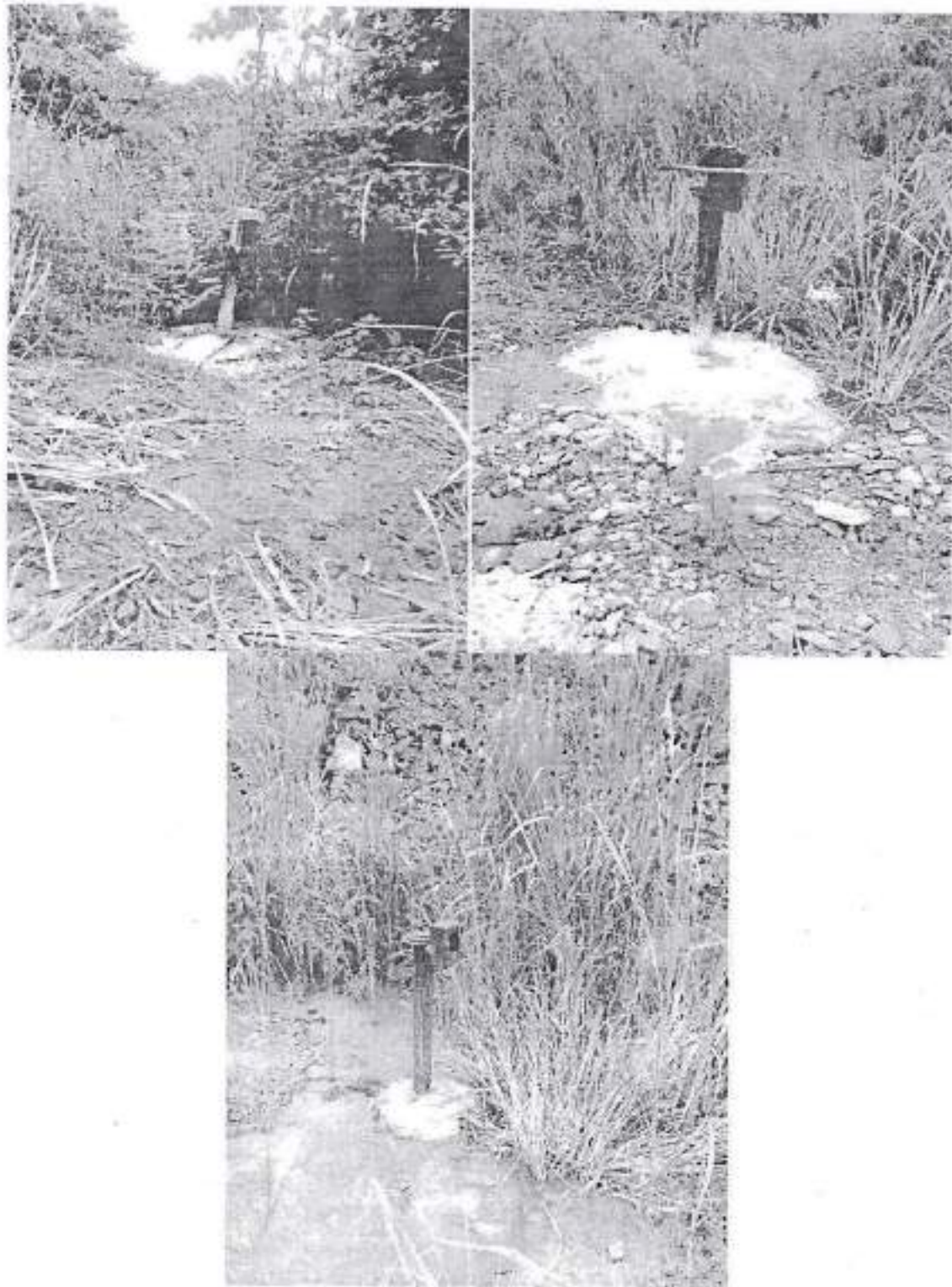


Plate III: The housing for Camera traps at different locations in the project area



Table 5. List of fauna in the project area generated through questionnaire survey

Sl.no	Scientific name	Vernacular name	Remarks
1	<i>Bambusicola fytchii hokinsoni</i>	Chyng-Kiar	Aves
2	Black drongo	Larwat	Aves
3	<i>Bubo flavipes</i>	Dhoh	Aves
4	<i>Bufoides meghalayana</i>	Khroh Chyrtob	Amphibian
5	<i>Calotes versicolor</i>	Chieh Cherko	Reptile
6	<i>Cannomys badtus</i>	Khrae Piahlang	Mammal
7	Indian pangolin	Rbae	Mammal
8	<i>Collosciurus erythraeus</i>	Rasang	Mammal
9	<i>Herpestes edwardsii</i>	Mongoose	Mammal
10	Himalayan black bear	Dngiem	Mammal
28	<i>Hoolock gibbon</i>	Hulu	Mammal
11	Indian muntjac	Skae	Mammal
12	<i>Kalij pheasant</i>	Syar Khloo	Aves
29	Indian Squirrel	Rasang stem kpoh.	Mammal
13	<i>Mus hooduga</i>	Khne Lum	Mammal
14	<i>Opheodrys vernalis</i>	Psain Rngam	Reptile
15	<i>Panthera pardus</i>	Krong	Mammal
16	<i>Passer domesticus</i>	Chyrkia	Aves
17	<i>Hystrix sp.</i>	Ynkhet	Rodent
18	<i>Presbytis pileatus</i>	Chrich	Mammal
19	<i>Psarisomus dalhousiae</i>	Purong	Aves
20	<i>Rana clamitans</i>	Khroh Rngam	Amphibian
Sl.no	Scientific name	Vernacular name	Remarks
21	<i>Rana danieli</i>	Khroh	Amphibians
22	<i>Rattus rattus</i>	Khne iung	Mammals
23	Red-vented bulbul	Riah Blong	Aves
24	<i>Rhinolopus pearsoni</i>	Labit	Mammal
25	<i>Suncus murinus griffithi</i>	Khnae Jit	Mammal
26	<i>Stus scrofa</i>	Sniang Bri	Mammal
27	<i>Varanus bengalensis</i>	Tyrpit	Reptile
28	<i>Milvus migrans lineatus</i>	Khlein	Aves
29	Indian woodpecker		Aves

Work

**component 5: Formulation of Eco-Development Plan and recommendations for medium/long term upkeep of project area:**

**Management and use of mine spoils:**

**Medium Term Plan:** Overburden generated during mining should be properly managed and stacked to discourage erosive losses. Topsoil and/or subsoil should be evenly spread out in areas where plantation activity can be undertaken. Mulches should be provided so as to ensure enrichment of soil fertility, insulation of soil against extreme temperature fluctuations and erosive losses due to impact of rainfall. Mulching shall also ensure accelerated growth of microorganisms.





and reduce evaporative losses. Spoils of larger size dimensions should be crushed so as to generate soil.

**Water harvesting and ground water recharge:** The mined out pits should be explored for their potential to harvest rainwater and/ or surface runoff through the creations of channels into such mine pits. Such pits can also form effective means for ground water recharge.

**Reforestation of barren/open areas:**

The listed native species should be propagated in the greenhouse and used for reforesting open areas and/or those affected by mining. Roads used for movement of mining equipment/ heavy vehicles should be subjected to avenue plantations/shelter breaks so as to reduce the movement and aerial dispersion of dust.

It is also advised to plant more fruit bearing species in the project area so as to encourage the increased visitation and roosting of avian species. Open/ sparsely vegetated locations within the project area should be subjected to gap filling with fodder and fruit bearing plants and grasses to encourage visitation of mammals for grazing. The greenhouse should be used for generating more seedlings/saplings on a continuous basis for future plantation programs in the project area. Cultural operations should be undertaken intermittently in the locations where new plantations have been made so as to ensure survival and proper growth of the seedlings/saplings.

**Long-term Plan:** The sites currently being used for Waste Dump and Soil Dump shall be developed into green zone by planting indigenous plants listed in Table 3 and rare and threatened tree species viz., *Argostemma khasianum*, *Fimbristylis nigrobrunnae* and *Begonia rubrovenia*. Wherever possible, orchids will be planted with an objective of adding aesthetic beauty as well as conserving the fast dwindling population of orchids in the region. The lands with poor soil may be planted with trees listed in Table 4. The seedlings of such tree species shall be raised in the green house developed for the purpose. In the long run when the mining operations shall be over, the pit shall be filled, as far as possible, with the soil and overburden collected nearby for landscaping the area into a socially acceptable landuse. The remaining part of the pit particularly deeper parts shall be developed into a water bodies. (Pit lake) which shall be used for fisheries, water sport and other recreation purposes. The whole mining area shall be developed into an eco-park for the inhabitants of village Thangskai.



Details of Action Plan for the issues raised during the Public Hearing by the stakeholders of the Elaka Narpuh for 31.05 ha Limestone mines area (as per EIA) and agree to comply.

**Annexure-IV**

Sl.No.	Issues	Action Plan	Status / Compliance
1.	During the Public Hearing concern was raised by the stakeholders that as per the environmental conditions granted to Meghalaya Cements Limited for 31.05 ha. limestone mines that the company should allocates about 40 lakh as a capital cost & 25 lakh as annual recurring cost will be kept for the various CSR activities like Health facilities (Ambulance), Education (Development School), Welfare of youth and community development.	M/s Meghalaya Cements Limited will allocate about 40 lakh as a capital cost & 25 lakh as annual recurring cost will be kept for the various CSR activities like Health facilities (Ambulance), Education (development School), welfare of youth and community development.	The detail CSR activities for financial year 2018-2019 have attached. (Annexure -IV-a)  Attached herewith as CSR detail - (Annexure -IV)
2.	Local residents have demand from the company to provide the cement at cheap rate.	The company will provide cement at cheap price to local residents.	The detail of cement distribution has attached. (Annexure -IV-a)
3.	The local residents has raised the concern and requested the officials of M/s Meghalaya Cements Limited to take appropriate mitigative measures to avoid pollution to the neighboring village due to mining activities.	M/s Meghalaya Cements Limited has taken appropriate mitigative measures to avoid pollution to the neighboring village due to mining activities.	The detail of action plan has attached (Annexure -IV -a)
4.	The local residents has raised the concern and demanded that M/s Meghalaya Cements Limited should generate 60% employment for local people also the Meghalaya Cements Limited should not emit any air pollution from its plant and should not discharge any waste into rivers bodies.	M/s Meghalaya Cements Limited will provide 60% employment to local people also will not emit any air pollution from plant and should not discharge any waste into rivers bodies.	Detailed employment record for mines has attached,  The employment given in the mines is controlled by the department mining of our company and the list of employee working under the mining department is already submitted.  Detail action plan to mitigate air and water pollution has attached. (Annexure -IV-a)



**ACTION PLAN FOR MITIGATION OF ENVIRONMENTAL POLLUTION**

**Annexure-IV – (a)**

Sl.No.	Environmental Impact	Action Plan	Status / Compliance	Cost	
				Capital cost	Recurring Cost
1.	Water pollution due to surface run-off from mines area.	a) M/s Meghalaya Cements Limited will construct check dam to avoid water contamination of local water body due to carry over sedimentation from mines area due mining activities.	The company have constructed check dam of length about 160 m at the upstream to control the runoff water to the mines and another two check dams is constructed below the waste dam and soil dam having length of about 580 m and 530 m (the last one is in progress) at the downstream.	Check dam construction – Rs 2.1 Lacs	Cleaning – once in a year – Rs 0.25
		b) M/s Meghalaya Cements Limited will construct garland drain on both side of the haul road and around the soil dump and OB dump to avoid mixing of sediments from mines area to surface run –off.	To avoid mixing of sediments from mines area to surface run –off the company have constructed garland drain of about 1125 m long on both side of the haul roads and dumping yards.	Garland Drain construction – Rs 2.8 lacs	Cleaning – once in a year – Rs 0.25 Lacs
2.(a)	Air pollution due to generation of fugitive dust.	a) M/s Meghalaya Cements Limited will take necessary measures to avoid generation of fugitive dust due to movement of vehicles by providing water sprinkler on haul road for dust suppression.	Water sprinkling is being carried out regularly at the loading point and unloading points, haul roads regularly to suppress the fugitive dust.	i) Water Tanker – Rs 12.0 Lacs	i) Maintenance Cost- 0.4 Lacs ii) Driver Salary – Rs- 4.08 Lacs iii) Diesel & Lubricants- Rs- 2.0 lacs



(b)	b) Plantation of native species to minimize the generation of air born dust due to movement of vehicles.	The afforestation is being carried out as per the approved mining plan and EIA and EMP. A total of 2324 nos. saplings of local species have been planted as on September, 2019 with survival rate of about 77.41%.	Area preparation, Sapling cost, Fertilizer and Fencing – Rs 2.75 lacs	Watch & ward – Rs- 3.25 Lacs
(c) & (d)	Air pollution due to dust generation during mining operation.	c) M/s Meghalaya Cements Limited will use wet drilling system to avoid fugitive emission due to drilling process. d) Construction of metallic Haul Road to minimize fugitive dust generation	The Meghalaya Cements Limited is using wet drilling from the inception of mining activities and the drilling machines are well equipped with the process. Metallic haul road has been prepared to transport/carryout limestone as well as Overburden.	i) Installation of Wet drilling system to ROC – Rs 0.7 Lacs. ii) Purchase of Real-time Air Sampler – Rs 4.2 Lacs, Construction Cost – Rs 7.2 Lacs Maintenance Cost – Rs 3.5 Lacs,
3.	Modification of exhaust system of mining machineries.	M/s Meghalaya Cements Limited will upgrade the exhaust of drilling and excavation machine to mitigate exhaust emission from the machines.	Continuously and periodically we are monitoring the emission of CO <sub>2</sub> gases and we are taking necessary initiatives as and when required.	i) Flue Gas Analyzer Cost- Rs 2.15 Lacs i) Spare & maintenance – Rs 0.1 Lacs
4.	Vibration due to use of traditional explosives.	M/s Meghalaya Cements Limited will use advance explosive (NONEL) to minimize the vibration generated during the explosion activity.	i) The Meghalaya Cements Limited is using NONEL/ (bottom initiations system) resulting least vibration.	i) Cost of Nonel – Rs 4.7 Lacs
5.	Maintenance of Soil Dump, OB Dump and Haul road.	Compaction of dumps and Haul roads to maintain the Stability.	JCB Compactor is used to maintain the stability of dumps and haul roads.	i) JCB Compactor – Rs 12.0 Lacs ii) Maintenance Cost- 1.5 /- Lacs iii) Driver Salary – Rs- 2. 2 Lacs iv) Diesel & Lubricants- Rs- 0.8 lacs



M/s Meghalaya Cements Limited  
Vill- Thangskai, P.O.- Lumshnong, East Jaintia Hills,  
Meghalaya - 793210

List of Occupational Health check-ups of mines employees working in the  
South Khliehjarl Limestone Mine (31.05 Ha)  
for the period of 1st April'2022 to 30th September'2022

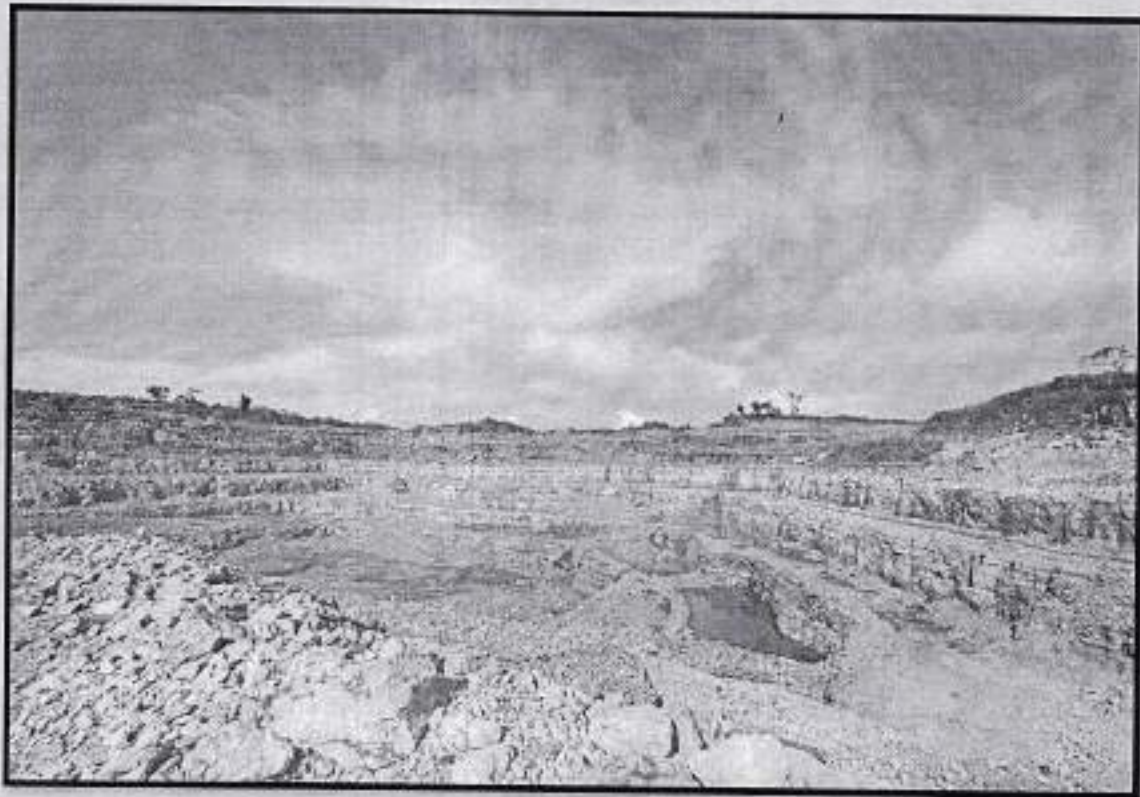
Sl. No	Name	Designation	Check-up Date	Remarks
1	Umesh Kumar	Manager	25.05.2022	
2	K. Arvind	Asst. Manager	23.05.2022	
3	Gopu Prashanth	Asst. Manager	23.05.2022	
4	A.M. Barbhuya	Geologist	24.05.2022	
5	Adarsh Kr Saket	Surveyor	26.05.2022	
6	Suvadeep Das	Surveyor	04.08.2022	
7	Pankaj Kumar	Auto Engineer	04.08.2022	
8	Raj Kumar	Auto Engineer	30.05.2022	
9	Ashok Kumar	Foreman	23.05.2022	
10	Sudarshan Dasgupta	Foreman	23.05.2022	
11	Uday Kr Jha	Foreman	23.05.2022	
12	Amitesh Kumar	DET	23.05.2022	
13	Rakesh Kr Sharma	Mining Mate	24.05.2022	
14	Madhob Phukon	Mining Mate	25.05.2022	
15	Sanjay Kr Singh	Mining Mate	24.05.2022	
16	Vakil Pandit	Mining Mate	24.05.2022	
17	Bikki Kumar	Supervisor	24.05.2022	
18	C. M. Jha	Supervisor	10.09.2022	
19	Nabajit Nath	Supervisor	23.05.2022	
20	Mintu Malakar	Supervisor	04.08.2022	
21	Debanshu Basu	Mechanical Foreman	25.05.2022	
22	Vibhesh Kumar	Electrical Forman	25.05.2022	
23	Arun Sinha	Auto Electrician	24.05.2022	
24	N.I. Laskar	Diesel Mechanic	25.05.2022	
25	Manoj Kr Yadav	Welder	04.08.2022	
26	Amar Dkhar	Hyva Opt	23.05.2022	
27	Deibormi Lapasam	Hyva Opt	25.05.2022	
28	Joy Gobind Bhulyan	Hyva Opt	25.05.2022	
29	Noril Shylla	Hyva Opt	27.05.2022	
30	Oniton Pajat	Hyva Opt	25.05.2022	
31	Prosper Rymbai	Hyva Opt	28.05.2022	
32	Pyniohlad Dkhar	Hyva Opt	25.05.2022	
33	Sunil Kr Singh	Hyva Opt	23.05.2022	
34	Sitaram Chetri	Hyva Opt	24.05.2022	
35	Samuel Rymbai	Hyva Opt	27.05.2022	
36	Talky Suting	Hyva Opt	28.05.2022	
37	Binay Sinha	Excavator Opt	24.05.2022	
38	Ganesh Ch Mahto	Excavator Opt	29.05.2022	
39	Jitendra Kr Singh	Excavator Opt	25.05.2022	
40	Sujit Barman	Doter Opt	02.09.2022	
41	Hemanta Borah	Drill Opt	28.05.2022	
42	Upendra Prasad	Drill Opt	28.06.2022	
43	Arun Kr Swargiyari	Drill Opt	26.05.2022	
44	Hansraj Pal	Blaster	22.06.2022	
45	Ajay Kr Thakur	Blaster	26.05.2022	
46	Nirbhay Kumar	Helper	26.05.2022	
47	Nanhe Kr Singh	Helper	27.05.2022	
48	Ram Kalesh Pal	Helper	27.06.2022	
49	B.P. Nongrum	Helper	25.05.2022	
50	Abhay Kumar	Helper	26.05.2022	



## MCL OCCUPATIONAL HEALTH CENTER

Health Center Staff			
Sr No.	Name of Staff	Designation	Course
1	Dr. N.Ranjit Singh	Medical officer	MBBS
2	Dr. Gita Shylla	Dentist	BCS
3	Sabir Hussain	Male Nurse	GNM
4	Tarini Bazzurah	Compounder	RMP
5	Shankar Singha	Lab Technician	MLT
6	Shilpi Nath	Nurse	ANM
7	Wanpi Talang	Nurse	ANM
8	Deimonmi Sulam	Dresser	First Aid Training
9	Other Staffs	1 no.	IR. ASSISTANT
Hospital Equipment			
Sr. No.	Hospital Equipment	Quantity	Remarks
1	ECG Machine	1	
2	Audiometry	1	
3	Spirometry (PFT)	1	
4	Cardiac Monitor	1	
5	Oxygen Cylinder for oxygen Inhalation (Jambo)	5	
6	Oxygen Cylinder for oxygen Inhalation (10 kg)	6	
7	Suction Machine	1	
8	Nebulizer Machine	2	
9	Bed in Ward	2	
10	Bed in Emergency ward	1	
Lab Equipment			
Sr. No.	Hospital Equipment	Quantity	Remarks
1	Semi auto analyzer	1	
2	Micro scop	1	
3	incubator	1	
4	Centrifuga machine	1	
5	Hemometer	1	
6	Acto check machine	1	
7	Blood cell counter	1	
8	Hemocto meter	1	
TEST FACILITY			
1	Blood RE (TC, DLC, ESR, HBS)		
2	Blood Sugar		
3	KFT, LFT, Lipid Profile		
4	Malaria		
5	Trop - T		
6	VDRL, HBSAg, HCB		
7	ASO titre		
8	Widal test		
9	Rheumatoid factor		
10	Grouping, ABO RH typing		
11	Uric acid		
12	AFB		
13	Urine analysis (test)		
DENTIST FACILITY			
1	Dentist X-Ray Machine		
2	Dentist Chair		
AMBULANCE			
1	Ambulance Traveler (Advance Life Support)	1	With Facility = Cardiac Monitor - 1 no., Defibrillator - 1 & Oxygen support
2	Ambulance (TATA SUMU)	1	With Facility = Oxygen support
Hospital Emergency Service			
1	A) Annual Periodic Medical Examination of Employees. (ECG, Audiogram, PFT, Blood Test, Urine Test & Physical examination) B) Handling Emergencies in OHC Centre :- Accidental Cases, Burning cases, Snake bite, Cardiac arrest and all emergency and primary treatment given. C) OPD		

**REPORT ON HYDROGEOLOGICAL STUDY IN AND  
AROUND MEGHALAYA CEMENTS LIMITED,  
EAST JAINZIA HILLS DISTRICT, MEGHALAYA**



**Submitted to:  
MEGHALAYA CEMENTS LIMITED**



August, 2021

**Centre for Ground Water Studies**

**54/B/2 Jadavpur Central Road,  
Kolkata 700032 .**

**Phone No.: 033 2412 0142**

**E-mail: [cgws@rediffmail.com](mailto:cgws@rediffmail.com)**



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### ACKNOWLEDGEMENT

The team of consultants from Centre for Groundwater Studies (CGWS) conducted the hydrogeological survey in and around Meghalaya Cements Limited (MCL) , duly acknowledge the cooperation including all logistic support and technical inputs during the survey, from the team of Senior Management & Senior officers of MCL namely Vice President (Projects), DGM (Purchase), Vice President (P&M), G M (Mines), Asst. Manager (Geology & Planning), Sr. Engineer (ISO & Environment) & Asst. Engineer (Geology & Planning).



## EXECUTIVE SUMMARY

The Meghalaya Cement Limited (Topcem), through its order no 4700018838, dated 23.03.2021, assigned a scientific study on Hydrogeological Survey and Investigation in and around the Limestone mining area of the company (MCL) to Centre for Ground Water Studies,(CGWS), Kolkata. The mining area is located in Thangskai village near village Lumshnong in Khliehriat block of East Jaintia Hill district of the state of Meghalaya. The scope of work in the study, envisaged to take into account all the major components of Hydrology and Hydrogeology in terms of Geomorphological studies (geomorphic features such as landforms etc) movement of surface water, natural surface gradient. The work also includes Geological studies ( presence of fractures), Hydrogeological studies (ground water occurrence its potential both in terms of quantity and quality) .

A study report based on the findings of the investigations is required to be prepared and submitted to MCL. Field visit to the study area could not be taken up after receiving the work order due to surge in covid-19 cases all over the country including Meghalaya, Assam and West Bengal during the period April'21 to June'21, however citing literature and collection of secondary data was in progress till the last week of June 2021. Field study was taken up during the period 5.7.2021 to 9.7.2021.

The Study Area of the present work comprises the Thangskai village in Khliehriat block under East Jaintia Hill district of the state of Meghalaya with limestone mining lease area of 31.05 Ha and the adjoining cement workshop area as the core and a buffer area which is within 10 km radius in the vicinity of the mining area.

The objective of the study is to prepare a comprehensive hydrogeological report containing technical details on groundwater condition prevailing in the study area in terms of depth to groundwater level below the mining lease hold area and to assess the quality of groundwater in the buffer zone area so as to ascertain any adverse impact of mining on quality of groundwater.

Daily requirement of water for different uses ie. domestic purpose, cement plant, industrial cooling, CPP, plantation and dust suppression in the mine area is about 1355 m<sup>3</sup>/day.



The scope of work covers geological, geomorphological, hydrological and hydrogeological investigations in the study area. Hydrological and hydrogeological studies include collection of rainfall data from IMD (Indian Meteorological Department) and analyses of rainfall data received, inventory of depth to groundwater levels. Collection of water samples from different sources, their chemical analysis in a recognized laboratory provides qualitative assessment of ground water.

The methodology of study can broadly be divided into three parts. The first part involves investigation of study area at field level with generation of both primary and collection of secondary data from the technical personnel of MCL. The other part involves collection of reliable secondary data from the institutions of repute engaged in specialized work in that discipline.

Geomorphologically, the area is an undulating one comprising dissected plateau, denudational (remnant after erosion in the geologic past) high and low hills with deep gorges. Undulating topography, dissected by numerous rivers and streams is the characteristic feature of the study and its adjoining area. This feature favours surface run-off and does not allow water received from rainfall to get infiltrated into the underlying aquifer, if any. The drainage pattern of dendritic, rectangular and at places parallel to sub-parallel types are found in the area which indicates mainly structural control with topography playing a minor role. It is being controlled by joints and faults as indicated by the straight courses of the rivers and streams with deep gorges.

The climate of any region is governed by the two parameters ie, temperature and rainfall. On analyses, it is found that the month of January is the coldest month, when temperature goes down to about 9°C. The maximum temperature of the year, is experienced in the months of May to August when temperature revolves around 30°C. The area is influenced by the south-west monsoon and rainfall is assured during summer. The average rainfall is of the order of 6683.18 mm per annum. Rainfall data recorded by the Indian Meteorological Department (IMD) has been taken into account for computation and analyses. The area receives a fairly high rainfall throughout the year. Most of the precipitation occurs between June to September due to south-west monsoon originating from the Arabian sea. The months of April and May also receive a fair amount of rainfall of the order of 500 mm to 800 mm, if it is compared with the



rainfall of the same period in rest of India- although it constitutes only 20% of the total annual rainfall in the region. This orographic rain during the non-monsoon period, results from clouds originating in the Bay of Bengal that drifts towards the Bangladesh plains after hitting the Jaintia hills and rapidly rise to the upper atmosphere, where they swiftly cool down and result in heavy precipitation. This implies that rainfall is well distributed throughout the year and non- monsoon months also contribute to the annual rainfall in the area. July is the wettest month, when rainfall down pouring on the area is as high as 1500 to 2000mm, which can be compared with the annual rainfall of some of the high rainfall eastern states of India.

The district area falls mainly within the Shillong or Meghalaya Plateau which is constituted mainly of Precambrian rocks of gneissic composition in which granites, schists, amphibolites, calc-silicate rocks occur as inclusions of various dimensions. The gneisses form the Basement Complex for the overlying Shillong Group of rocks ( Tertiary sediments) and is separated from the later by an unconformity indicated at places by the occurrence of a conglomerate bed.

These occur mostly as thick layers. Granite Plutons occur as isolated patches in the district , intruding the Basement Gneissic complex and Shillong Group of rocks. The Granites occur as intrusive body in the Basement Gneissic complex. Both Porphyritic and fine-grained pink granite occur in the area.

The Shella Formation of Jaintia Group consists of alteration of sandstone and limestone occurs in the south-central and south-western part of the district. The different lithounits of the area belong to Jaintia series of Eocene age. The limestone unit belongs to Sylhet stage Shella Formation of Jaintia series of middle Eocene age. Three bands of limestone occur in the area which are Known as Prang, Umlatdoh and Lakadong limestone bands. These are separated by Narpuh sandstone and Lakadong sandstone. The topmost limestone band i.e. Prang limestone occurs further south of the study area.

In hydrogeological study, lithological logs of the selective borehole were studied and it was found that the overburden consisting of Narpuh sandstone with loose soil and limestone boulder ranges in thickness from 7.80 to 16 m , Umlatodh limestone 21 to 33m, Lakdong sandstone 4.80 m and Lakadong limestone 4.60 to 5.90 m. In almost all the boreholes there is an alternate layer of Sandstone & Limestone. **It has been further reported by MCL that no**



water bearing fracture zones were encountered in any of the core bore holes drilled in the mining lease area down to the reduced level depth of 668 mamsl. During the course of hydrogeological survey in the study area field traverse in the core area & in the buffer zone area of 10 Km radius was taken. Three bore wells were found in operation, the reported depth of the bore wells ranges from 80 m to 130 m below respective reduced levels and yield of one such bore well was measured and recorded as 1.5 ( IOCL Petrol pump, 483 mamsl ). Field level hydrogeological study also indicates that ground water level is at a depth far below the reduced level of the present lowest bench of the mining activity except for a few locations where cavity within the limestone might have been encountered which reflects an anomaly from the general ground water level scenario in the area. The findings at the ground level matches with the recorded borehole logs which indicate that no water bearing zone was encountered during the core drilling of approximately of 20 core boreholes. It is therefore expected that water bearing fractures are much below the present lowest bench of mining.

The water samples from one surface water resource, five groundwater structures and rainwater were collected during field survey to study the water quality as well as hydro-geochemistry of water in the area. The samples were subjected for analysis for both major and minor parameters viz. pH, Total dissolved solids, Conductivity, Sodium, Calcium, Potassium, Manganese, Chloride, Sulphate, Carbonate, Bicarbonate, Iron, Total Hardness and Total Alkalinity. In order to study the chemical quality, ground water samples were also analyzed for Arsenic. the pH of ground water samples at all the sampling points was found to be slightly alkaline ranges from 6.69 to 8.16, except spring water collected at Lumshnong. The alkaline pH of water samples near limestone mining and cement manufacturing sites found in present study may be due to the weathering of calcium carbonate rocks and minerals present in limestone of this area. All other parameters of water quality analyses are well within the permissible limit of drinking water limits of BIS ( Bureau of Indian Standard) including Arsenic and Calcium. Slightly higher pH is not harmful. Rock-water interaction behavior is important to evaluate the weathering, ion exchange process, and dissolved constituent that consequences in the groundwater quality. Gibbs diagram that is widely used to recognize the functional sources of the dissolved chemical element of the water and the effect of hydrogeochemical processes,



such as precipitation dominance, evaporation dominance, and rock-water interaction dominance, was applied to ascertain the origin of water samples collected. In the present study the Gibbs diagram based on TDS and the concentration of cations and anions, shows that most of the cations and anions in groundwater of deeper aquifer have a rock-dominance and spring water (Shallow aquifer) have a Precipitation dominance origin.

The information collected from MCL, reveals that the general orientation of the pits is in NE-SW direction and the existing working pits are located in the central, south eastern part & SW boundary of the lease area. The lowest level of the existing mine pit is 668 mamsl (RL). From the results of the boreholes & surface exposures it was established that entire lease area is limestone bearing and depth wise extension was proved down to 643.20 mamsl (RL). The reduced level for the lowest bench for the present Mining Plan shall be 661.2 mamsl (RL).

Since aquifers (water bearing layer) in this undulating topography with hard sedimentary rocks beneath the ground surface, are localized in nature and cannot be extended regionally. However, considering the hydrogeological set up of the area, it can be inferred that the groundwater level, is well below the present lowest mining level of 668 mamsl. Groundwater is not likely to be encountered, within the present Mining Plan of 661.2 mamsl (RL).

Construction of a monitoring well is recommended which will establish the inference drawn about the depth of groundwater level in the mining lease hold area. This monitoring well can be used for recording both depth to water level and water quality analyses results, periodically and the data generated can be placed before the regulating agencies like Indian Bureau Of Mines, Central Pollution Control Board and Central Ground Water Authority.



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## CHAPTER I

### INTRODUCTION

The Meghalaya Cement Limited (Topcem), through its order no 4700018838, dated 23.03.2021, assigned a scientific study on Hydrological Survey and Investigation in and around the Limestone mining area of the company (MCL) to Centre for Ground Water Studies (CGWS), Kolkata. The mining area is located in Thangskai village near village Lumshnong in Khliehriat block of East Jaintia Hills district of the state of Meghalaya. The scope of work in the study, envisaged to take into account all the major components of Hydrology and Hydrogeology in terms of Geomorphological studies (geomorphic features such as landforms etc) movement of surface water, natural surface gradient. The work also includes Geological studies (Presence of fractures), Hydrogeological studies (ground water occurrence its potential both in terms of quantity and quality).

A study report based on the findings of the investigations is required to be prepared and submitted to MCL. Field visit to the study area could not be taken up after receiving the workorder due to surge in COVID-19 cases all over the country including Meghalaya, Assam and West Bengal during the period April'21 to June'21. However citing literature and collection of secondary data was in progress till the last week of June 2021. Field study was taken up during the period 05.07.2021 to 09.07.2021.

### STUDY AREA

The Study Area of the present work (Fig. 1) comprises the Thangskai village in Khliehriat block with limestone mining lease area of 31.05 hector and the adjoining cement workshop area as the core and a buffer area which is within 10km radius in the vicinity of the mining area.

### LOCATION AND ACCESSIBILITY

The study area falls in Thangskai village in Khliehriat block under East Jaintia Hills district of the state of Meghalaya. The study area falls in Survey of India toposheet no. 83C/SW (New) or 83C/8 (Old). The Study area at Thangskai is bounded by longitude  $92^{\circ}23'00''$  E to  $92^{\circ}23'18''$  E





and by latitude  $25^{\circ} 12' 12''$  N to  $25^{\circ} 12' 48''$  N. Its distance from the state capital Shillong is 104 Kms on the National Highway number 44 connecting the capital and the eastern part of Assam passing through the district. The study area is located at a distance of 18 km south of district and block headquarters Khliehriat. The air route is through Shillong airport and Guwahati airport. The rail route is through Badarpur railway junction. Thangaskai is situated on a all weather metalled road which runs upto Agartala in the state of Tripura through Silchar in Assam.

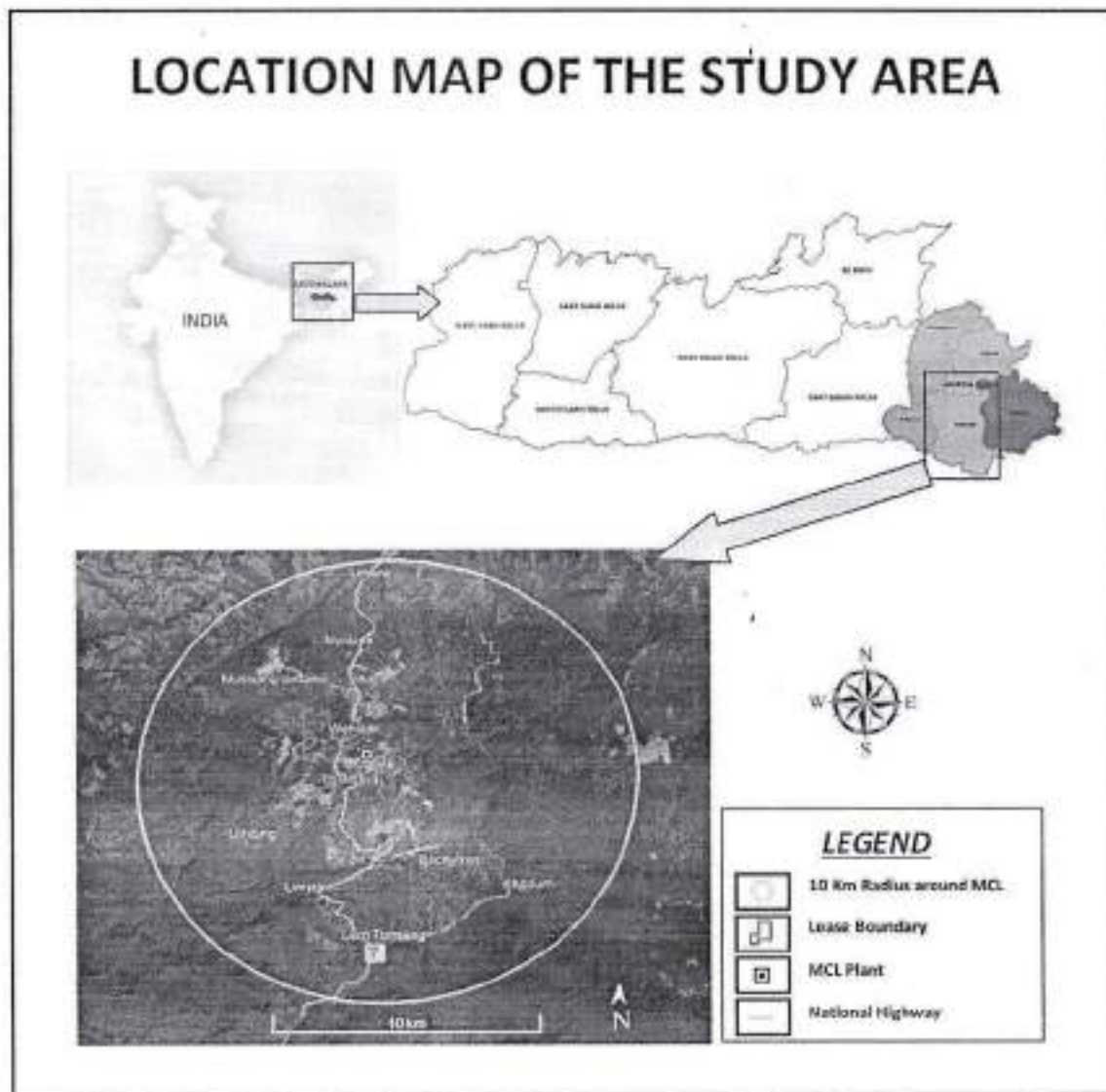


Fig 1 : Location map of the study area

### ADMINISTRATIVE SETUP

Thangskai village is located in East Jaintia Hills District. East Jaintia Hills District is one of the 11 (eleven) districts of the state of Meghalaya with the bifurcation of the erstwhile Jaintia Hills District into East and West Jaintia Hills District. East Jaintia Hills District came into existence on 31<sup>st</sup> July 2012 with its Head Quarter at Khliehriat. East Jaintia Hills is the home of one of the major tribes of the state of Meghalaya popularly known as the 'Jaintias' or the 'Pnars' and sub tribes like the 'Wars' and the 'Biates'.

It comprises all the village of two community and rural development blocks viz. Saipung community & Rural Development Block and Khliehriat Community & Rural Development Block. **Thangskai falls in Khliehriat Community & Rural Development Block** with the following boundaries in the North – West Jaintia Hills District and Assam, South – Bangladesh and Assam, East – Saipung Community & Rural Development Block and in the West – West Jaintia Hills District.

### OBJECTIVE OF THE STUDY

The objective of the study is to prepare a comprehensive hydrogeological report containing technical details on groundwater condition prevailing in the study area in terms of depth to groundwater level below the mining lease hold area and to assess the quality of groundwater in the buffer zone area so as to ascertain any adverse impact of mining on quality of groundwater.

Water in the study area is utilized for various purposes. Wet drilling is practiced to reduce noise generation, dust suppression is carried out in mine working area and on haul roads (transport roads) by sprinkling water from water tanker. Plantation is carried out to develop Green belt. The total requirement of water of MCL is met from the river Lunar, which is 5km away from the Cement Plant or workshop of MCL. Withdrawal of groundwater is not envisaged by the company authority, as there is adequate water available in Lunar river throughout the year, which is brought to the plant area through pipeline deploying multistage pumping.

### SCOPE OF WORK

The scope of work covers geological, geomorphological, hydrological and hydrogeological investigations in the study area. Geological investigation covers identification of rock types



present, the noticeable structural features on them at the field level and correlating the features with the available authentic literature on the geology of the area. Scope of work also involves study of physiography (landforms, landslopes and categorizing them in different units etc) and drainage (movement of surface water, preparation of drainage map) in the area as part of the Geomorphological studies. Hydrological and hydrogeological studies include collection of rainfall data from IMD (Indian Meteorological Department) and analyses of rainfall data received, inventory of depth to groundwater levels. Collection of water samples from different sources, their chemical analysis in a recognized laboratory provides qualitative assessment of ground water.

The scope of work also includes preparation of a technical report containing the findings of the investigations with facts and figures, suitably represented by tabulated formats, graphs and maps wherever necessary. The report in conclusion includes recommendations with measures of interventions.

#### **METHODOLOGY OF INVESTIGATIONS**

The methodology of study can broadly be divided into three parts as follows

1. The first part involves investigation of study area at field level with generation of both primary and collection of secondary data from the technical personnel of MCL. While generating primary data, inputs were recorded either through direct measurements during the field investigation or enquiring from the officials of MCL who accompanied the consultants from CGWS during all the 3days and collection of secondary data from the officials of Environmental Department of MCL.
2. The other part involves collection of reliable secondary data from the institutions of repute engaged in specialized work in that discipline. Use of Google map and available literature in soft and hard copies to comprehend the scenario with respect to ground water in the area.
3. Synthesis, of both primary and secondary data, analyses of data using various tools, and interpretation of the findings in terms of required output.

In the first part, field traverses were undertaken, to study and record the inputs on the geology, geomorphology, hydrogeology, watershed, catchment area etc. to ascertain the availability of the existing sources of water for the mining industry and also for the consumption of villagers in



the core and buffer area. The water sources may be from open or dug well with or without pumping devices, the other source may be bore wells or fitted with pumps having an overhead tank. Another source is deep bore wells, energized with electric pumps. Spring water is tapped at various convenient locations with simple rubber or plastic pipes which at places connected to stand point structure. Water samples of both surface and ground water sources were collected for chemical analyses to ascertain the quality of water, specially from the point of view of drinking water standard of BIS (Bureau of Indian Standard).

The input data collected from MCL, in terms of Water consumption data, raw river water quality data, water quality data of captive power Plant, Scrutiny Comments, on Draft Review of Mining plan report, were consulted and incorporated wherever necessary.

## CHAPTER II

### GEOMORPHOLOGY & CLIMATE

#### Geomorphology

The study area, is sparsely populated mountainous region which constitutes part of the Meghalaya plateau and has an average elevation of more than 3,000 feet (900 metres). It receives generally heavy rainfall and is densely forested. It is a rolling tableland. Geomorphologically, the district is an undulating one comprising dissected plateau, denudational (remnant after erosion in the geologic past) high and low hills with deep gorges. Undulating topography, dissected by numerous rivers and streams is the characteristic feature of the study area and its adjoining area. This feature favours surface run-off and does not allow water received from rainfall to get infiltrated into the underlying aquifer, if any.

The area represents a remnant of ancient plateau of Indian Peninsular shield uplifted to its present height due to tectonic activities in the past and deeply dissected, suggesting several geotectonic and structural deformities that the plateau has undergone. The southern parts form a platform on which Tertiaries were deposited in the post- cretaceous period. Topography



varies from gently rolling type to highly undulating type. The study area (buffer zone) can be differentiated into two major following geomorphic units.

- Alluvial plain in the southern part of the study area bordering Bangladesh.
- Area having denudo-structural hills and highly undulating topography.

### Drainage

The drainage pattern of dendritic, rectangular and at places parallel to sub-parallel types are found in the area which indicates mainly structural control with topography playing a minor role. It is being controlled by joints and faults as indicated by the straight courses of the rivers and streams with deep gorges.

The important river and stream in East Jaintia Hills district includes WahLukha, Umtyrngai, Umlunar, Seshympa, Wahlaring, Umbadoh, Umutha, Lubachhra, Sharigoyain. Umparthi and Umchyrtong streams join Umlunar which is a tributary of Lukha river. Sharigoyain river act as physical boundary between West Jaintia hills and East Jaintia Hills. The rivers of the study area fall in Meghna basin. Lukha river is located at a distance of 5 km from the study area. The river is beautifully bounded by beautiful mountains and landscape on both sides as it is flowing downward to Bangladesh. All the major rivers and streams flow towards south. The drainage map, map of major river basin in Jaintia Hills and map of major rivers and catchments in Jaintia Hills is shown in Fig. 2,3 and 4.

The drainage system of the district is also to an extent controlled by topography. The streams and rivers of the study area flow in the southerly direction and towards the Surma valley in Bangladesh.





### DRAINAGE MAP OF THE STUDY AREA

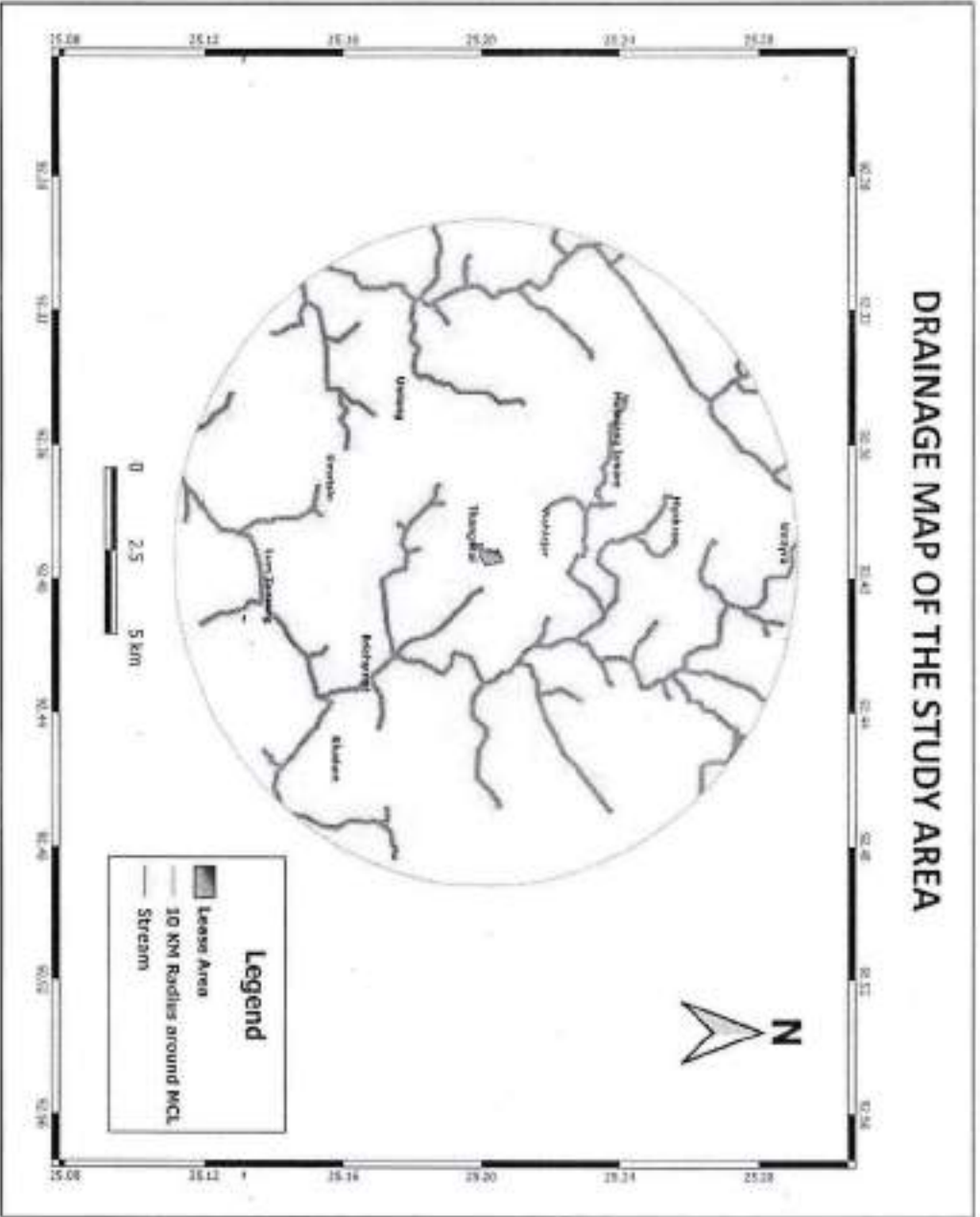


Fig 2: Drainage map of the study area (Source: CGWB)

(Map prepared by CGWS, Kolkata)



# MAJOR RIVER BASIN IN JAINTIA HILLS

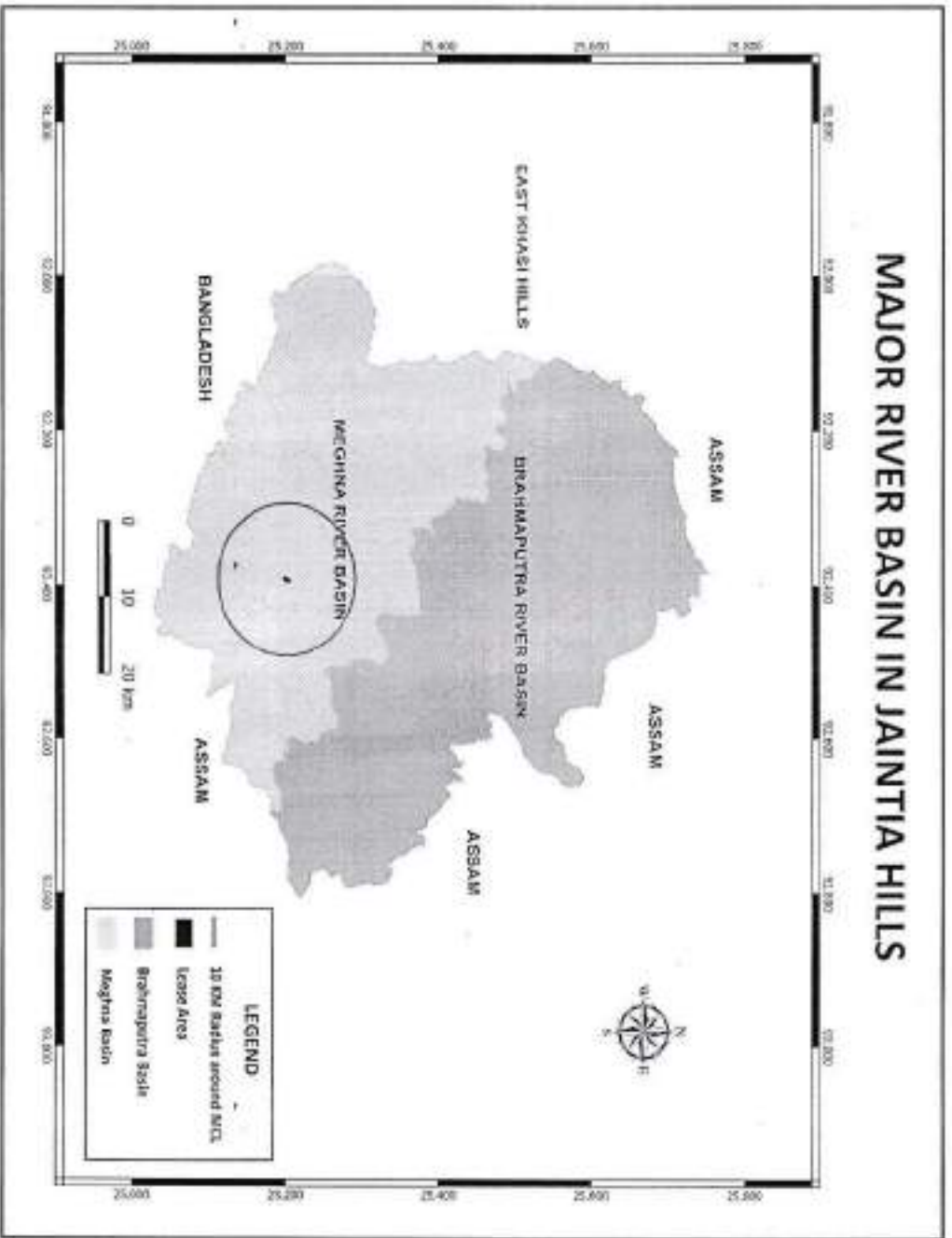


Fig 3: Major river basin in Jaintia Hills



# MAJOR RIVERS AND CATCHMENTS IN JAINTIA HILLS

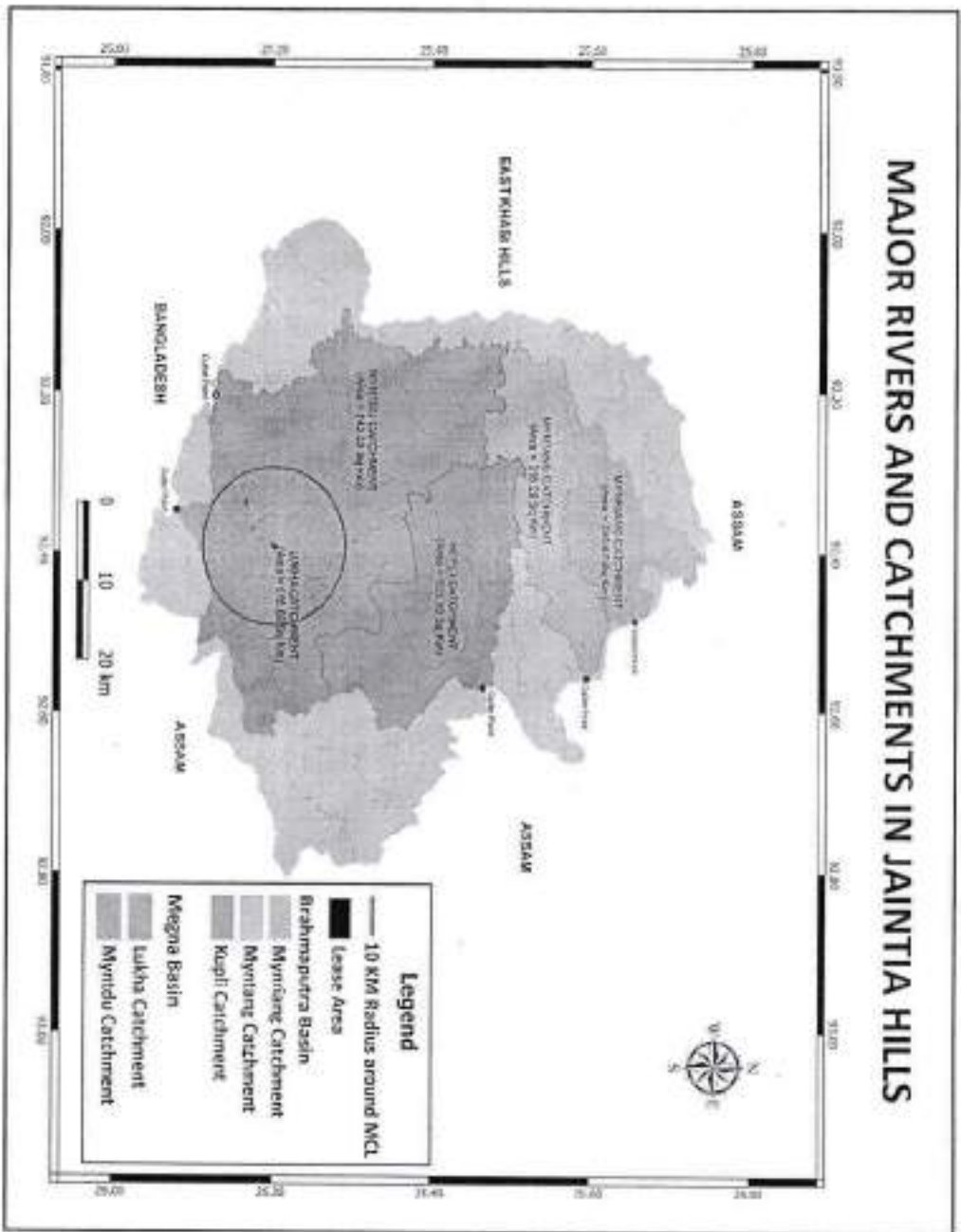


Fig 4: Major rivers and catchments in Jaintia Hills





**CLIMATE:****Temperature:**

The climate of any region is governed by the two parameters ie, temperature and rainfall. The temperature data of the last five years ( from 2015 to 2019), has been analysed. On analyses, it is found that the month of January is the coldest month, when temperature goes down to about 9<sup>o</sup>C, followed by the months of December and February. The maximum temperature of the year, is experienced in the months of May to August when temperature revolves around 30<sup>o</sup>C. The mean temperature has been computed taking into consideration, mean temperature of each day of every month for a period of 5 years. The temperature data collected from NASA LaRC Sciences Data Center and analysed, has been presented in tabular form (Table 1) and also graphically in the figure number 5 and 6.

Based on temperature, the climate of the study area is mildly sub-tropical to temperate. In the winter months the climate is pretty cold like the other parts of the state and the district, the study area has a very pleasant climate.

Table 1: Monthly minimum, maximum and mean temperature variations for the period 2015-2019  
(Data Source: NASA LaRC Sciences Data Center)

Year (2015-2019)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max Temp	22.29	24.54	28.6	28.88	28.99	28.95	29.09	30.05	28.65	27.96	25.11	23.13
Mean Temp	14.93	17.36	20.73	23.25	24.72	25.59	25.56	25.85	25.11	23.05	19.50	16.03
Min Temp	9.17	11.4	14.24	18.45	20.94	22.94	22.81	23.01	22.36	18.02	14.01	10.43



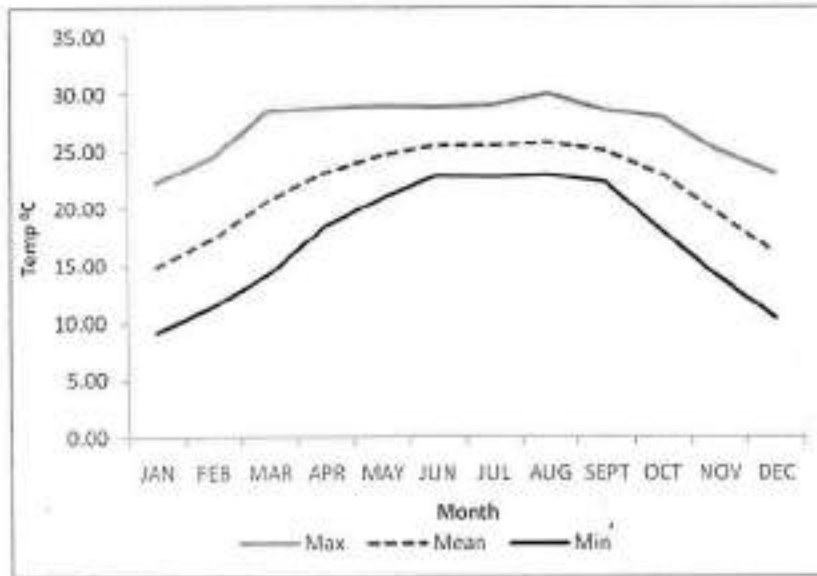


Fig 5: Monthly minimum, maximum and mean temperature variations for the period 2015-2019

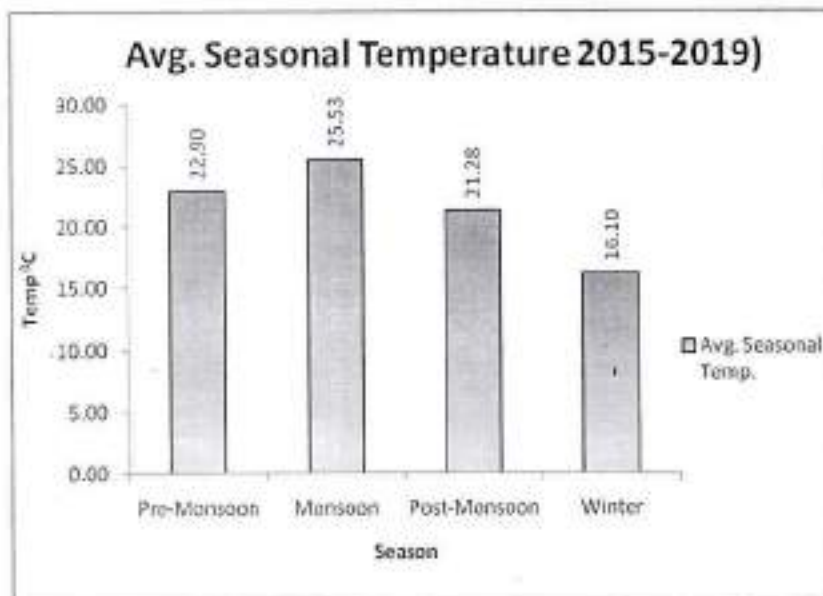


Fig 6: Average seasonal temperature variation



## RAINFALL

The area is influenced by the south-west monsoon and rainfall is assured during summer. Rainfall data recorded by the Indian Meteorological Department (IMD) has been taken into account for computation and analyses. Since the data available for Jowai recording station of IMD, was not available in a continuous time series for the last five years, the data available for Shillong station for the last five years (2016-2020), was analysed. It was observed that the data of Jowai and Shillong does not vary much. The average annual rainfall in the study area considering Shillong station of IMD, is 6683.18 mm/annum. The area receives a fairly high rainfall throughout the year. Most of the precipitation occurs between June to September due to south-west monsoon originating from the Arabian sea. The months of April and May also receive a fair amount of rainfall of the order of 500 mm to 800 mm, if it is compared with the rainfall of the same period in rest of India- although it constitutes only 20% of the total annual rainfall in the region. This orographic rain during the non-monsoon period, results from clouds originating in the Bay of Bengal that drifts towards the Bangladesh plains after hitting the Jaintia hills and rapidly rise to the upper atmosphere, where they swiftly cool down and result in heavy precipitation. Rainfall during the winter months, specially in the month of October is also high which is of the order of 343.5mm which is attributed to 'Retreating Monsoon', when moisture laden south-west monsoon winds get reflected from the High Himalaya ranges and on their way back, precipitate in Myanmar and other adjoining hilly areas. This implies that rainfall is well distributed throughout the year and non- monsoon months also contribute to the annual rainfall in the area. July is the wettest month, when rainfall down pouring on the area is as high as 1500 to 2000mm, which can be compared with the annual rainfall of some of the high rainfall eastern states of India.

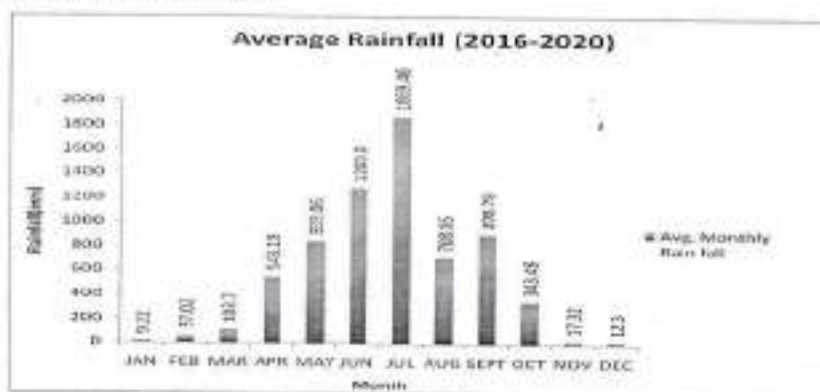
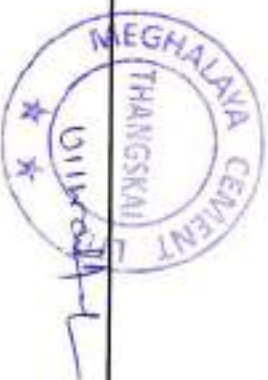


Fig. 7: Monthly variations of mean rainfall for the period 2016-2020

Table 2: Rainfall Data in mm over a period of last 5 years till 2020 (Data Source: IMD)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	Annual RF	Monsoonal RF
2016	13.7	8.8	83.7	1026.9	661.2	796.4	2603.8	318.6	644.4	335.6	25.7	7.5	5526.3	4363.2
2017	0.6	214.4	313.4	887.4	395.9	1537.9	1433	1523.6	854	471.9	11.8	35.8	7679.7	5348.5
2018	3.6	18.1	67.7	254.6	691.5	1129.7	1431.7	746.6	617.5	73.9	6.1	14.9	5065.9	3925.5
2019	0.1	28.9	22.5	271.9	913.5	1474.5	2210.6	731.3	1016.6	508.3	25.8	3.3	7207.3	5433
2020	28.1	14.9	31.2	265.1	1533.2	1465.5	1666.2	224.2	1361.4	327.7	17.2	0.0	6936.7	4719.3
Average													6683.18	4757.9



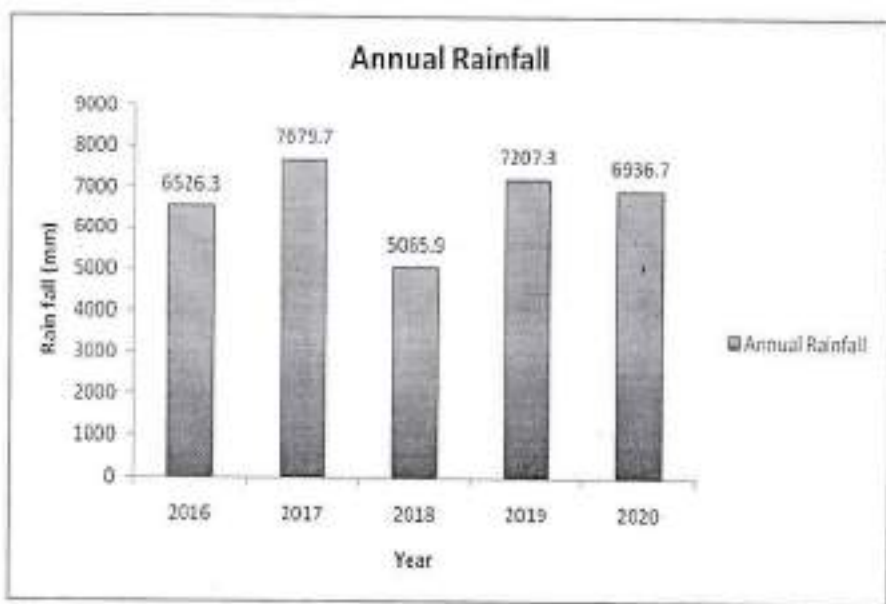


Fig 8: Annual rainfall for the period 2016-2020

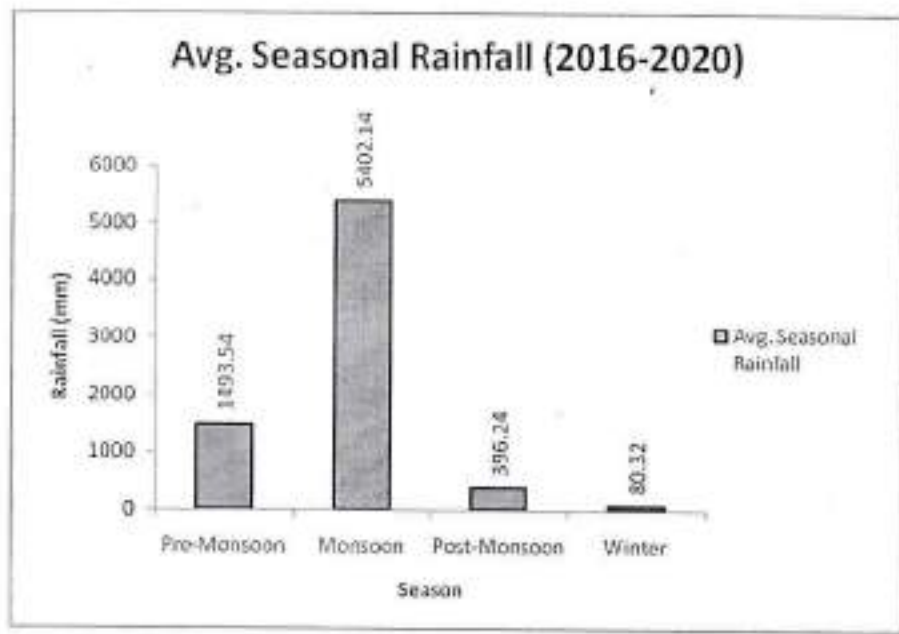


Fig 9: Seasonal variations of rainfall for the period of 2016-2020



## CHAPTER - III

### GEOLOGY

#### Regional Geology

The state of Meghalaya covers an area of approximately 23,000 sq km. East Jaintia Hills District is located at the eastern most part of Meghalaya. It covers an area of 2040 sq. Kms . The district area falls mainly within the Shillong or Meghalaya Plateau which is constituted mainly of Precambrian rocks of gneissic composition in which granites, schists, amphibolites, calc-silicate rocks occur as inclusions of various dimensions. The gneisses form the Basement Complex for the overlying Shillong Group of rocks and is separated from the later by an unconformity indicated at places by the occurrence of a conglomerate bed.

These occur mostly as thick layers. Granite Plutons occur as isolated patches in the district , intruding the Basement Gneissic complex and Shillong Group of rocks. The Granites occur as intrusive body in the Basement Gneissic complex. Both Porphyritic and fine-grained pink granite occur in the area.

The unconformably overlying Shella Formation of Jaintia Group consists of alteration of sandstone and limestone occurs in the south-central and south-western part of the district. The shelf facies of Barail Group, consists of fairly coarse grained sandstone, shale, carbonaceous shale with streaks and minor seams of coal and occupy the south-eastern part of the District.

The Tertiary sediments are thick, extensive and are divided into three groups, viz. a) the Khasi Group, b) the Jaintia Group and c) the Barail Group. The Cretaceous rocks of Mahadek Formation of the Khasi Group consist of feldspathic sandstone, conglomerate. The Jaintia Group is a calcareous facies and has been divided into two formations viz. Shella Formation and Kopili Formation. Mahadek Formation is overlain by Shella Formation of Eocene Age. Tertiary rocks of Jaintia Group consist of Shella and Kopili formations comprise of fossiliferous limestone, sandstone, coal, fireclay and shale having phosphatic nodules. Rengi Formation of Barail Group characterized by sandstone, carbonaceous shale with conglomerate and limestone is found at places which is unconformably overlain by Garo group consisting of coarse, feldspathic sandstone, pebble, conglomerate, clay, silty clay with a fossiliferous limestone horizon at the top.



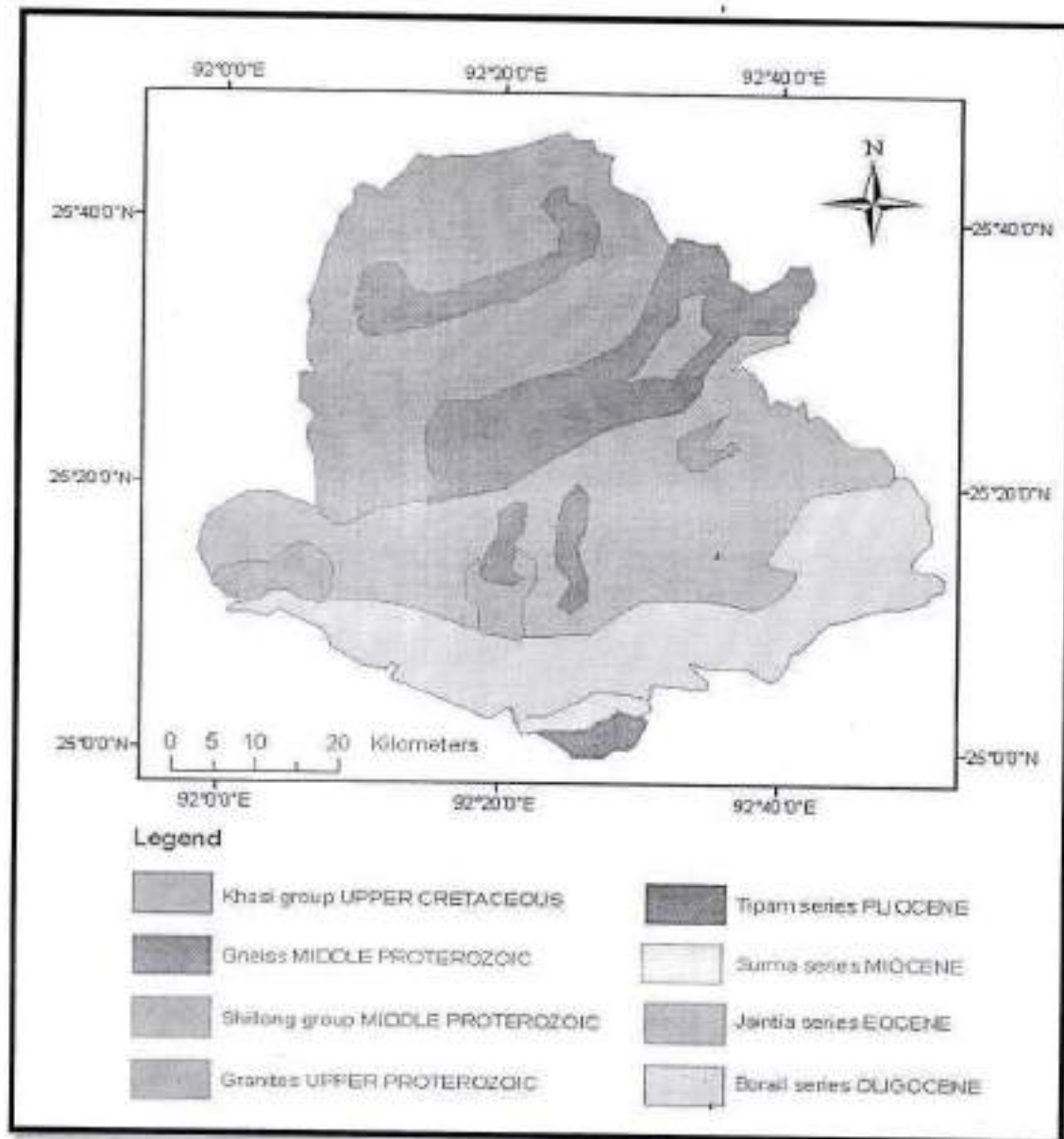


Fig 10: Geological map of Jaintia Hills (Source: Geological Survey of India, 1974)

#### Local Geology

The present study area falls under survey of India Toposheet No. 83C/SW (New) or 83C/8 (old) and located near village Thangskai (25°12'12.0" to 25°12'48.0" N to 92°23'0.00" to 92°23'18.0" E). The different lithounits of the area belong to Jaintia series of Eocene age. The limestone unit belongs to Sylhet stage of Jaintia series of middle Eocene age. Three bands of limestone occur in the area which are known as Prang, Umlatdoh and Lakadong limestone bands. These are separated by Narpuh sandstone and Lakadong sandstone. The



topmost limestone band i.e. Prang limestone occurs further south of the project area. Barail Group of Upper Eocene age unconformably overlies Jaintia Group and unconformably underlain by the Khasi group. The stratigraphy of the area is as follows.

Table 3: Stratigraphy of the area

Age	Group/Series	Formation/ Stage	Beds
Oligocene to Mid Miocene	Garo		Sandstone & Shale
----- Unconformity -----			
Upper Eocene	Barail	Kopili Formation	Grey Shale with alternate layers of Sandstone & siltstone.
Lower to Middle Eocene	Jaintia Group	Shella Formation/Shyllet Stage	Shale Parang Limestone Narpuh Sandstone Umlatodh Limestone Lakadong Sandstone Lakadong Limestone
----- Unconformity -----			
Upper Cretaceous to Middle Cretaceous	Khasi Group		Arkosic sandstone (often Glauconitic & Uraniferous). Also contains grey shales, mudstones and calcareous sandstone





## CHAPTER-IV

## HYDROGEOLOGY

**Regional Hydrogeology**

The regional or the hydrogeology of the district can be divided into three units, namely consolidated, semi consolidated and unconsolidated formations:

**Consolidated formation:** These include the oldest rock formation occupying about 1300 km<sup>2</sup> in the northern and western parts. Gneissic complex, quartzites etc constitute this unit. The depth of weathering varies from place to place and is 15 to 20m at places. The presence of substantial-weathered mantle is confined to their secondary porosities, which form excellent repository of ground water in hard rocks area. The storage and movement of ground water in hard rock is controlled by physiography, zone of weathering and interconnected weak planes. Ground water occurs under unconfined condition and in semi-confined condition in the interconnected secondary structural weakplanes/ features like joints, fractures etc of the underlying hard rocks.

**Semi consolidated formation**

These constitute the major part of the district covering *Amlarem* and *Khliehriat* blocks and covers two-thirds of the entire area. It ranges in age from late Cretaceous to Plio-Pleistocene. The *Shella* formation of the *Jaintia* group is the most conspicuous. Ground water in this formation occurs under unconfined to semi confined conditions due to primary porosities of the semi consolidated formations as well as in the secondary porosities like caverns, open fractures and joints. The formation shows both isolated hammock topography to highly undulating topography with steeply rising hills and deep gorges. The karst topography is observed in areas of *Letein*, *Lotyrk*, *Litang* etc. occupied by the cavernous limestone.

**Unconsolidated formation**

The unconsolidated formation is mainly represented by recent alluvium occurs near the southern fringe of the district and is the continuation of the alluvial plain of Bangladesh. It constitute about 67 km<sup>2</sup> representing about 2% of the total area.

The depth of shallow aquifer in the district ranges from 5 to 40 meters. The hydrogeological map has been shown in fig. 11.



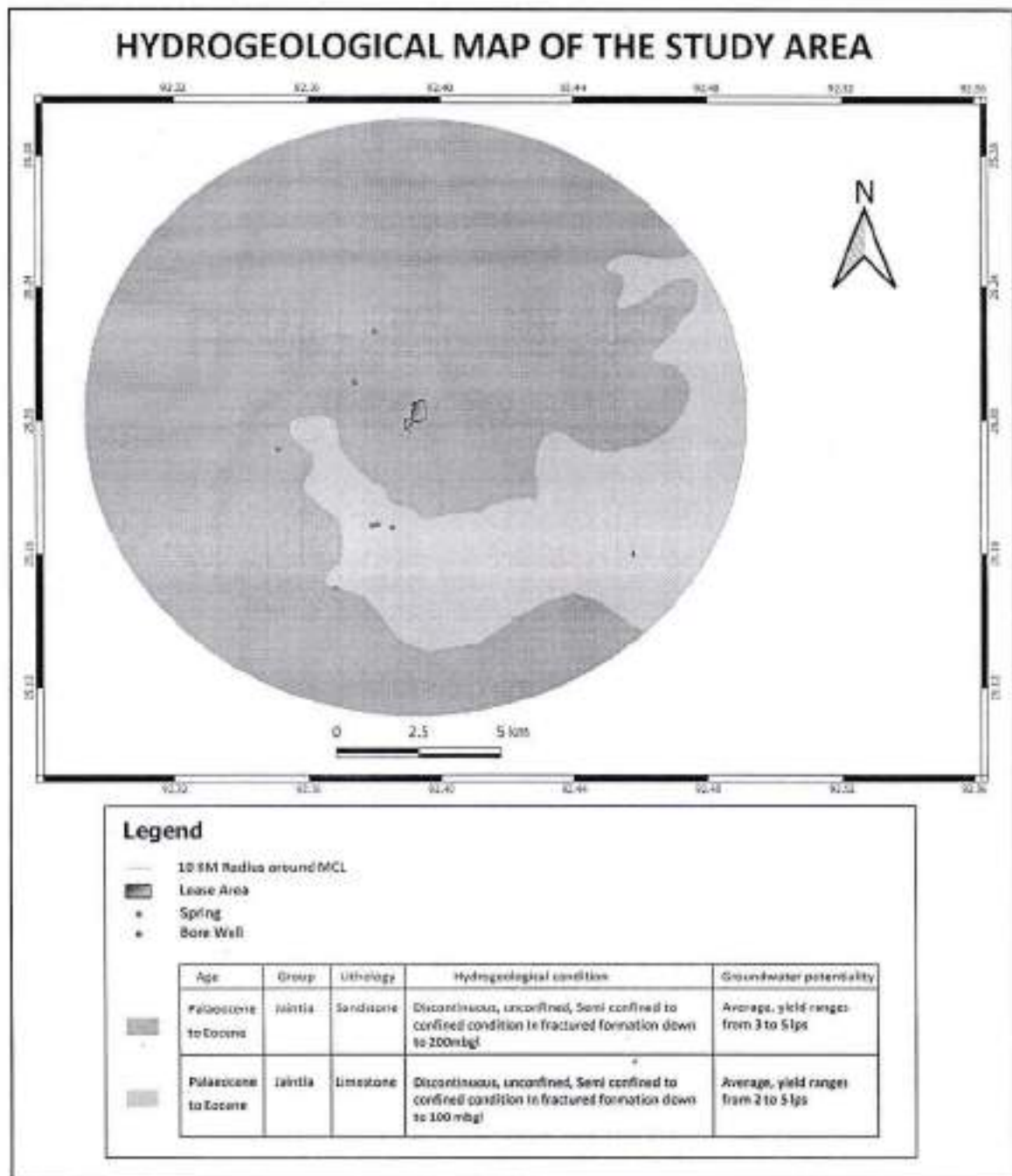


Fig.11: Hydrogeological map of the study area (Source: CGWB)

(Map prepared by CGWS, Kolkata)



This shallow aquifer occurs under unconfined to semi confined condition. Ground water from shallow aquifer is exploited through different types of ground water extraction structures such as dug wells.

The deeper aquifer occurs as semi-confined to confined condition where ground water is found in the fractured zone of consolidated Sandstone and Limestone. The drilled depth of exploratory wells tapping this aquifer ranges from 80.30 to 192m bgl. The number of fractures and its zones encountered varies in all the places which show the complexity of the hydrogeology of consolidated hard rock formation.

In the study area there are two groups of aquifers (CGWB reports) which is described below:

**Aquifer I:** It is the unconfined aquifer where the aquifer zones were tapped within 2 to 40 m depth and generally exhibits unconfined nature of the aquifer. The study area is highly undulating terrain and tapping of aquifer I (shallow aquifer) is not suitable.

**Aquifer II :** This is the deeper aquifer which occurs in the as semi confined to confined condition where ground water is found in the fractured zone of consolidated Sandstone and Limestone. One exploratory well with one observation drilled by CGWB at Khliehriat block down to 164.90m. The result of exploratory drilling and detail study in the area indicates that the two sets fracture zones encountered within 50 to 100 m & 100 to 150 mbgl. The number of fractures and zones of encountering fractures varies widely which show the complexity of the hydrogeology of the formation. The piezometric head in second group of aquifer ranges from 9.36 to 63.88 mbgl.

#### LOCAL HYDROGEOLOGY

In the lease area at least 20 number of boreholes was drilled for coring to estimate the quantity and quality of the limestone. The maximum depth drilled 60 m from the different benches / different reduced level, diameter of the bore being 57mm. Location map of selected core borings within the lease area - depicting lithological disposition and the lithological logs of the selected borehole were studied and the sub-surface diagrams presented in Fig 12 &13 respectively.

It was found that the overburden consisting of Narpuh sandstone with loose soil and limestone boulder ranges in thickness from 7.80 to 16 m , Umlatodh limestone 21 to 33m, Lakdong sandstone 4.80 m and Lakadong limestone 4.60 to 5.90 m. In almost all the boreholes there is an alternate layer of Sandstone & Limestone.



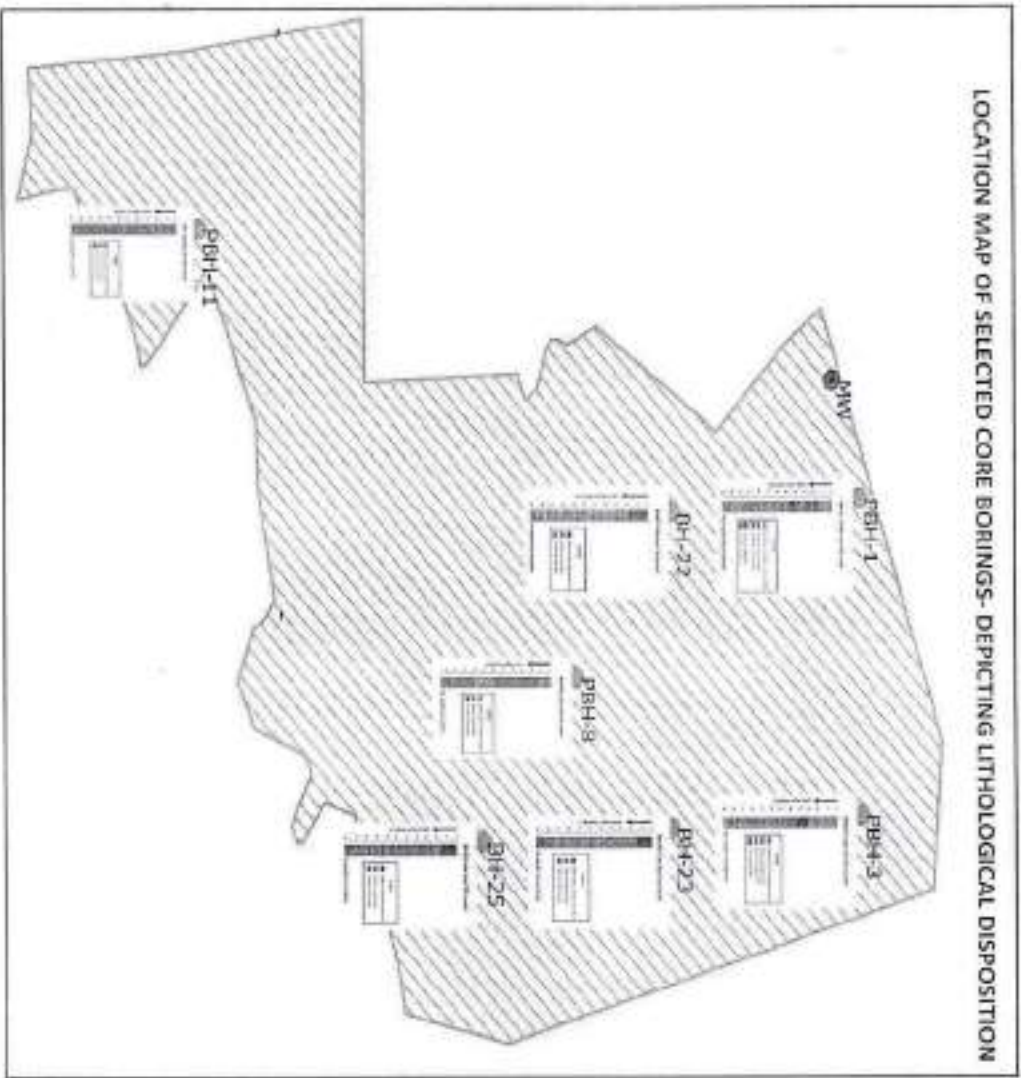


Fig 12 : LOCATION MAP OF SELECTED CORE BORINGS- DEPICTING LITHOLOGICAL DISPOSITION



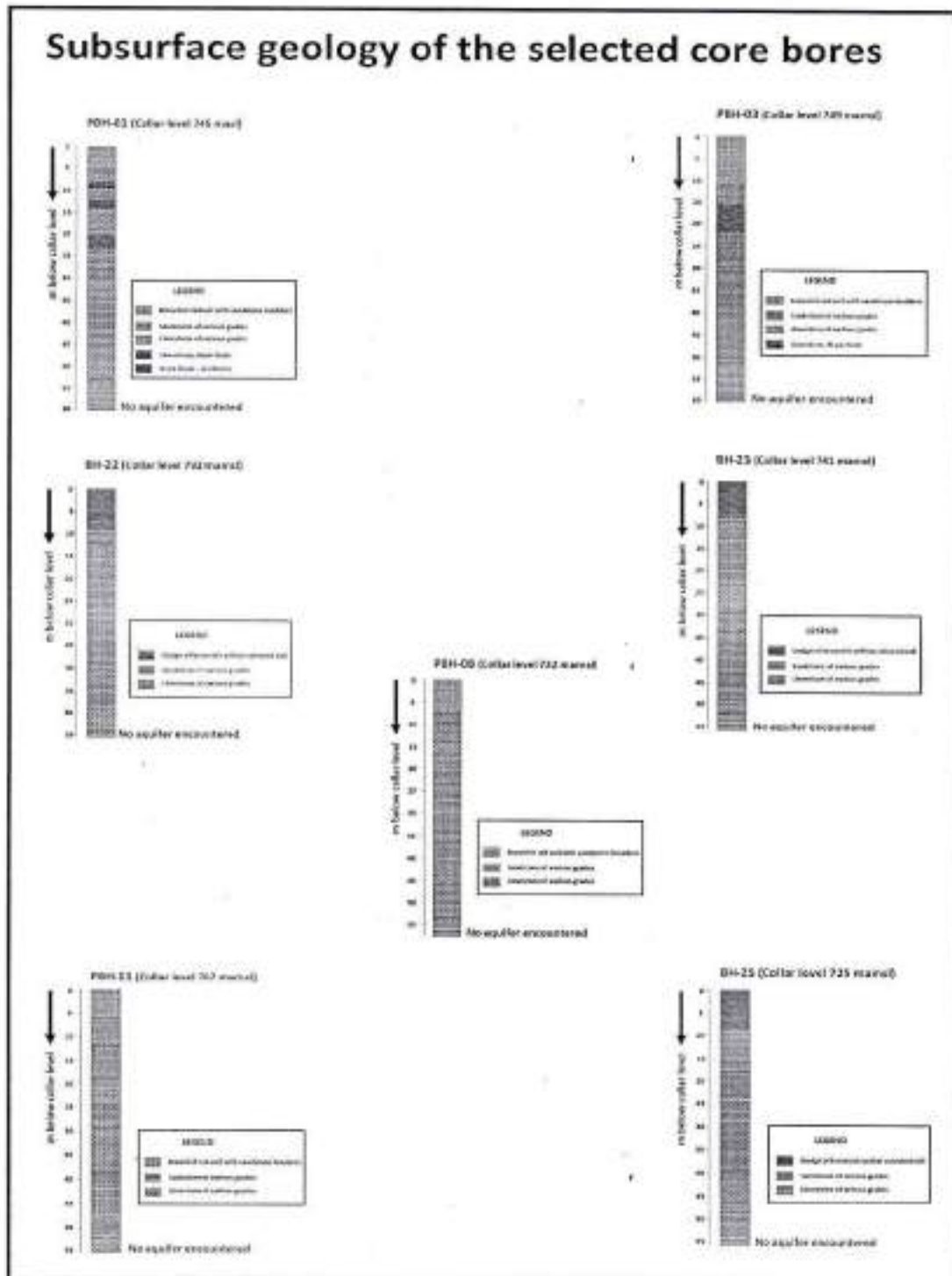


Fig 13: Sub-surface geology of the selected core bores



It has been further reported by MCL that no water bearing fracture zones were encountered in any of the core bore holes drilled in the mining lease area down to the reduced level depth of 668 mamsl.

During the course of hydrogeological survey in the study area field traverse in the core area & in the buffer zone area of 10 Km radius was taken. Three bore wells were found in operation, the reported depth of the bore wells ranges from 80 m to 130 m below respective reduced levels and yield of one such bore well was measured and recorded as 1.5 lps ( IOCL Petrol pump ,RL 483 mamsl ) .Location of these bore wells shown in the hydrogeological map (Fig. 11) and the data is given in table 4.

Table 4: Details of bore wells and springs in and around Meghalaya Cement Factory, East Jaintia Hills District

Location	Co-ordinate	Toposheet No.	Type	Depth (m)	Water level Mbgf	RL mamsl
Lumshnong IOCL petrol pump	25° 10' 08" 92° 22' 50.5"	83C/8	Bore well	128	--	483
Meghalaya Mines & Minerals Ltd	25° 10' 07" 92° 22' 44"	do	do	106.80	--	481
Lumshnong J K Service station	25° 10' 4.8" 92° 23' 6.2"	do	do	NA	61	471
Dalmia Cement factory premises	25° 11' 28.9" 92° 21' 2.9"	do	do	80	45	704
Lumshnong Spring	25° 08' 59.2" 92° 22' 4.2"	do	Spring	--	--	282
Chiehruphi Petrol pump	25° 12' 42.1" 92° 22' 26.8"	do	Bore well	130	55	801
Nongsning	25° 14' 36" 92° 22' 34"	do	No bore well/ dug well	--	--	--
Larseng	25° 17' 00" 92° 23' 00"	Do	Spring	--	--	876
Umtyra	25° 17' 07" 92° 23' 03"	do	Spring	--	--	873
Thangskai	25° 11' 44" 92° 22' 40"	do	Spring	--	--	723

The entire lease area were surveyed by MCL for preparation of mine planning map, the map has been studied thoroughly, proposed mining was from 741mamsl RL of the lease area and the height of the present mine bench is 668 mamsl (RL) and no saturated fractures zones



were encountered, this indicates absence of water saturated fractures in the difference of 73 m.

In the vicinity of the lease area no groundwater abstraction structures were also noticed, which suggests absence of water bearing fracture zones in the limestone and sandstone formation.

The table presented above also indicates that ground water level is at a depth far below the reduced level of the present lowest bench of the mining activity except for a few locations where cavity within the limestone might have been encountered which reflects an anomaly from the general ground water level scenario in the area. The findings at the ground level matches with the recorded borehole logs which indicate that no water bearing zone was encountered during the core drilling of approximately of 20 core boreholes. It is therefore expected that water bearing fractures are much below the present lowest bench of mining. This analytical inference can be further corroborated with the construction of a monitoring well close to the present mining area.

Springs play a major role in managing the water resources in the area. They serve as a major source of water supply for drinking water and other uses. Spring discharge is controlled by climate (timing and amount of precipitation), land use, vegetation, and geomorphology of the recharge zone. Geologically, the springs monitored in the area are of gravity type. The host rock of these springs is mainly fractured/ fissured sandstones. The spring discharge were measured during the course of survey and it was observed the discharge approximately 30 lps . It has also been reported that the discharge of springs has been increased during monsoon season and gradually decreases in post-monsoon and pre-monsoon

#### **Depth to water Level**

During the course of survey, an attempt was made for systematic well inventory around the study area covering 10 Sq.km. But in the area there is no dug well and bore well for monitoring, only there were three bore wells in the road side petrol pump water levels in the bore wells were measured, the depth to water level varies from 45 to 61 mbgl.

It has also been revealed from the report of CGWB, there is only dug well in the extreme southern most corner of the district ( Umkiang 25°03'41" 92°22'49) and two piezometres



one in extreme northern part of the district and other one is located in north western part of the district.

The recent study of CGWB further reveals that in the near vicinity of the study area in toposheet No 83 C/8 ( Grid B1) there is no existing exploratory well, dug well or bore well for periodical monitoring.

#### **Ground Water Resources**

Dynamic Groundwater Resources of East Jaintia Hills district has been estimated based on the methodology recommended by Groundwater Estimation Committee. The resources computed for the groundwater year 2020. In the present resource estimation, the smallest administrative unit considered for resource estimation is district, since block-wise data is not available and the area with more than 20% slope has been excluded for the recharge computation. Hence the study area has been excluded for groundwater resource assessment.

The overall scenario of ground water resource of East Jaintia district as on 2020 is given below:

1. Annual extractable ground water resource (Ham)	:	17726.92
2. Ground water extraction for irrigation use (Ham)	:	0
3. Ground water extraction for industrial use (Ham)	:	4
4. Ground water extraction for domestic use (Ham)	:	171.06
5. Annual groundwater allocation for domestic as on 2025	:	208.68 ham
6. Net Groundwater availability for future use	:	17514.24 ham
7. Stage of groundwater extraction	:	0.98 %

As per ground water resource estimation 2020, the stage of ground water development is just 0.98 % and there is no utilization of ground water for irrigation in this area. All the irrigation schemes in the district are dependent upon the surface water resources. Therefore, there is enough scope for future development of ground water in the district to bring more area under irrigation practice. At present the irrigation practice by utilizing ground water (constructing bore well) is not accepted by villagers due to small land holding, high cost for construction and running of a well compared to production outcome. Another major obstacle in accelerating ground water irrigation is the absence of power lines in most of the cultivated/cultivable area.





**Present source of water supply**

At present daily requirement of water was calculated based on the information furnished by the MCL authority for their different uses i.e. domestic purpose, cement plant and industrial cooling, CPP, plantation and dust suppression in the mines area and found it is about 1355m<sup>3</sup>/day, the entire quantity of water is presently being pumped from a perennial nala Umtyrng flowing west to east along the northern boundary of the lease area, Umtyrng nala joins Umlunar river 2.5 km further east. Umlunar is a tributary of Lukha river. The intake point of water from the Lunar river is approximately 5km from the water treatment plant.

The area is also very sparsely populated hence exploitation of groundwater for irrigation and drinking purposes is not being practiced in large scale in the core and buffer zone of the study area, except in few locations.

From the field study and available borehole logs (core drilling logs) it is also apparent that construction of bore well is not feasible to meet the huge demand. In the lean months also surface water source can sustain the demand for different uses as mentioned above.



## Chapter-V

### HYDROGEOCHEMICAL ANALYSIS

The development projects are planned for social benefits. The development and environment are two sides of the same coin. Mining and water resources projects are no exceptions. Lime Stone mines are concentrated in an around Khlieriat Block. Thus, the large-scale mining activities may affect the quality of water resources. Hence keeping this in view a detailed chemical quality study of water resources in the area was undertaken for safe water and environment.

The water samples from one surface water resource, five groundwater structures and rainwater were collected during field survey to study the water quality as well as hydro-geochemistry of water in the area. The samples were subjected for analysis for both major and minor parameters viz. pH, Total dissolved solids, Conductivity, Sodium, Calcium, Potassium, Manganese, Chloride, Sulphate, Carbonate, Bicarbonate, Iron, Total Hardness and Total Alkalinity. In order to study the chemical quality, ground water samples were also analyzed for Arsenic. Detail results of water samples are given in the Table no 5.

#### Groundwater Quality Assessment

Groundwater quality depends upon the lithological and chemical composition of the aquifers, climatic conditions, to which they are subjected at the time of formation, quantity of water available and its rate of circulation, the activities of microorganism, temperature and pressure condition. The complex dissolution and decomposition processes have resulted in the diverse hydro-chemical condition in groundwater occurring in the area.

Total five nos. of groundwater samples were analysed for different physicochemical parameters. In present study, the pH of ground water samples at all the sampling points was found to be slightly alkaline ranges from 6.69 to 8.16, except spring water collected at Lumshnong. The alkaline pH of water samples near limestone mining and cement manufacturing sites found in present study may be due to the weathering of calcium carbonate rocks and minerals present in limestone of this area. The total dissolved solids in groundwater within the study area varies from 42 mg/l to 378 mg/l and electrical conductivity ranges from 70 to 631  $\mu$ S/cm at 25° C. Iron content ranges from 0.12 to 1.79 mg/l. Manganese content of ground water samples at all the sampling points were found below 0.05 mg/l. The chloride content varies from 7 to 26 mg/l. Calcium content in



groundwater ranges from 20 to 77 mg/l. Magnesium content varies from 6 to 36 mg/l. Total alkalinity value ranges between 11 to 160 mg/l. Total hardness value varies from 74 to 341 mg/l. Total arsenic content of ground water samples at all the sampling points were found below 0.01 mg/l. The values of other major parameters are shown in the table 5 .

#### **Suitability of Ground Water for Drinking**

The pH of groundwater shows that groundwater collected from bore wells were slightly alkaline in nature. Spring water collected from Lumshnong Spring is slightly acidic in nature. As per the BIS drinking water standard (IS 10500:2012), groundwater collected from bore wells as well as spring is suitable for drinking purpose. As per the BIS drinking water standard (IS 10500:2012), the acceptable limit for pH value is from 6.5 to 8.5. At all the sampling points TDS values were found within the acceptable limit of 500 mg/l as per BIS drinking water standard (IS 10500:2012). The calcium content in all groundwater samples has been found within acceptable limit of BIS drinking water standard i.e. 75 mg/l except the borewell located beside Meghalaya Mines & Minerals Ltd. but that is also within the permissible limit of 200 mg /l in absence of alternate source. Chloride values were found within the acceptable limit of 250mg /l as per the BIS drinking water standard (IS 10500:2012). Magnesium values in all ground water samples were found within the acceptable limit of 30 mg/l as per BIS drinking water standard (IS 10500:2012) except except the borewell located beside Meghalaya Mines & Minerals Ltd but that is also within the permissible limit of 100 mg /l in absence of alternate source. Manganese content was found within the acceptable limit of 0.1 mg /l as per the BIS drinking water standard. Sulphate values were found within the acceptable limit of 200mg /l as per the BIS drinking water standard in all the ground water sampling points. Total alkalinity ranges within the acceptable limit of 200 mg /l as per the BIS drinking water standard. In most of the samples total hardness values were found higher than the acceptable limit of 200mg /l but all the sampling points were within the permissible limit of 600 mg /l in absence of alternate source as per the BIS drinking water standard. The Iron content of water collected from Starway petrol pump was exceeding the acceptable limit of BIS drinking water standard i.e. 0.3 mg/L. In other sampling points Iron content was within the acceptable limit of BIS drinking water standard. Total arsenic content in all the groundwater samples were found within the acceptable limit of BIS drinking water standard that is 0.01 mg/l.



Table 5: Ground water samples analysis results

Sample ID	Latitude	Longitude	Location	Type	pH	TDS (mg/l)	Conductivity (µmhos/cm)	Ca (mg/l)	Na (mg/l)	K (mg/l)	Mg (mg/l)	Mn (mg/l)	SO <sub>4</sub> (mg/l)	Cl (mg/l)	CO <sub>3</sub> (mg/l)	HCO <sub>3</sub> (mg/l)	Total Alkalinity (mg/l)	Total Hardness (mg/l)	Fe (mg/l)	As (mg/l)
W <sub>1</sub>	25° 10' 08" N	92° 22' 50.5" E	KOCL petrol pump, Lumsheng	Bore Well	7.16	258	498	69	2.3	1	38	<0.05	78.7	17	0	185	152	290	0.16	<0.01
W <sub>2</sub>	25° 10' 07" N	92° 22' 44" E	Beside Meghalaya Mines & Minerals Ltd	Bore Well	6.09	378	631	77	1.01	1.1	36	<0.05	146.3	13	0	157	117	341	0.15	<0.01
W <sub>3</sub>	25° 08' 59.2" N	92° 22' 4.2" E	Lumsheng	Spring	6.69	42	70	20	1.2	20	5	<0.05	2.5	7	0	14	11	74	0.29	<0.01
W <sub>4</sub>	25° 10' 4.8" N	92° 23' 6.2" E	I. K. Service station, Lumsheng	Bore Well	8.16	216	419	40	1.8	1.9	27	<0.05	2.5	16	0	195	160	217	0.12	<0.01
W <sub>5</sub>	25° 12' 01" N	92° 22' 14" E	Highway Star Petrol Pump, Thangskai	Bore Well	8.1	290	433	52	4.7	2.1	25	<0.05	6.25	9	0	185	152	211	1.79	<0.01



### Gibbs Diagram

Rock-water interaction behavior is important to evaluate the weathering, ion exchange process, and dissolved constituent that consequences in the groundwater quality. Gibbs (1970) proposed a diagram that is widely used to recognize the functional sources of the dissolved chemical element of the water and the effect of hydrogeochemical processes, such as precipitation dominance, evaporation dominance, and rock-water interaction dominance. The reaction between groundwater and aquifer minerals has a significant role in groundwater quality which is useful to assume the genesis of water. Gibbs ratio is calculated using the following equation.

$$\text{Gibbs ratio I for anion} = (\text{Cl}^-) / (\text{Cl}^- + \text{HCO}_3^-)$$

$$\text{Gibbs ratio II (for cation)} = (\text{Na}^+ + \text{K}^+) / (\text{Na}^+ + \text{K}^+ + \text{Ca}^{2+})$$

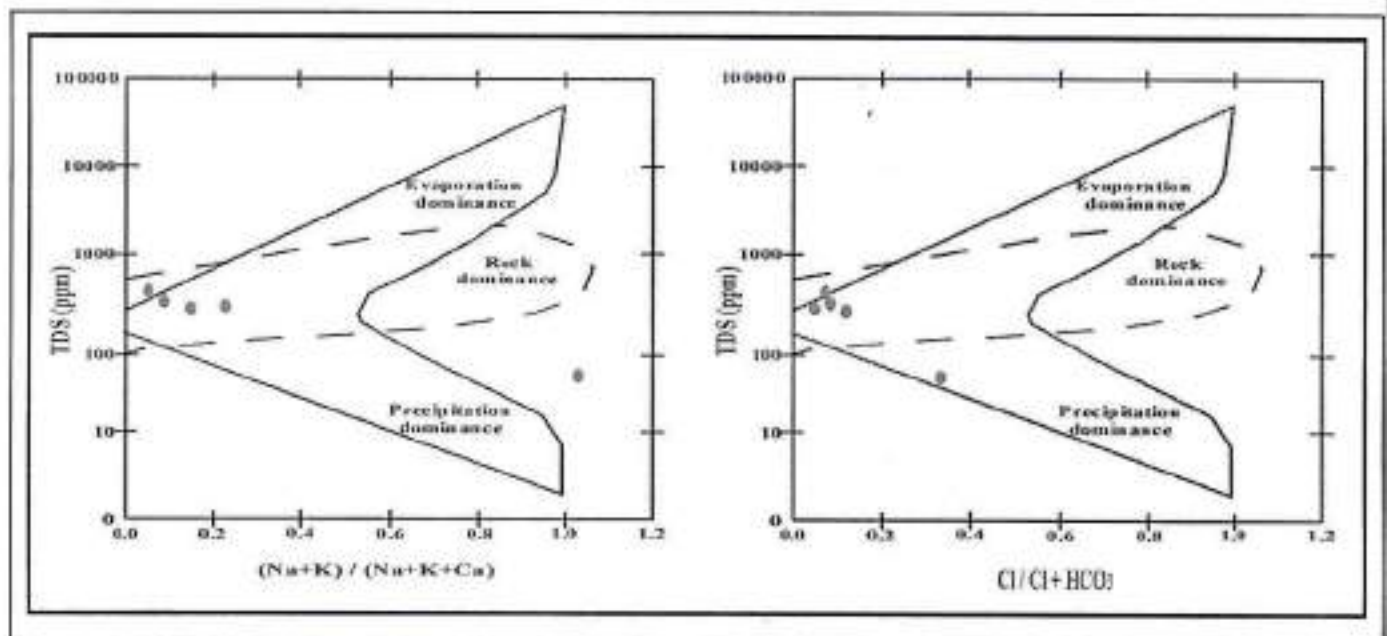


Fig 14: Gibbs diagram showing major processes controlling groundwater chemistry

In the present study the Gibbs diagram based on TDS and the concentration of cations and anions; it shows that most of the cations and anions in groundwater of deeper aquifer have a rock-dominance and spring water (Shallow aquifer) have a Precipitation dominance origin. This

characteristic indicates the dissolution of ions in groundwater through the interaction between groundwater and rock or soil precipitation is more dominant than any other sources.

#### Water Quality of Surface Water (River Water)

One sample of surface water was collected from Lunar river. The samples were subjected for analysis for both major and minor parameters viz. pH, Total dissolved solids, Conductivity, Sodium, Calcium, Potassium, Manganese, Chloride, Sulphate, Carbonate, Bicarbonate, Iron, Total Hardness and Total Alkalinity. The pH of surface water is 7.79. So this result indicates that surface water is slightly alkaline in nature. All the analyzed parameters are within the acceptable limit of BIS drinking water standard (IS 10500:2012) except Iron content.

Table 6 : Surface Water quality details

Items	Details
Sample ID	W6
Latitude	25°14'5.22"N
Longitude	92°24'51.36"E
Location	Lunar River near pump house
pH	7.79
TDS (mg/L)	134
Conductivity ( $\mu$ mhos/cm)	205
Ca (mg/L)	36
Na (mg/L)	<1
K (mg/L)	<1
Mg (mg/L)	5
Mn (mg/L)	<0.05
SO <sub>4</sub> (mg/L)	<2.5
Cl (mg/L)	11
CO <sub>3</sub> (mg/L)	0
HCO <sub>3</sub> (mg/L)	12
Total Alkalinity	10
Total Hardness	110
Fe (mg/L)	0.71



### Water Quality of Rain Water

One sample of rain water was collected at MCL Guest House. The samples were subjected for analysis for both major and minor parameters viz. pH, Total dissolved solids, Conductivity, Sodium, Calcium, Potassium, Manganese, Chloride, Sulphate, Carbonate, Bicarbonate, Iron, Total Hardness and Total Alkalinity. All the analyzed parameters are within the acceptable limit of BIS drinking water standard (IS 10500:2012).

Table 7 : Rain Water quality details

Items	Details
Sample ID	WR
Latitude	25°12'15.86"N
Longitude	92°22'46.76"E
Location	MCL Guest House
pH	7.19
TDS (mg/L)	32
Conductivity ( $\mu$ mhos/cm)	55.1
Ca (mg/L)	17
Na (mg/L)	<1
K (mg/L)	<1
Mg (mg/L)	<2
Mn (mg/L)	<0.05
SO <sub>4</sub> (mg/L)	<2.5
Cl (mg/L)	6
CO <sub>3</sub> (mg/L)	0
HCO <sub>3</sub> (mg/L)	14
Total Alkalinity	11
Total Hardness	47
Fe (mg/L)	0.15



## CHAPTER -VI

### LIMESTONE MINING AND GROUNDWATER

#### Mining of Limestone for Cement Industry

##### Regional

Limestone is a non-metallic sedimentary rock and is a raw ingredient for the manufacturing of cement- an important construction material. Mining industry in India is a very important industry essential for the economic development of the country. India is the second largest cement producing country in the world after China. Next to coal, limestone is the most abundantly found and extracted mining material in Meghalaya.. The state of Meghalaya accounts for about 9% of the total limestone resources of India. However Meghalaya contributes 12% of cement grade limestone in the country. Limestone is found in the southern fringe of the state, extending for about 200km from Jaintia Hills in the East to Garo Hills in the West. Jaintia Hills contributes, 55% of the total limestone reserves in the state.

Upper Sylhet Limestone member (stage) of Shella Formation has been targeted for limestone resources, majorly belonging to Cement (Blendeble and Benificiable) grade. Limestone occurs as thick layered bedded deposits with alternate bands of sandstones of the same Sylhet stage. There is huge demand of Limestone of any grade in the state both for the domestic requirements and also outside the state. .

##### Local

The information collected from MCL, reveals that the general orientation of the pits is in NE-SW direction. The existing working pits are located in the central, south eastern part & SW boundary of the lease area. The lowest level of the existing mine pit is 668 mamsl (RL). From the results of the boreholes & surface exposures it was established that entire lease area is limestone bearing and depth wise extension was proved up to 643.20 mamsl (RL). The reduced level for the lowest bench for the present Mining Plan shall be 661.2 mamsl (RL). The bottom RL and depth of boreholes cannot be decided now as it depends upon the continuity of the





mineralised zone and it will be decided during the course of drilling. So, the depth of the borehole may vary as per the continuity of mineralized zone.

The entire lease area surveyed for preparation of mine planning map by MCL, has been studied thoroughly. The initial highest RL of the lease area was 758 mamsl but the commencement of mining which started from 741 mamsl after topographical treatment and removal of over burden. The reduced level of active mining started from 741mamsl which is still in progress. The present lowest reduced level of mining base has gone down to 668 mamsl, and no bore hole log indicates that saturated fractures zones were encountered. This indicates absence of water saturated fractures in the difference of 73 m.

#### **Groundwater**

Very little information is available on hydrogeology of either the buffer zone or even the zone surrounding the buffer zone of the study area. There is no groundwater structure in the form of bore well or dug well exist in and around the mining lease area. Therefore the depth to groundwater level could not be ascertained in the core zone of the study area. In the buffer zone (10km radius) bore wells exist specially close to some of the petrol pumps in the area. But even after best efforts, water level within the bore wells could be measured only in three bore wells out of five bore wells where attempts were made. Since aquifers (water bearing layer) in this undulating topography with hard sedimentary rocks beneath the ground surface, are localized in nature and cannot be extended regionally. However, considering the hydrogeological set up of the area, it can be inferred that the groundwater level, is well below the present lowest mining level of 668 mamsl. Groundwater is not likely to be encountered, within the present Mining Plan of 661.2 mamsl (RL.). Quality of ground has been chemically analysed and except a slightly higher pH value, all other parameters are within the desirable limit as per Bureau of Indian Standards. Higher pH values are generally expected in any terrain, where mining for limestone is underway. This also indicates that there is no trace of 'acid mine drainage' which is a common feature in a mining area.

However, construction of a monitoring well will establish the inference drawn about the depth of groundwater level in the mining lease hold area. This monitoring well can be used for



recording both depth to water level and water quality analyses periodically and the data generated can be placed before the regulating agencies like Indian Bureau Of Mines, Central Pollution Control Board and Central Ground Water Authority. The location of such a monitoring well has been shown to GM (Mines), MCL during the field level study and marked on the mine plan map (Fig. 15) provided for the study of consultants from Centre for Ground Water Studies. The design of the monitoring well is required to be as follows;

- i) Depth of the well 200 meters or depth of water saturated zones whichever is less
- ii) Diameter : 6 inches (150 mm)
- iii) Blank pipe 1 meter above ground level
- iv) Casing (150 mm dia.) down to the depth of 30 m to 40 m below ground level and below which bore hole remaining uncased.

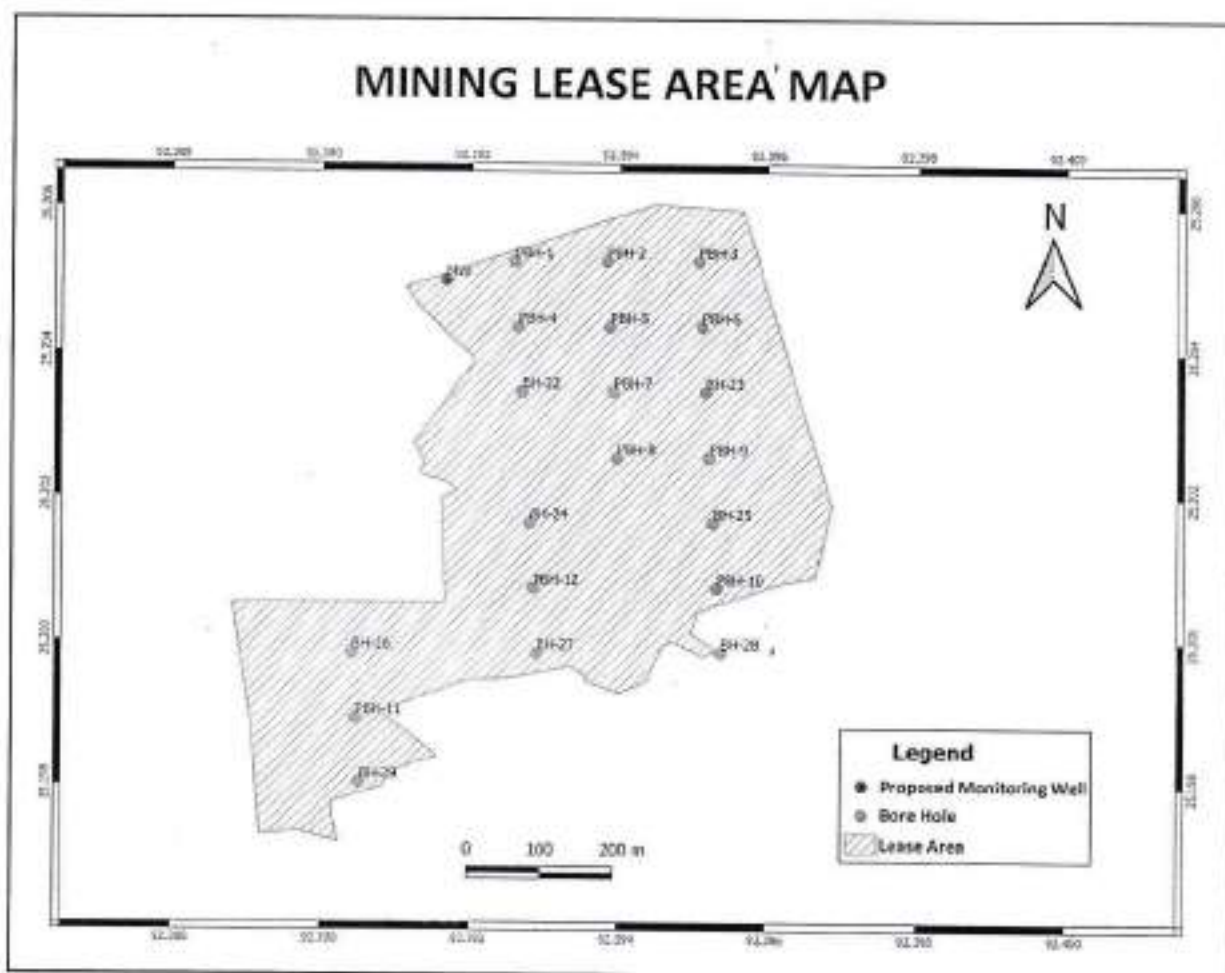


Fig 15 : Mining lease area map showing location of proposed monitoring well

## CHAPTER -VII

### CONCLUSIONS AND RECOMMENDATIONS

This report is an outcome of Hydrogeological Survey conducted by a team of consultants from Centre for Ground Water Studies, Kolkata during the period, from 06.07.2021 to 09.07.2021 in the village Thangaskai in Khelarihat block of East Jaintia Hill district in the state of Meghalaya. The study area was divided in two parts i) a core area comprising 2km radius of the mining leasehold area and 10 km radius surrounding the core area.

The main objective of the study was to ascertain hydrogeological regime prevailing in the area and to analyse the hydrogeological and hydrochemical factors that may be closely associated with the mining of limestone that is operative in full swing. Field level investigations coupled with collection of required data, following detailed technical discussions with the officials of Meghalaya Cement Limited during the visit and citing and incorporating relevant literature from secondary sources of repute during pre-field visit and post-field visit form the basis for the preparation of this report.

All the parameters associated with Hydrogeological Survey, have been dealt with in this report. Undulating tableland geomorphic feature enhances surface run off component and does not allow water received from rainfall much scope to go underneath to supplement groundwater reservoir. Drainage is structurally controlled as manifested in the form of parallel to sub-parallel geometric configuration. The area is a very high rainfall area, with average annual rainfall being 6683.18 mm per annum where noticeable rainfall occurs even during the non-monsoon months. It experiences fairly pleasant climate. Geologically study area comprises sedimentary rocks which belong to Shylhet stage of Shella formation belonging to Jaintia group of Tertiary age. Here Limestones alternate with sandstone bands of various thickness. Hydrogeologically, the set up is a semi-consolidated units which get dissected at places with fractures and fissures which may or may not be saturated with water. Hydrochemical analyses reveals that water in both bore wells and streams have not been affected, due to mining in the area, except a higher pH value which is a common feature of any Limestone terrain. Analyses



using Gibbs diagram indicates that the water is mainly of rock-dominance origin except the spring water which is precipitation-dominance origin.

The information collected from MCL, reveals that the general orientation of the pits is in NE-SW direction. The existing working pits are located in the central, south eastern part & SW boundary of the lease area. The lowest level of the existing mine pit is 668 mamsl (RL). However, considering the hydrogeological set up of the area, it can be inferred that the groundwater level, is well below the present lowest mining level of 668 mamsl. Groundwater is not likely to be encountered, within the present Mining Plan of 661.2 mamsl (RL.)

Construction of a monitoring well is recommended which will establish the inference drawn about the depth of groundwater level in the mining lease hold area. This monitoring well can be used for recording both depth to water level and water quality analyses results, periodically and the data generated can be placed before the regulating agencies like Indian Bureau Of Mines, Central Pollution Control Board and Central Ground Water Authority.



### Field Photographs



Fig:16 MCL mining lease area



Fig 17: Chyrtong water falls



Fig:18 Lumshnong Spring



Fig:19 Pump house beside Lunar river



Fig:20 Pump house beside Umparthi river



Fig:21 River water settling tank



Fig:22 Water level measurement at J K Service station, Lumshnong



Fig:23 Bore well beside Meghalaya Mines & Minerals Ltd.



Fig:24 Water level measurement at J K Service station, Lumshnong



Fig:25 Sample collection from Lunar river



Fig:26 Water level measurement at Chiehruphi Petrol pump



Fig:27 Sample collection from Lumshnong Spring





## MEGHALAYA CEMENTS LTD

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 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, S.S. Road, Guwahati-781005  
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 Kolkata Office: SE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.

### SERVICE ORDER

<b>To,</b> D.K.D ENTERPRISE EXPRESS TOWER, MALIGAON, , GUWAHATI Phone No: 9954032234 Email : Contact Person Contact No. GST No. : 16AGJPD2842A5Z5	<b>Invoice To</b> MCL-Lumshnong Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia <b>GST : 17AADCM8079P13M</b> <b>Delivery Address</b>	<b>WO No</b> : 4700023860 <b>PO Date</b> : 08.09.2022 <b>Validity Start</b> : <b>Validity End</b> : <b>Quotation No</b> : <b>Quotation Date</b> :
---	---	--

Dear Sir,

We are pleased to place order to you for the following on the terms &amp; conditions given below:

Sl.	Service Code	Description	SAC	Qty.	Unit	Rate	Amount INR
90010		Borewell drilling at Mines					
<b>Page Total</b>							0.00
<b>Other Page Total</b>							274,000.00
<b>Grand Total</b>							274,000.00
<b>Tax Code</b>		: CGST +SGST INPUT- 18%	<b>Packing and Forwarding(BT)</b>		:	0.00	
<b>Payment Terms</b>		: After 30 Days From Invoice date	<b>Other Charges</b>		:	0.00	
<b>Inco Terms</b>		: BY ROAD	<b>CGST</b>		:	24,660.00	
<b>Transporter</b>		:	<b>SGST</b>		:	24,660.00	
<b>Inspection</b>		:	<b>IGST</b>		:	0.00	
			<b>Packing and Forwarding(AT)</b>		:	0.00	
			<b>Mis Incidentl Exp (VI)</b>		:	0.00	
			<b>Total with Tax</b>		:	323,320.00	

Amount In Words: THREE LAKH TWENTY THREE THOUSAND THREE HUNDRED TWENTY RUPEES

#### General Terms & Conditions

- 1 Original Document required along with the materials.
- 2 Purchase Order No. & Material Code must be mentioned in invoice.
- 3 All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- 4 Others Terms & Condition as per ANNEXURE-1
- 5 Issued under GST Act, 2017.

Remarks:

On accepting this order it is understood that you agree to the terms &amp; conditions shown above and on continuation sheet which are made part thereof

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory





## MEGHALAYA CEMENTS LTD

Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53661 / 860 / 862  
 Kolkata Office: SE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/466, Fax : 933-23340505.

WO No : 4700023860 WO Date:08.09.2022

## SERVICE ORDER

Sl.	Service Code	Description	SAC	Qty.	Unit	Rate	Amount INR
		Terms & Condition : 1. Advance 80% 2. In case of boulder found while boring the CDEX will be applied (charge for CDEX drilling as per quotation) 3. In case of collapse, filter casing will be used from top to till the end of the boring 4. Final payment must be cleared on completion of work. 5. We are not responsible of iron is present in water or water not found 6. We are not responsible for the water under their guarantee/ warrantee 7. In case of boring fail no washing charge will be applied.					
	1001045	Drilling Charges	998333	180.000	M	1,250.00 /1 M	225,000.00
	1001045	MS Fitting pipe fitting charge	998333	40.000	M	100.00 /1 M	4,000.00
	1001045	Welding Charges Per Joint	998333	10.000	NO	500.00 /1 NO	5,000.00
	1001046	Transportation (Fixed)	998333	1.000	NO	40,000.00 /1 NO	40,000.00

Page Total : 274,000.00

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_





## ANNEXURE-1

Work Order No : 4700023860

Date: 08.09.2022

## A. Common Terms

- 1 You will confirm that if any spare required at the time of this period that should be delivered at the earliest at proper cost.
- 2 You will send Inspection call to us before machining Process.
- 3 You will do the ordered repair work which is send by us to your works & send it at our work in Meghalaya / Guwahati.
- 4 You will provide Test / Calibration certificate by mentioning the complete instrument's details i.e.: name, model, SI No etc. before dispatch.

Warrantee: You will give warrantee for 1 year from the date of commissioning/repairing of this machine. In case of any problem during the warrantee period you will Repair/ Rebabbit/Machining of the bearing at free of cost.

## B. Service Terms:

- 7 Submission of Report: You will submit all the reports along with the Invoice Copy at our Kolkata/Guwahati office address within 5-6 working days after receipt of material.
- 8 Freight: Up down Freight will be borne by us.
- 9
- 10
- 11 Your expert will train our site operators for handling & operating the supplied / commissioned equipment.  
Your expert will carry all special tools & tackles for above job.  
You will provide technical assistance/spares as and when required.  
Our Scope:
  - a) The Boarding & lodging/fooding at site will provided by us free of cost as available at site.
  - 12 b) To & fro Air Fare/ Train Fare from your origin to Guwahati & vehicle for onward journey (as available at site) will be provided by us.
  - c) We will provide system equipment specification, data's, drawings & operational data's time to time as available at site.
  - d) We will provide supporting staff & measuring equipments if any needed for site measurements.

Service Period: The Engineering / Service charges will be applicable from the date of reaching the site, till leaving the site.





## ANNEXURE-2

Work Order No : 4700023860

Date: 08.09.2022

## A. Safty Norms

- 1 You shall provide all the Personal Protective Equipments (PPE) which includes Helmet, Shoe, and Safety Belt etc. to your workers deployed by you for the work. Failure on part you, in this regard, will be deemed as violation of contract & MCL shall have the right to impose
- 2 penalty etc to you.  
That you will ensure observance of safe work practices and safety
- 3 norms as well as use of PPE's by the employees engaged by you.  
You will engage adequate nos. of safety officers, safety steward who
- 4 will take care of safety & safe working conditions at your site.  
You shall take all safety measures for the machines/equipments being used by your personnel during the course of execution of the job, any damage caused to person or property of MCL during use of machines/execution of job will have to be compensated by you only.

## B. ACCIDENT /DAMAGES:

- 1 In case of any accident or other incident attributable to the negligence or omission or commission of the contractor, resulting in any loss / damage of material or damage of equipment belonging to the
- 2 MCL/Third Party, the entire cost of, such cost of damages shall be recovered from your bill.
- 3 You shall intimate the report of accident, if any, occurs while in the course of employment immediately.  
In the event of accident resulting into temporary, partial or total disablement or death of any of your personnel, you shall ensure that immediate and adequate medical aid viz First Aid and subsequent treatment facilities are provided to the concerned personnel free of cost and without fail. In addition, you shall solely be liable for
- 4 meeting with statutory obligations under the Workmen's Compensation Act. In case any such expenses including hospitalization expenses are incurred by MCL on your behalf, then it reserves all right to recover
- 5 the same from you including interest thereon.  
That it is advisable to you to have a suitable insurance policy to cover your liabilities in respect of accident arising out of and in the course of employment. A copy of such policy may please be provided to us for our records & reference.  
That if it is found that any person of your Staff is involved or abetted, directly or indirectly, in any act of theft, sabotage, pilferage, fire, physical violence at the premises of MCL, then we shall be at full liberty to take suitable criminal or otherwise action against the erring staff as well as against you for damages, costs of consequences whether during the tenure of this agreement or thereafter.



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 Ph. 033-23340004/666, Fax : 033-23340005.  
 GST No: 17AADCM8079P1ZM, CIN No: U26942ML2003PLC007125

## PURCHASE ORDER

To, BLUE BIRD CHEMICAL 34, CANAL SOUTH ROAD KOLKATA Phone No: 9433060765 Fax No: Email : Contact Person Mr. Biswa Saraf Contact No. 9433060765 GST No:19AJMPS2135H1ZX	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia GST- 17AADCM8079P1ZM <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500040020 <b>PO Date</b> : 09.03.2021 <b>Quotation No</b> : <b>Quotation Date</b> :
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Dear Sir,  
 We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name \ Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00010	CVGEX1188	HDPE PIPE 32 MM\18.03.2021	3917	140	M	30.00 / 1 M		4,200.00

Page Total 4,200.00  
 Other Page Total 236,290.00  
 Grand Total 240,490.00

Tax Code	: IGST INPUT- 18%	P & F	:	0.00
Payment Terms	: 100% AGAINST PERFORMA INVOICE	OTHER CHARGES	:	0.00
Inno Terms	: BY ROAD	Loading/Unloading	:	0.00
Transporter	: Ex-Kolkata, Freight Charges: To Pay/At Actual	CGST	:	0.00
Inspection	: You will intimate us in advance the readiness of the material.	SGST	:	0.00
		IGST	:	43,288.20
		CESS	:	0.00
		TDS	:	240.49
		TCS	:	0.00
		Insurance Value	:	0.00
		Total with Tax	:	283,778.20
		F & F(AT)	:	0.00
		Discount(AT)	:	0.00
		Total	:	283,529.71

Amount In Words: TWO LAKH EIGHTY THREE THOUSAND FIVE HUNDRED THIRTY SEVEN Rupees SEVENTY ONE Paise INR

## General Terms &amp; Conditions

- Original Document required along with the materials.
- Purchase Order No. & Material Code must be mentioned in invoice.
- All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- Others Terms & Condition as per ANNEXURE-1
- Issued Under GST Act, 2017

Remarks: Indent No: 1101043669,40743

On accepting this order it is understood that you agree to the terms & conditions shown above and on continuation sheet all which are made part thereof

Prepared By \_\_\_\_\_ Checked By \_\_\_\_\_

FOR MEGHALAYA CEMENTS LIMITED

Authorised Signatory

**MEGHALAYA CEMENTS LTD**



Regd. Office: Vill-Thangskai, Dist. - East Jaintia Hills, PO-Lushnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian West, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: 88-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCM8079P12M, CIN No: U26942ML2003PLC007125

PO No : 4500040020 PO Date: 09.03.2021

**PURCHASE ORDER**

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 MATERIAL GRADE: PE80 PRESSURE RATING: P86						
00020	CWGER1167	HDPE PIPE 75 MM\18.03.2021	3917	1,500	M	115.00 /1 M		172,500.00
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 PIPE OD 75 MM MATERIAL GRADE: PE80 WALL THICKNESS: P86 END TYPE: PLAIN END Pipe shall be manufactured as per IS:4984/95, duly "ISI" marked, of PE83 P816 Grade, in 6 Mtrs length						
00040	CWGER1164	HDPE PIPE 90 MM\18.03.2021	39172110	5	NO	768.00 /1 NO		3,840.00
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 MATERIAL GRADE: PE80 PRESSURE RATING: P86 1 no = 6 mtr length (Total 30 mtr)  NOTE: Our Requirement : 5 Nos 6 Mtr = 01 Nos 30 Mtr = 05 Nos Per Mtr Rate Rs: 126/- (126*30/5)=768/- Per nos						
00050	CWGER1166	HDPE PIPE 160 MM\18.03.2021	3917	5	NO	2,400.00 /1 NO		12,000.00

Page Total : 188,340.00



FOR MEGHALAYA CEMENTS LIMITED

Authorised Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist. - East Jaintia Hills, PO-Dunshoog-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-1, Kolkata - 700064 (M.B.)  
 Ph. 033-23340504/666, Fax : 033-23340505.  
 GST No: 17AADCH8079PL2M, CIN No: U26942ML2003PLC00Y125

PO No : 4500040020 PO Date: 09.03.2021

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 MATERIAL GRADE: PE80 PRESSURE RATING: PN6 1 no = 6 Mtr length (Total 30 mtr)  NOTE: Our Requirement 3 Nos 6 Mtr = 01 Nos 30 Mtr = 05 Nos Per Mtr Rate Rs. 400/- (400*30/5)=2400/-Per nos.						
00190	CVGER1457	HDPE TER 75X25 MM\16.03.2021	3917	250	NO	175.00 /1 NO		43,750.00
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 HDPE TER 75X25MM PRESSURE RATING: PN6 RAW MATERIAL GRADE: PE 80						
00320	CVGER1454	HDPE PIPE 25 MM\16.03.2021	3917	200	M	21.00 /1 M		4,200.00
		AJAPLAS Brand HDPE Pipe as per IS:4984/2016 PIPE OD 25 MM MATERIAL GRADE: PE80 WALL THICKNESS: PN6 END TYPE: FLAIN END Pipe shall be Manufactured as per IS:4984/95, duly 'ISI' marked, of PE80 PN6 Grade, in 6 Mtrs length						

Page Total : 47,950.00

For MEGHALAYA CEMENTS LIMITED

THANGSKAI  
Authorized Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340504/505, Fax : 033-23340505.  
 GST No: 17AADCM8079P1ZM, CIN No: U26942ML2003PLC007125

## PURCHASE ORDER

<b>To,</b> SHREE NARAYANI PIPE MFG. CO. 29, GANESH CHANDRA AVENUE, 3RD FLOOR Kolkata Phone No: Fax No: Email : Contact Person Mr. Navin Contact No. 9830118771 GST No:19AAKFS4206J1ZY	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East , Jaintia Hills, PO-Lunshnong-793210 MeghalayaIndia GST- 17AADCM8079P1ZM <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500040697 <b>PO Date</b> : 21.04.2021 <b>Quotation No</b> : <b>Quotation Date</b> :
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Dear Sir,  
 We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00030	CVHER1455	HDPE COLLAR FLANGE 75 MM\30.04.2021	39174000	10	NO	88.00 /1 NO		1,760.00

Page Total	1,760.00
Other Page Total	7,500.00
Grand Total	9,260.00

Tax Code	: IGST INPUT- 165	P & F	:	3.00
Payment Terms	: 100% AGAINST PERFORMA INVOICE	OTHER CHARGES	:	3.00
Inco Terms	: BY ROAD	Loading/Unloading	:	0.00
Transporter	: Ex-Kolkata, Freight Charges: To Pay/At Actual	CGST	:	0.00
Inspection	: You will intimate us in advance the readiness of the material.	SGST	:	0.00
		IGST	:	1,656.80
		CCESS	:	0.00
		TDS	:	9.26
		TCS	:	0.00
		Insurance Value	:	0.00
		Total with Tax	:	10,926.80
		P & F(AT)	:	0.00
		Discount(AT)	:	1.00
		Total	:	10,917.54

Amount In Words: TEN THOUSAND NINE HUNDRED SEVENTEEN Rupees FIFTY FOUR Paise INR

## General Terms &amp; Conditions

- Original Document required along with the materials.
- Purchase Order No. & Material Code must be mentioned in invoice.
- All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- Others Terms & Condition as per ANNEXURE-1
- Issued Under GST Act, 2017

Remarks: Indent No: 1100040743 Dated: 16.12.2020

On accepting this order it is understood that you agree to the terms & conditions shown above and in continuation sheet all which are made part thereof

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory



## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thargekai, Dist.- East Jaintia Hills, PO-Lushalnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G. S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/566, Fax : 033-23340505.  
 GST No: 17AADCM8079FLEM, CIN No: U26942ML2003PLC007125

PO No : 4500040697 PO Date: 21.04.2021

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		AJAPLAS BRAND HDPE COLLAR FLANGE Pipe as per IS:4984/2016 Size:75MM PRESSURE RATING: PMS MATERIAL GRADE: PE80						
00940	CVGERH456	HDPE COLLAR FLANGE 25 MM\30.04.2021	39174000	250	NO	30.00 /1 NO		7,500.00
		AJAPLAS BRAND HDPE COLLAR FLANGE Pipe as per IS:4984/2016 Size:25MM PRESSURE RATING: PMS MATERIAL GRADE: PE80						

Total : 7,500.00  
 For MEGHALAYA CEMENTS LIMITED  
 THANGSKAI  
 Authorised Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: SE-77, Saltlake City, Sector-I, Kolkata - 700054 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCM8079P12M, CIN No: U26942ML2003PLC007125

## PURCHASE ORDER

<b>To,</b> ASVA CORPORATION SHED NO:6, SATYA ESTATE, AHMEDABAD Phone No: 9099032897 Fax No: Email : Contact Person Ms. Rushika Contact No. 9099032897 GST No:24AOFPP74663H2ZM	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia GST- 17AADCM8079P12M <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500040698 <b>PO Date</b> : 21.04.2021 <b>Quotation No</b> : <b>Quotation Date</b> :
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Dear Sir,

MeghalayaIndia

We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00170	CVBR1459	HDPE BALL VALVE 25 20/10.04.2021	84818030	250	NO	301.00 / 1 NO		75,250.00

Page Total 75,250.00

Other Page Total 13,336.00

Grand Total 88,586.00

Tax Code	: IGST INPUT- 18%	P & F	:	0.00
Payment Terms	: 100% AGAINST PERFORMA INVOICE	OTHER CHARGES	:	0.00
Incoterms	: BY ROAD	Loading/Unloading	:	0.00
Transporter	: Ex-Ahmedabad, Freight Charges: To Pay	CGST	:	0.00
Inspection	: You will intimate us in advance the readiness of the material.	SGST	:	0.00
		IGST	:	15,944.40
		CESS	:	0.00
		TDS	:	88.58
		TCS	:	0.00
		Insurance Value	:	0.00
		Total with Tax	:	104,524.40
		P & F(AT)	:	0.00
		Discount (AT)	:	0.00
		Total	:	104,435.82

Amount In Words: ONE LAKH FOUR THOUSAND FOUR HUNDRED THIRTY FIVE Rupees EIGHTY TWO Paise INR.

## General Terms &amp; Conditions

- Original Document required along with the materials.
- Purchase Order No. & Material Code must be mentioned in invoice.
- All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- Others Terms & Condition as per ANNEXURE-1
- Issued Under GST Act, 2017

Remarks: Indent No: 1100049743 Dated: 16.12.2020

On accepting this order it is understood that you agree to the terms & conditions shown above and on continuation sheet all which are made part thereof

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory



**MEGHALAYA CEMENTS LTD**



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshomong-793310, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781035  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCMS6079F12M, CIN No: U26942ML2003PLC007125

PO No - 4500040698 PO Date: 21.04.2021

**PURCHASE ORDER**

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		HDPE BALL VALVE WITH FLANGE END ID 25 MM PRESSURE RATING: PN6 RAW MATERIAL GRADE: PE 80 Connection End: FLANGE MAKE: ASVA CORPORATION						
00060	CVGER1460	HDPE BALL VALVE 75 NR\30.04.2021	84828030	10	NO	1,333.00 /1 NO		13,330.00
		HDPE BALL VALVE WITH FLANGE END ID 75 MM PRESSURE RATING: PN6 RAW MATERIAL GRADE: PE 80 Connection End: FLANGE MAKE: ASVA CORPORATION						

Prepared By _____		Checked By _____		Page Total : 15,330.00
For MEGHALAYA CEMENTS LIMITED			Authorised Signatory	



## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340805.  
 GST No: 17AADCM8079P12M, CIN No: U26942NL2003PLC007125

## PURCHASE ORDER

<b>To,</b> Nagarjuna polymers PLOT NO: 206/8&9, IDA, PHASE-II, CHE Hyderabad Phone No: 9701544069 9100500777 Fax No: Email : Contact Person Mr. Raju Contact No. 9000227583 GST No:36AACFN7973P12P	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210 MeghalayaIndia GST- 17AADCM8079P12M <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500040022 <b>PO Date</b> : 09.03.2021 <b>Quotation No</b> : <b>Quotation Date</b> :
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Dear Sir,  
 We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00090	CVGMR1190	HDPE BEND 75 MM\16.03.2021	3917	50	NO	73.00 /1 NO		3,650.00
<b>Page Total</b>								3,650.00
<b>Other Page Total</b>								6,660.00
<b>Grand Total</b>								10,290.00
<b>Tax Code</b>	+ IGST INPUT- 18%					<b>P &amp; F</b>	:	0.00
<b>Payment Terms</b>	+ 180% AGAINST PERFORMA INVOICE					<b>OTHER CHARGES</b>	:	0.00
<b>Inco Terms</b>	: BY ROAD					<b>Loading/Unloading</b>	:	0.00
<b>Transporter</b>	: Rx-Hyderabad, Freight Charges: To Pay					<b>CGST</b>	:	0.00
<b>Inspection</b>	: You will intimate us in advance the readiness of the material.					<b>SGST</b>	:	0.04
						<b>IGST</b>	:	1,952.20
						<b>CESS</b>	:	0.00
						<b>TDS</b>	:	10.29
						<b>TCS</b>	:	0.00
						<b>Insurance Value</b>	:	0.00
						<b>Total with Tax</b>	:	12,142.20
						<b>P &amp; P(AT)</b>	:	0.00
						<b>Discount (AT)</b>	:	0.00
						<b>Total</b>	:	12,131.91

Amount In Words: TWELVE THOUSAND ONE HUNDRED THIRTY ONE Rupees NINETY ONE Paise INR

## General Terms &amp; Conditions

- Original Document required along with the materials.
- Purchase Order No. & Material Code must be mentioned in invoices.
- All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- Others Terms & Condition as per ANNEXURE-1
- Issued Under GST Act, 2017

Remarks: Indent No: 1100040743 Dated: 16.12.2020

On accepting this order it is understood that you agree to the terms & conditions shown above and on continuation sheet all which are made part thereof

Prepared By \_\_\_\_\_ Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lushnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G. S. Road, Guwahati-781003  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: HS-77, Saltlake City, Sector-1, Kolkata - 700064 (W.B.)  
 Ph. 033-23340304/666, Fax : 033-23340505.  
 GST No: 17AADCM8079E1EM, CIN No: U26942ML2003PLC007125

PO No : 4500040022 PO Date: 09.03.2021

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount	Total Value
00110	CVGER1451	SUBCRKE BEND PRESSURE RATING: PMS RAW MATERIAL GRADE: PE 80 MAKE: NAGARJUNA HDPE FLANGE 25 MM\16.03.2021	3917	250	NO	22.00 /1 NO		5,500.00
00120	CVGER1452	REQUIRE FLANGE WITHOUT COLLAR PRESSURE RATING: PMS RAW MATERIAL GRADE: PE 80 MAKE: NAGARJUNA HDPE FLANGE 25 MM\16.03.2021	3917	20	NO	57.00 /1 NO		1,140.00
		REQUIRE FLANGE WITHOUT COLLAR PRESSURE RATING: PMS RAW MATERIAL GRADE: PE 80 MAKE: NAGARJUNA						

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

FOR MEGHALAYA CEMENTS LIMITED

Authorized Signatory



Page Total : 6,640.00



**MEGHALAYA CEMENTS LTD**

Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-1, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/646, Fax : 033-23340505.  
 ECC No: AADCM807SPXND01, CIN No: U26942MLJ003PLC007125

**PURCHASE ORDER**

<b>To,</b> SHREE NARAYANI PIPE MFG. CO. 29, GANESH CHANDRA AVENUE, 3RD FLOOR Kolkata Phone No: Fax No: Email : Contact Person Mr. Navin Lath Contact No. 9830118771 GST No:19AAKFS4206J1ZY	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia GST- 17AADCM8079P12M <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500039237 <b>PO Date</b> : 02.02.2021 <b>Quotation No</b> : <b>Quotation Date</b> :
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Dear Sir,  
 We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00100	CVHER0980	SPRINKLER -180 DEG. ROTATION\10.02.2021	8424	150	NO	700.00 /1 NO		105,000.00

Page Total	105,000.00
Other Page Total	0.00
<b>Grand Total</b>	<b>105,000.00</b>

Tax Code : 10ST INPUT- 18% Payment Terms : 100% AGAINST PERFORMA INVOICE Inco Terms : BY ROAD Transporter : Ex-Kolkata, Freight Charges: To Pay/At Actual Inspection : You will intimate us in advance the readiness of the material.	P & F : 0.00 OTHER CHARGES : 0.00 Loading/Unloading : 0.00 CGST : 0.00 SGST : 0.00 IGST : 18,900.00 CCESS : 0.00 TDS : 105.00 TCS : 0.00 Insurance Value : 0.00 Total with Tax : 123,900.00 P & F (AT) : 0.00 Discount (AT) : 0.00 Total : 123,900.00
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Amount In Words: ONE LAKH TWENTY THREE THOUSAND SEVEN HUNDRED NINETY FIVE Rupees INR

- General Terms & Conditions**
- Original Document required along with the materials.
  - Purchase Order No. & Material Code must be mentioned in invoice.
  - All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
  - Others Terms & Condition as per ANNEXURE-1
  - Issued Under GST Act, 2017

Remarks: Indent No: 1180040743 Dated: 16.12.2020

On accepting this order it is understood that you agree to the terms & conditions shown above (as per continuation sheet all which are made part thereof)

Prepared By \_\_\_\_\_ Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED  
  
 Authorised Signatory

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshkong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 840 / 862  
 Kolkata Office: BS-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23140004/666, Fax : 033-153140505,  
 ECC No: AACM817SPXM001, CIN No: U26342ML2001PLC007128

PO No : 4500019237 PO Date: 02.02.2021

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		3/4" Insect Metallic half Circle# Sprinkler BSP Male Threads- 3/4" Sprinkler's Operating Pressure- 1kg/cm2 to 3kg/cm2 Sprinkler's Discharge- 25 LPM to 42 LPM Sprinkler's Diameter of Coverage- 1.5mtr to 2mtr MAKE : AJAPLAST  NOTE :  Supplier will send 5Pcs Sprinkle out of total ordered qty immediately for our site approval purpose.						

Gross Total : 0.00

For MEGHALAYA CEMENTS LIMITED

Authorised Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

**POLLUTION TESTING STATION**

LADTHALABOH, JAINTIA HILLS

Name of Licence Holder:-  
M/s JASPER I SLONG  
Ladthalaboh, Jaintia Hills  
Jowai - 793150



LICENCE NO. Com/Trans/74/2004/5  
DATE OF ISSUE :- 21ST March, 2005

Book No. 72

SI No. 7240

Date 27.10.2022

**SMOKE EMISSION TEST REPORT  
(DIESEL DRIVEN VEHICLES)**

The Vehicle No. ML 11 3279 is tested for emission level and reading is as under.

Type of Vehicle other than agriculture tractors	Notified Standard of Maximum smoke density			Actual Reading	
	Light absorption co-efficient	Hatidye Units	Bosch Unit	Light absorption co-efficient	Hatidye Units
1. Full load at 60 to 70% of maximum engine rated rmp declared by the manufacture. or	3.25	75	5.2		41.13
2. Free acceleration	2.45	65	5.2		

Certified that the vehicle meets the emission standard fixed under Rule 115 (2) of the Central Motor Vehicles Rules 1989. This Certificate is valid 26-04-2023.

Com/Trans/PTS (JIS)/44/2005/74, dated: 17.05.2017

Authorised Signature  
Seal of the Testing Station  
Pollution Testing Station  
Ladthalaboh, Jowai, Meghalaya



**POLLUTION TESTING STATION**

LADTHALABOH, JAINTIA HILLS

Name of Licence Holder:-  
M/s JASPER I SLONG  
Ladthalaboh, Jaintia Hills  
Jowai - 793150



LICENCE NO. Com/Trans/74/2004/5  
DATE OF ISSUE :- 21ST March, 2005

Book No. 72

SI No. 7242

Date 27-10-2022

**SMOKE EMISSION TEST REPORT  
(DIESEL DRIVEN VEHICLES)**

The Vehicle No ML 11 3150 is tested for emission level and reading is as under.

Type of Vehicle other than agriculture tractors	Notified Standard of Maximum smoke density			Actual Reading	
	Light absorption co-efficient	Hatidye Units	Bosch Unit	Light absorption co-efficient	Hatidye Units
1. Full load at 60 to 70% of maximum engine rated rpm declared by the manufacture. or	3.25	75	5.2		41.74
2. Free acceleration	2.45	65	5.2		

Certified that the vehicle meets the emission standard fixed under Rule 115 (2) of the Central Motor Vehicles Rules 1989. This Certificate is valid 26-09-2023.

Cont/ Trans/PTS (JIS)/44/2005/74,dated: 17.05.2017

Authorized Signature  
Seal of the Testing Station  
Pollution Testing Station  
Ladthalaboh, Jowai, Meghalaya



**POLLUTION TESTING STATION**

LADTHALABOH, JAINTIA HILLS

Name of Licence Holder:-  
**M/s JASPER I SLONG**  
 Ladthalaboh, Jaintia Hills  
 Jowai - 793150



LICENCE NO. Com/Trans/74/2004/5  
 DATE OF ISSUE :- 21ST March, 2005

Book No. 72

SI No. 7300

Date 27-10-2022

**SMOKE EMISSION TEST REPORT**  
**(DIESEL DRIVEN VEHICLES)**

The Vehicle No ML 11 1798 is tested for emission level and reading is as under.

Type of Vehicle other than agriculture tractors	Notified Standard of Maximum smoke density			Actual Reading	
	Light absorption co-efficient	Hatidye Units	Bosch Unit	Light absorption co-efficient	Hatidye Units
1. Full load at 60 to 70% of maximum engine rated rpm declared by the manufacture. or	3.25	75	5.2		45.06
2. Free acceleration	2.45	65	5.2		

Certified that the vehicle meets the emission standard fixed under Rule 115 (2) of the Central Motor Vehicles Rules 1989. This Certificate is valid 26-04-2023

Com/Trans/PTS (JIS)/44/2005/74, dated: 17.05.2017



Authorised Signatory  
 Seal of the Testing Station  
 Pollution Testing Station  
 Ladthalaboh, Jowai, Meghalaya



**POLLUTION TESTING STATION**

LADTHALABOH, JAINTIA HILLS

Name of Licence Holder:-  
M/s JASPER I SLONG  
Ladthalaboh, Jaintia Hills  
Jowai - 793150



LICENCE NO. Com/Trans/74/2004/5  
DATE OF ISSUE :- 21ST March, 2005

Book No. 72

SI No. 7241

Date 27.10.2022

**SMOKE EMISSION TEST REPORT  
(DIESEL DRIVEN VEHICLES)**

The Vehicle No. MK 11 3152 is tested for emission level and reading is as under.

Type of Vehicle other than agriculture tractors	Notified Standard of Maximum smoke density			Actual Reading	
	Light absorption co-efficient	Hatidye Units	Bosch Unit	Light absorption co-efficient	Hatidye Units
1. Full load at 60 to 70% of maximum engine rated rpm declared by the manufacture. or	3.25	75	5.2		40.07
2. Free acceleration	2.45	65	5.2		

Certified that the vehicle meets the emission standard fixed under Rule 115 (2) of the Central Motor Vehicles Rules 1989. This Certificate is valid 26-04-2023

Com/ Trans/PTS (JIS)/44/2005/74, dated: 17.05.2017



Authorized Signature  
Seal of the Testing Station  
Pollution Testing Station,  
Ladthalaboh, Jowai, Meghalaya

**POLLUTION TESTING STATION**

LADTHALABOH, JAINTIA HILLS

Name of Licence Holder:-  
M/s JASPER I SLONG  
Ladthalaboh, Jaintia Hills  
Jowai - 793150



LICENCE NO. Com/Trans/74/2004/5  
DATE OF ISSUE :- 21ST March, 2005

Book No. 72

SI No. 7244

Date 27-10-2022

**SMOKE EMISSION TEST REPORT  
(DIESEL DRIVEN VEHICLES)**

The Vehicle No ..... ML 11 1800 ..... is tested for emission level and reading is as under.

Type of Vehicle other than agriculture tractors	Notified Standard of Maximum smoke density			Actual Reading	
	Light absorption co-efficient	Hatidye Units	Bosch Unit	Light absorption co-efficient	Hatidye Units
1. Full load at 60 to 70% of maximum engine rated rmp declared by the manufacture. or	3.25	75	5.2		43.08
2. Free acceleration	2.45	65	5.2		

Certified that the vehicle meets the emission standard fixed under Rule 115 (2) of the Central Motor Vehicles Rules 1989. This Certificate is valid ..... 28-04-2023 .....

Com/ Trans/PTS (JIS)/44/2005/74,dated: 17.05.2017



Authorized Signature  
Seal of the Testing Station  
Pollution Testing Station  
Ladthalaboh, Jowai, Meghalaya



# MEGHALAYA CEMENTS LIMITED

CIN- U26942ML2003PLC007125

Annex - XI



Ref:- MCL/ENV/CGWB/Comm./2022-23/31

Date: 07.11.2022

To,

The Regional Director,  
Central Ground Water Board,  
4P7C+7RQ, NH-37, OPP-ISBT,  
Betkuchi, Gaurchuk,  
Guwahati, Assam.

**Sub: - Submission of Detailed Scheme for Rainwater harvesting system for 2600TPD Cement Plant & 31.05 Ha Mines for approval.**

Ref: -Our Letter No. MCL/ENV/CGWB/Comm./2022-23/26; dated: 20.10.2022

Dear Sir,

With reference to subject cited above, we wish to inform you that we are complying the Environment Clearance compliance for the project of Expansion of Cement Plant (from 900-2600 TPD) along with 10 MW Captive Power Plant (**Specific Condition-X**) and For Limestone mining for an area of 31.05 Ha, South Khliejhari, Thangskai Village (**Specific Condition-XI**) under MoEF North Eastern Regional Office, Shillong. As per our EC Stipulation we interest to develop Rainwater harvesting in our premises. Detailed scheme for Rainwater Harvesting to recharge the ground water aquifer & reuse in domestic purpose along with Approved layout, Rainfall Data, Copy of Environmental Clearance, Estimation of Quantum of runoff available are attached herewith for your kind approval.

On view of the above we request you to kindly approve the Rainwater Harvesting scheme.

Thank you for your consideration and attention to the matter.

Thanking You Sir,

Yours Faithfully,

For Meghalaya Cements Limited

Authorized Signatory

Encl: as above.



Sales & Marketing Office :  
Mega Plaza, 4th Floor, Christan Bazar  
G.S. Road, Guwahati - 781 006  
Tel : 361 234521/22/23, Fax : 0361 2345719  
E-mail : gwahead@topcem.in  
Web : www.topcem.in

Kolkata :  
BE-77, Salt Lake City  
Sector-1, Kolkata - 700 064  
Tel : 033 2334 0666 / 0604  
Fax : 033 2334 0505  
E-mail : kolkata@topcem.in

Registered Office :  
Village, Thangskai, PO & PE Lumilong  
District - East Jaintia Hills, Meghalaya, PIN 782201  
Tel : 3666 074324 / 363 / 364  
Fax : 0366 278207  
E-mail : meghalaya@topcem.in

HELPLINE NO : 18001233666





भारत सरकार | Government of India

वाणिज्य और उद्योग संचालक | Ministry of Commerce &amp; Industry

पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो) | Petroleum &amp; Explosives Safety Organisation (PESO)

पूर्व नाम: विस्फोटक विभाग | Formerly- Department of Explosives

घर क्रमांक २१६, दूसरी मंजिल, IOBI बैंक के ऊपर, पादमती | House No. 216, 2nd Floor, above IOBI, Chandmari,

गुवाहाटी, असम - ७८१०२१ | Guwahati, Assam (Guwahati) 781021

फ़ोन (Phone): 2652783 | फ़ैक्स (Fax): 2652503

संख्या/ No: A/EC/MG/P35(A271)

दिनांक / Dated: 23/03/2022

सेवा में / To

M/s. Meghalaya Cement Ltd.

Thangskai, East Jaintia Hills

Tura Village - East Jaintia Hills

Dist. EAST JAINTIA HILLS, State- Meghalaya, Pincode- 792216

विषय / Licence in process for use of Ammonium Nitrate from a store house attached to explosives manufacturing unit (ANFO) situated at Survey No.: Umph Area, Village/Town: Village: Lamshuong, Dist. EAST JAINTIA HILLS, State Meghalaya

Subject: Licence No.: A/EC/MG/P35(A271) granted in Form P-3 of Ammonium Nitrate Rules, 2012 - Renewal regarding

सहोदय / Sir(s),

आपके पत्र संख्या 60936 दिनांक 22/03/2022 के सन्दर्भ में अनौपचारिक लाइसेंस नियम 2012 के प्रसंग पी-3 में जारी विषयक अनुमतिपत्र दिनांक 31/03/2027 तक विधिवत नवीनीकृत कर आपको प्रेषित की जा रही है। कृपया अनुमतिपत्र की पावती स्वीकृत करें। / Reference to your letter No.: 60936 dated: 22/03/2022, the subject licence duly renewed upto 31/03/2027 and issued in Form P-3 of Ammonium Nitrate Rules, 2012 is forwarded herewith. Please acknowledge receipt of the licence.

अनुमति के आगामी नवीनीकरण हेतु कृपया निम्नलिखित दस्तावेज इस प्रकार प्रेषित करें कि वह दिनांक 31/3/2027 को या उससे पूर्व this office में प्राप्त हो जाएं। / For further renewal of licence, please submit the following documents so as to reach this office on or before 31/3/2027.

- विधिवत भरा हुआ एवं हस्ताक्षरित प्रसंग अर्क - 1 / Application in Form R-1 duly filled in and signed
- एक से पांच वर्ष के अनुमतिपत्र शुल्क का अनौपचारिक लाइसेंस नियम, 2012 के तहत ऑनलाइन आवेदन पोर्टल पर उपलब्ध है-अनुदान शुल्क के माध्यम से लाइसेंस शुल्क ऑनलाइन जमा किया जाता है। Licence fees renewable for one to five years, to be submitted online through e-payment facility available on online application portal under the Ammonium Nitrate Rules, 2012.
- मूल अनुमतिपत्र मय अनुमोदित आरेखण / Original licence with approved plan
- इस सम्बन्धित में कृपया अनौपचारिक लाइसेंस नियम, 2012 के नियम 36 का भी सन्दर्भ लें। / In this connection, please also refer to Rule 36 of Ammonium Nitrate Rules, 2012
- शीश पत्राघाट साइज के 6 फोटोग्राफ जिन पर सजने की ओर काले रंग की अमिट स्टाडी से ओवरकावर (अनौपचारिक लाइसेंस नियम, 2012 के नियम 2 (O) के अन्तर्गत) तथा परिभाषित। द्वारा विधिवत हस्ताक्षर किया गया हो (यदि जमा नहीं किया गया हो) / Six copies of colour passport size photographs duly signed by the occupier (as defined under Rule 2 (O) of Ammonium Nitrate Rules, 2012) in front of 'black color indelible ink' (if not submitted).

संलग्नक / Enclosures:

अवधीय / Yours faithfully,

( एस. के. शीले ) (S. K. Shile)

विस्फोटक नियंत्रक | Controller of Explosives

For Joint Chief Controller of Explosives

कृते संयुक्त मुख्य विस्फोटक गुवाहाटी

For Jt. Chief Controller of Explosives

गुवाहाटी Guwahati

प्रतिलिपि प्रेषित / Copy Forwarded to

1. District Magistrate, EAST JAINTIA HILLS (Meghalaya) for information

कृते संयुक्त मुख्य विस्फोटक नियंत्रक | For Joint Chief Controller of Explosives

गुवाहाटी | Guwahati

(पेटेंट, मुद्रा एवं अन्य विभागों के साथ से अधिक जानकारी हेतु कृपया संगठन का वेबसाइट <http://peso.gov.in> देखें। For more information regarding patents, stamps and other details, please visit our web site <http://peso.gov.in>)



**अनुमति प्रकृ P-3**  
(अमोनियम नाइट्रेट नियम, 2012 की अनुसूची 1 की क्रम संख्या-1 और नियम 35 देखें )

**LICENCE FORM P-3**  
(See Sr.No.-3 of Schedule I and rule 35  
of Ammonium Nitrate Rules,2012 )

विस्फोटक विनिर्माण इकाई (एनएफओ) से जुड़े गोदाम से अमोनियम नाइट्रेट के उपयोग के लिए रखने हेतु अनुमति  
Licence to possess for use of Ammonium Nitrate from a store house attached to explosives manufacturing unit (ANFO)

अनुमती संख्या | Licence No. : A/EC/MG/P3/S(A271)  
वार्षिक अनुमती शुल्क | Annual Licence Fee Rs. 1000/-



अनुमति प्राप्तता जारी की जाती है | Ms. Meghalaya Cements Ltd. (अभिषेकाला : Ramesh Kumar Pareek)  
Thangskai, East Jaintia Hills,  
शहर 1 गांव - East Jaintia Hills  
Licence is hereby granted to : जिला- EAST JAINTIA HILLS, राज्य- Meghalaya, पिन कोड - 793210  
Phone -, Email-, फैक्स-

- अनुमतिधारी का नाम: Company  
Name of licence holder: Company
- अनुमति केवल निम्नलिखित प्रयोजन हेतु वैध है: विस्फोटक विनिर्माण इकाई (एनएफओ) से जुड़े गोदाम से अमोनियम नाइट्रेट के उपयोग के लिए रखने हेतु अनुमति  
Licence is valid only for the following purpose: Licence to possess for use of Ammonium Nitrate from a store house attached to explosives manufacturing unit (ANFO)
- अनुमति अमोनियम नाइट्रेट की निम्नलिखित मात्रा के लिए वैध है: :  
Licence is valid for the following quantity of Ammonium Nitrate:

नाम तथा विवरण Name and Description	किसी एक समय में मात्रा (कि.ग्रा.) Quantity at a time (Kg)	किसी एक वित्तीय वर्ष में क्रय की जाने वाली अमोनियम नाइट्रेट की मात्रा(कि.ग्रा.) Quantity of Ammonium Nitrate to be purchased in a financial Year (Kg)
Ammonium Nitrate (Solids)	40000	480000

- अनुमति प्राप्त परिसर निम्नलिखित आरेख(एनपी) के अनुरूप होगा  
The licensed premises shall conform to the following drawing(s)  
आरेखण संख्या | Drawing No : A/EC/MG/P3/S ( A271 ) दिनांक | Dated : 13/06/2014
- अनुमति प्राप्त परिसर निम्नलिखित पते पर स्थित है  
The Licensed premises are situated at following address  
Survey No, Umpek Area, शहर/गांव | Town/Village : Village: Lumshoung  
पोलिस स्टेशन | Police Station Lumshoung जिला | District EAST JAINTIA HILLS राज्य | State Meghalaya  
पिन कोड | Pin Code : 793210 फोन | Phone : 0360 | E-Mail : mines@topcem.in फैक्स | Fax :
- अनुमति प्राप्त परिसर में निम्नलिखित सुविधाएँ उपलब्ध हैं  
The licensed premises consist of following facilities  
Consist of one store house .
- अनुमति समय-समय पर सशर्त विस्फोटक अधिनियम 1884 एवं उसके अर्पण बनाए गए अमोनियम नाइट्रेट नियम, 2012 की शर्त, अतिरिक्त शर्त तथा निम्नलिखित अपवन्धों के अर्पण जारी की जाती है  
(i) उक्त क्रम संख्या 5 में उल्लिखित आरेखण (जिसमें स्थल निर्माण एवं अन्य विवरण दर्शाए गए हैं)।  
(ii) अनुमति जारी करने वाले अधिकारी द्वारा इस्तेमालित अनुमति की शर्त एवं अतिरिक्त शर्त ।

The licence is granted subject to the provision of Explosives Act 1884 as amended from time to time and the Ammonium Nitrate Rules, 2012 framed there under and the conditions, additional conditions and Annexures.  
(i) Drawings (showing site, constructional and other details) as stated in serial No. 5 above.  
(ii) Conditions and Additional Conditions of this licence signed by the license issuing authority.



(A 271)

8. यह अनुमति 31 मार्च 2019 तक वैध रहेगी।  
This license shall remain valid till 31st day of March 2019

यह अनुमति विस्फोटक अधिनियम, 1884 का उल्लंघन कराने पर अमोनियम नाइट्रेट नियम, 2012 या इस अनुमति के किताब शर्तों का उल्लंघन करने पर या यदि अनुमति परीक्षण, जांच और उसके संलग्न उपकरण में दक्षिण विभाग के अनुसंधान नहीं किए जाने पर निरन्तरित या प्रतिबंधित की जा सकती है।

This license is liable to be suspended or revoked for any violation of the Explosives Act 1884 or Ammunition Nitrate Rules, 2012 framed there under or the conditions of this license if the licensed premises are not found conforming to the description shown in the plans and annexes attached hereto.

दिनांक | Date: 13/06/2014

Sd/-  
संयुक्त मुख्य विस्फोटक नियंत्रक  
Joint Chief Controller of Explosives  
पूरुघार, कोलकाता | East Circle office, Kolkata

**Amendments:**

- Change in Authorized Signatory/Operator/Partners/Directors dated : 26/08/2015
- Change in Authorized Signatory/Operator/Partners/Directors dated : 04/03/2019

**अनुमति नवीकरण के लिए पृष्ठान्न | Endorsement for renewal of license**

नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry	अनुमति प्रधिकारी के हस्ताक्षर Signature of licensing authority
21/03/2022	31/03/2027	B. Chief Controller of Explosives, Purgahat, Gurdahat कोलकाता मुख्य विस्फोटक नियंत्रक

सांविधिक चेतावनी: अमोनियम नाइट्रेट कानून का दुरुपयोग करना एक गंभीर अपराध है।  
Statutory Warning: Misuse of Ammonium Nitrate shall constitute serious criminal offence under the law.

**Note :- This is system generated document does not require physical signature. Applicant may take printout for their records.**





MEGHALAYA  
CEMENTS LIMITED



**TOPCEM**  
CEMENT

Mazbooti ka bhara...hamesha

31.05 Ha South Khliehji Mines

MEGHALAYA CEMENTS LIMITED

EAST JAINTIA HILLS, MEGHALAYA

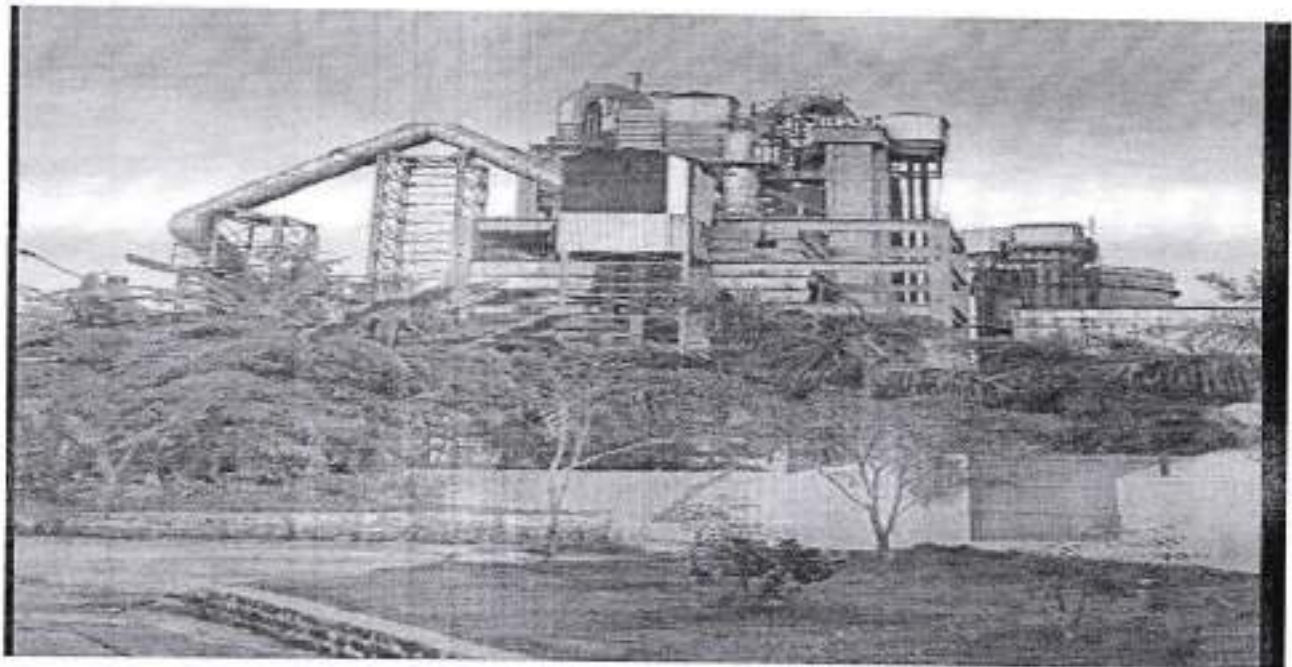
# Corporate social responsibility

Report for the period of April to September-2022







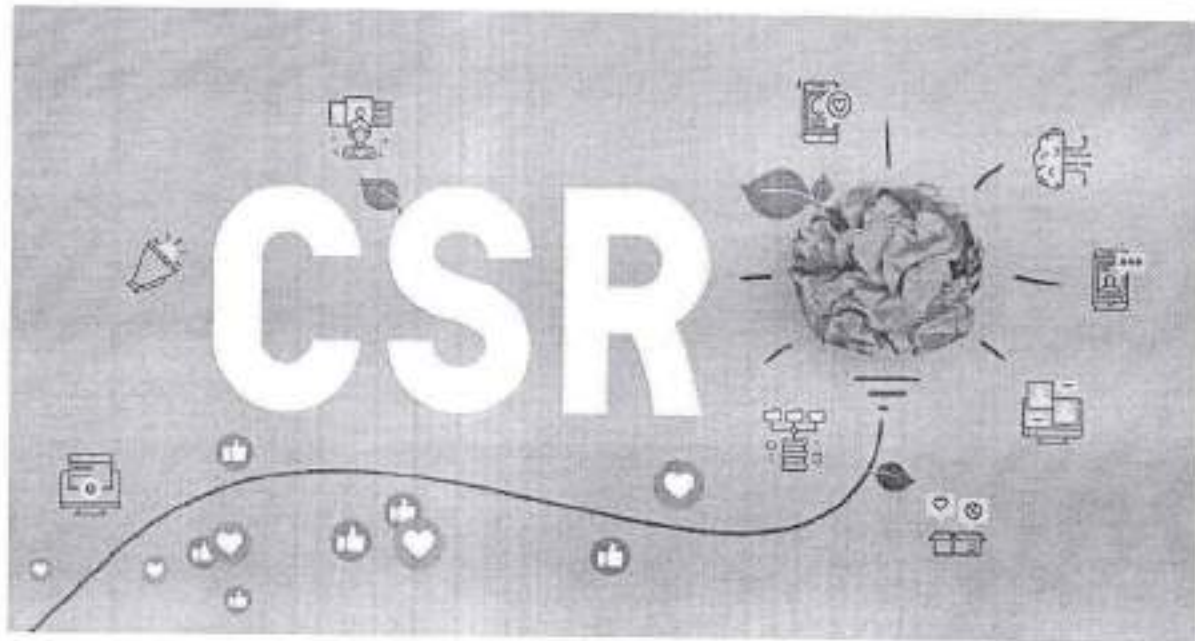


## Reference of Environment Clearance

Letter No. - SEIAA/ (PR-19/2012) PT/PR-05/2015/444 dated: 9th Jan 2017.

## Environment Condition

"As per the Companies Act, 2013 and the CSR Rules, 2% of average net profit of last three years shall be made available by the PP for the socio economic development of the neighborhood habitats. This shall be properly planned by the PP with the help of expert institutes and implemented through registered Agency as per the CSR Rules. Compliance report shall be submitted to the SEIAA, Meghalaya, the NE Regional Office of the MoEF & CC, and Shillong on a six monthly basis."



## Corporate Social Responsibilities

Corporate social responsibility (CSR) is a self-regulating business model that helps a company be socially accountable to itself, its stakeholders, and the public. By practicing corporate social responsibility, also called corporate citizenship, companies can be conscious of the kind of impact they are having on all aspects of society, including economic, social, and environmental.

To engage in CSR means that, in the ordinary course of business, a company is operating in ways that enhances society and the environment instead of contributing negatively to them.

### **Key Takeaways':-**

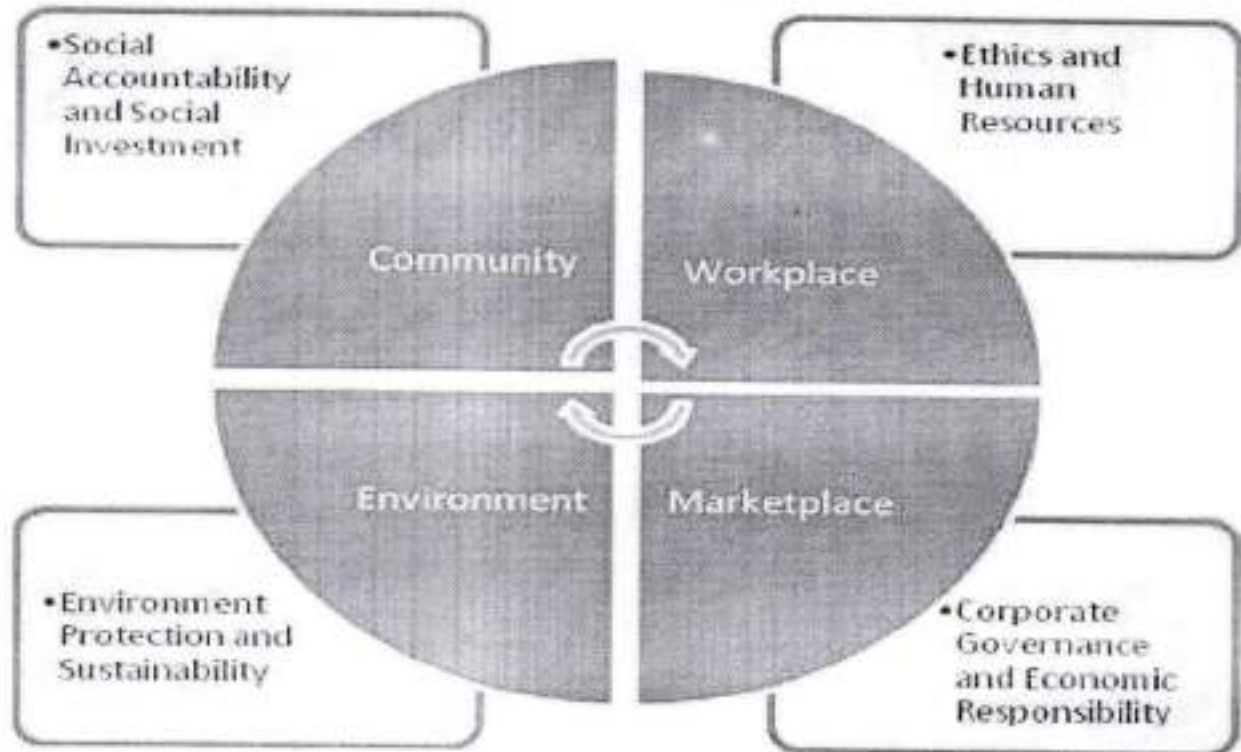
- Corporate social responsibility is a business model by which companies make a concerted effort to operate in ways that enhance rather than degrade society and the environment.
- CSR helps both improve various aspects of society as well as promote a positive brand image of companies.
- CSR helps both improve various aspects of society as well as promote a positive brand image of companies.

- CSRs are often broken into four categories: environmental impacts, ethical responsibility, philanthropic endeavors, and financial responsibilities.

## Benefits of Corporate Social Responsibility

- As important as CSR is for the community, it is equally valuable for a company. CSR activities can help forge a stronger bond between employees and corporations, boost morale, and aid both employees and employers in feeling more connected to the world around them. Aside from the positive impacts to the planet, here are some additional reasons businesses pursue corporate social responsibility.
- ISO 26000 clarifies what social responsibility is and helps organizations translate CSR principles into practical actions. The standard is aimed at all types of organizations, regardless of their activity, size, or location. And because many key stakeholders from around the world contributed to developing ISO 26000, this standard represents an international consensus.





## Role of Meghalaya Cements Limited towards Corporate Social Responsibilities

Meghalaya Cements Limited is contributing on account of Social Accountability and Social Investment, Ethics and Human Resources, Environment Protection and Suitability and Corporate Governance and Economic Responsibility. In the period of April 2022 to September 2022 Meghalaya Cements Limited has spent Rs. 35.95 Lacs in different activities.

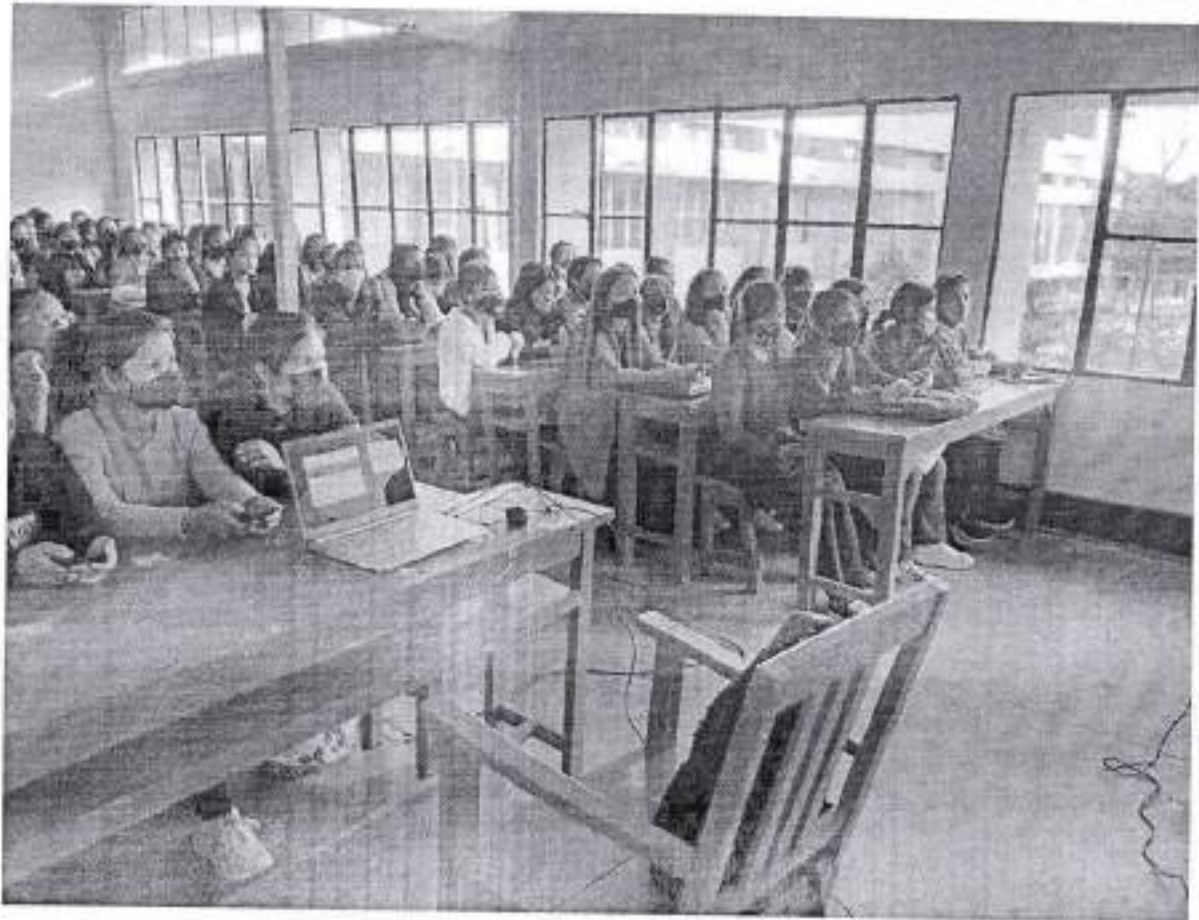
### **Expenditure Incurred for Socio-Economic Development under CSR for the period of April 2022 to September 2022:-**

SL.NO.	HEADING	AMOUNT (In Rs.)
1	Emphasis on Education	66,000
2	Sports Activity	22,000
3	Encouraging/Felicitation prog. For Students.	55,950
4	Polio Immunization Camps, Family	344,604

	planning, etc.	
5	Infrastructure development of Hospitals/Schools	21,000
6	Cement Distribution Programme.	2,540,315
7	Plant Distribution Programme.	13,980
8	Donation to Churches, Road & House / Community Center Repairing etc.	55,200
9	Community Feast	41,468
10	Drinking water supplying scheme.	179,101
11	Village Development Funds.	237,500
12	Corona Pandemic	-
<b>Total</b>		<b>3,577,118</b>

## 1. Emphasis on Education

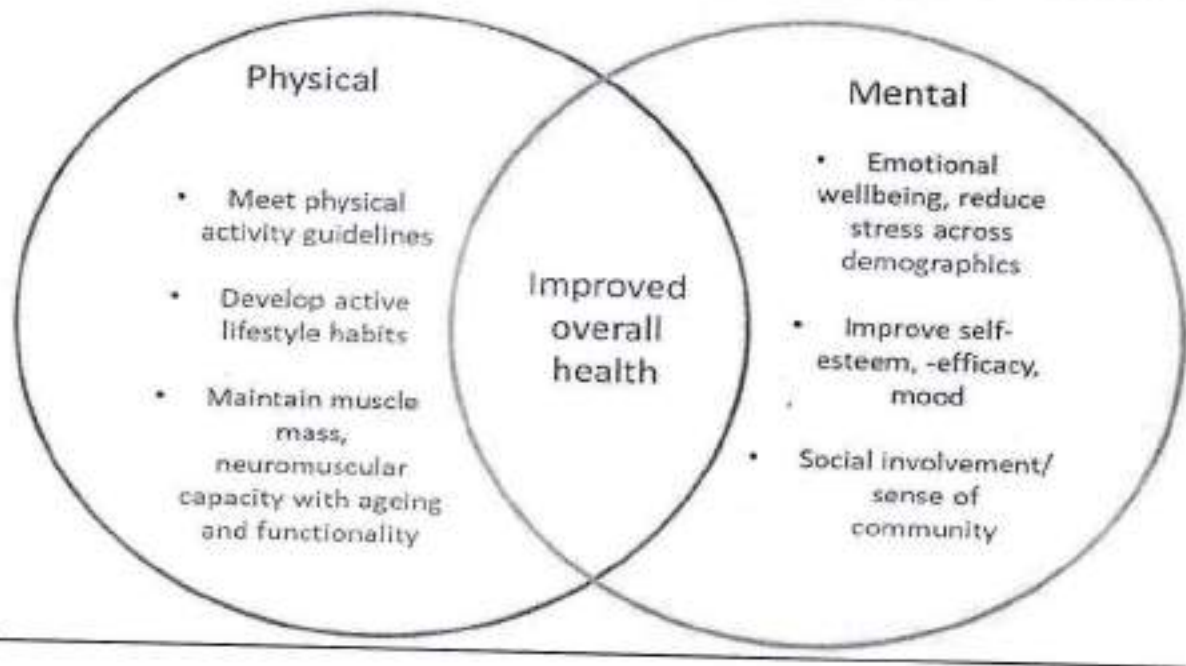
The level at which teachers place importance on meeting the educational goals of all students. Education provides stability in life, and it's something that no one can ever take away from you. By being well-educated and holding a college degree, you increase your chances for better career opportunities and open up new doors for yourself. For That Meghalaya Cements Limited has sponsored a well trained Teacher to "**Chiehruphi Higher Secondary School**" to meet the educational goals of all students. The deputed professional teacher who teaches students based on national curriculum guidelines within their specialist subject areas. Their duties include assigning homework, grading tests, documenting progress and keeping up with parent communication. The Monthly salary of the Professional Teacher has paid by the Company. The amount of Rs. 66000 has paid for the Teacher as monthly salary.



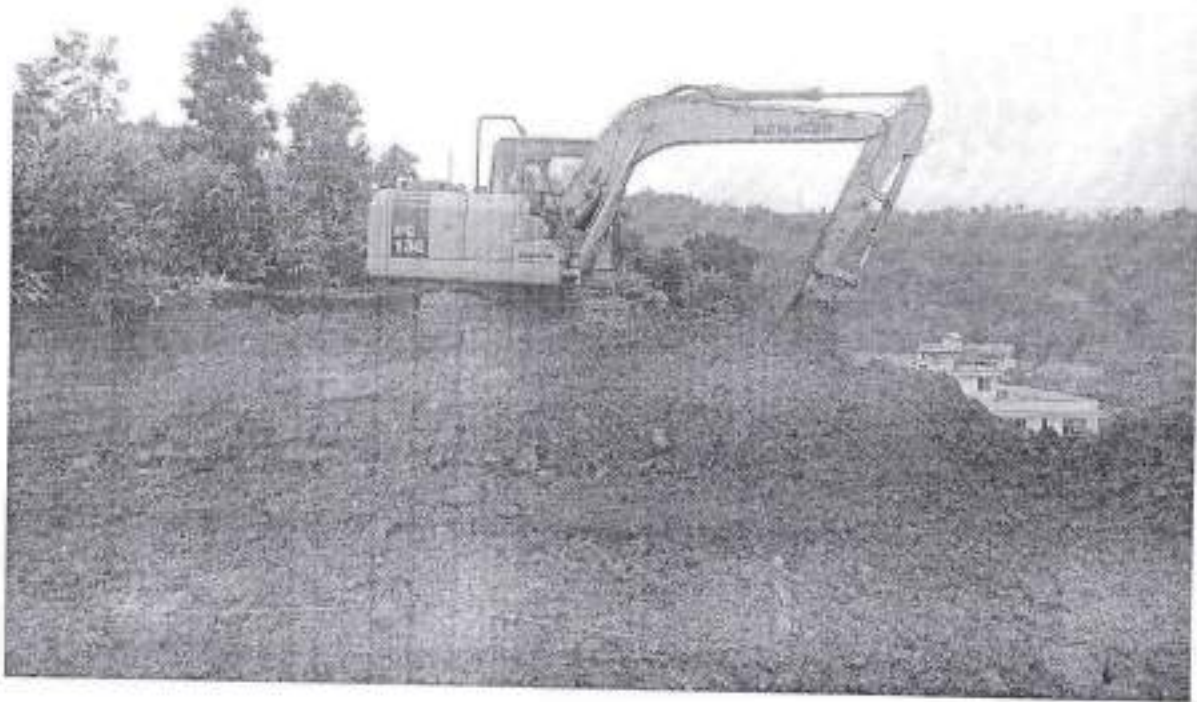
## 2. Sports Activity:-

Sports are games such as football and basketball and other competitive leisure activities which need physical effort and skill. Being physically active can improve your brain health, help manage weight, reduce the risk of disease, strengthen bones and muscles, and improve your ability to do everyday activities. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.

## Corporate Social Responsibility Report



The Company has helps for Uninterrupted Sports Activities for that Developed a Play Ground located at Lumshnong Village. For the Development of Ground company has spent Rs. 22000 on Manpower and Machineries. Providing a proper playground is beneficial to keep the children fit and healthy. School playground equipment in India positively impacts children's emotional, social, physical, and mental growth. Various other advantages include increased self-esteem, critical thinking skills, and a strong immune system.





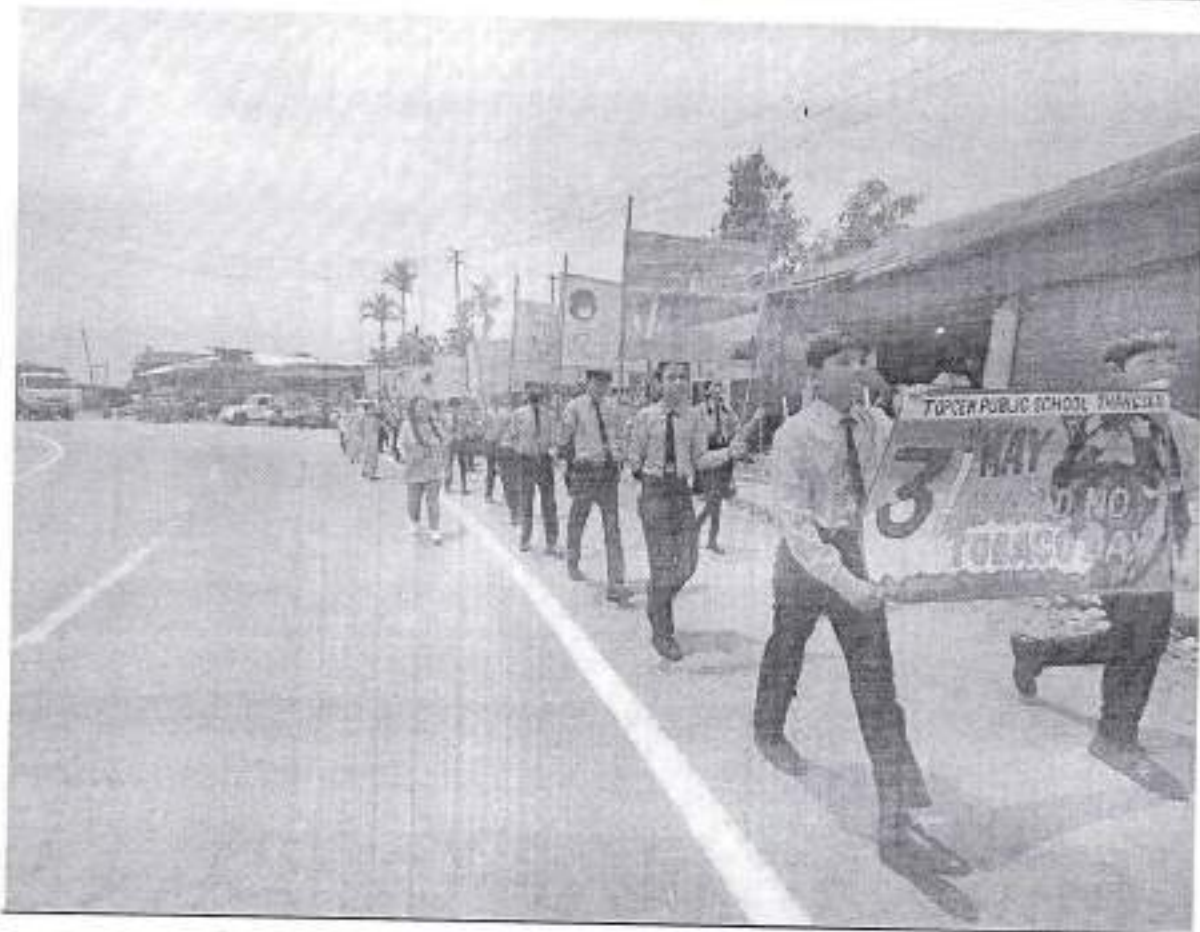
### 3. Encouraging / Felicitation Programme for Students:-

**"Encouragement is a Powerful Force in Education."**

Encouraging words and actions are often internalized by students and have the power to motivate them to succeed. Encouragement can even be the difference between students completing school and giving up on themselves. Meghalaya Cements Limited has organized SSLC award programme and financial assistance to the poor students and meritorious student of three villages. On dated 19.09.2022 Company has distributed Rs. 55950 to the 12 meritorious students who done excellent in SSLC examination.

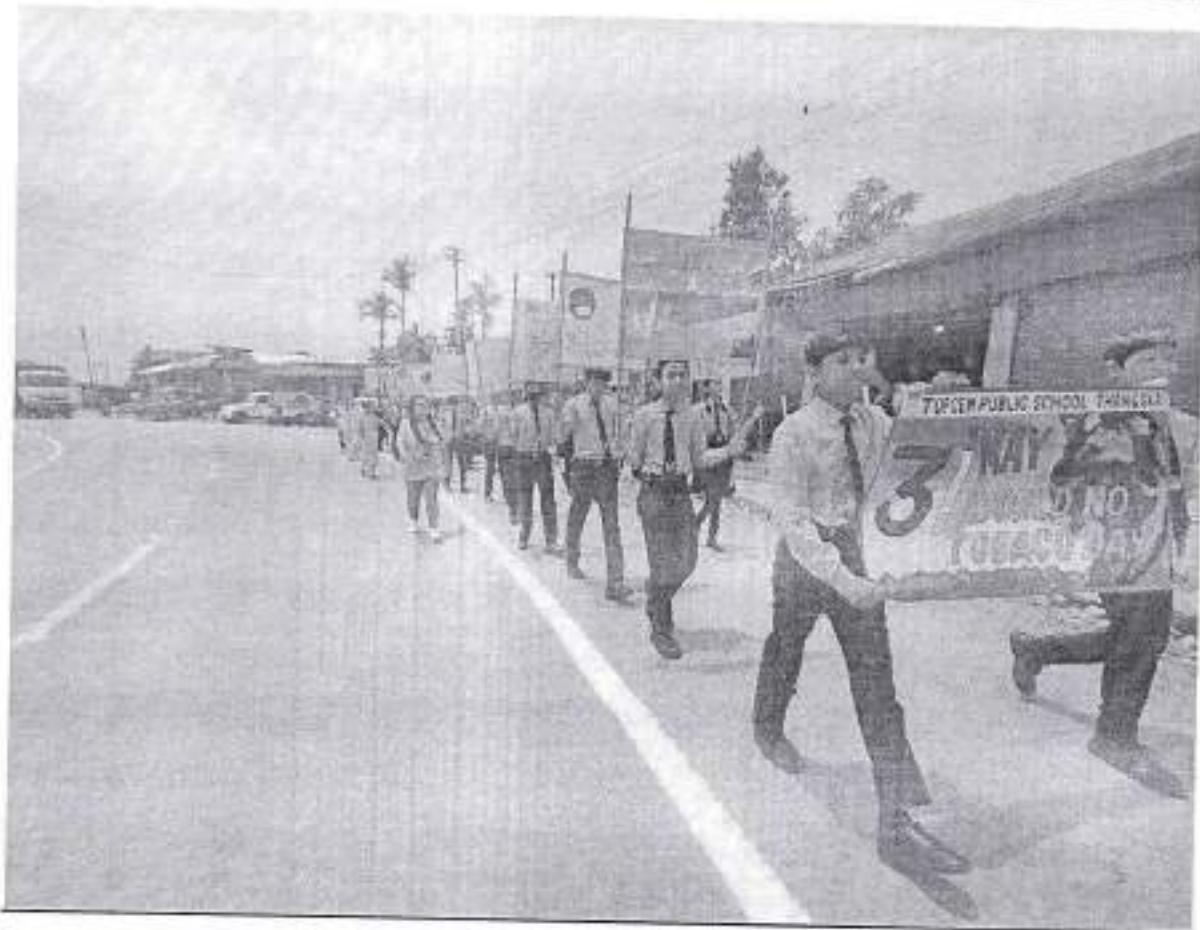






#### 4. Polio Immunization Camps, Family planning, etc.:-

The Pulse Polio Initiative was started with an objective of achieving hundred per cent coverage under Oral Polio Vaccine. It aimed to immunize children through improved social mobilization, plan mop-up operations in areas where poliovirus has almost disappeared and maintain high level of morale among the public. Natural Family Planning (NFP) relies on the ability to track ovulation in order to prevent pregnancy. These methods predict fertile and infertile days to identify when to avoid unprotected sex and are only used by a small fraction of women. In View of National Health Mission, Company has deputed skilled Nurses for taking care of Child and Woman. Free medicine and Vaccine has distributed among the villagers by the company on periodic. The Salary of Nurses has provided by the company and Rs. 344'604 has been spent for the period of April-2022 to September-2022.



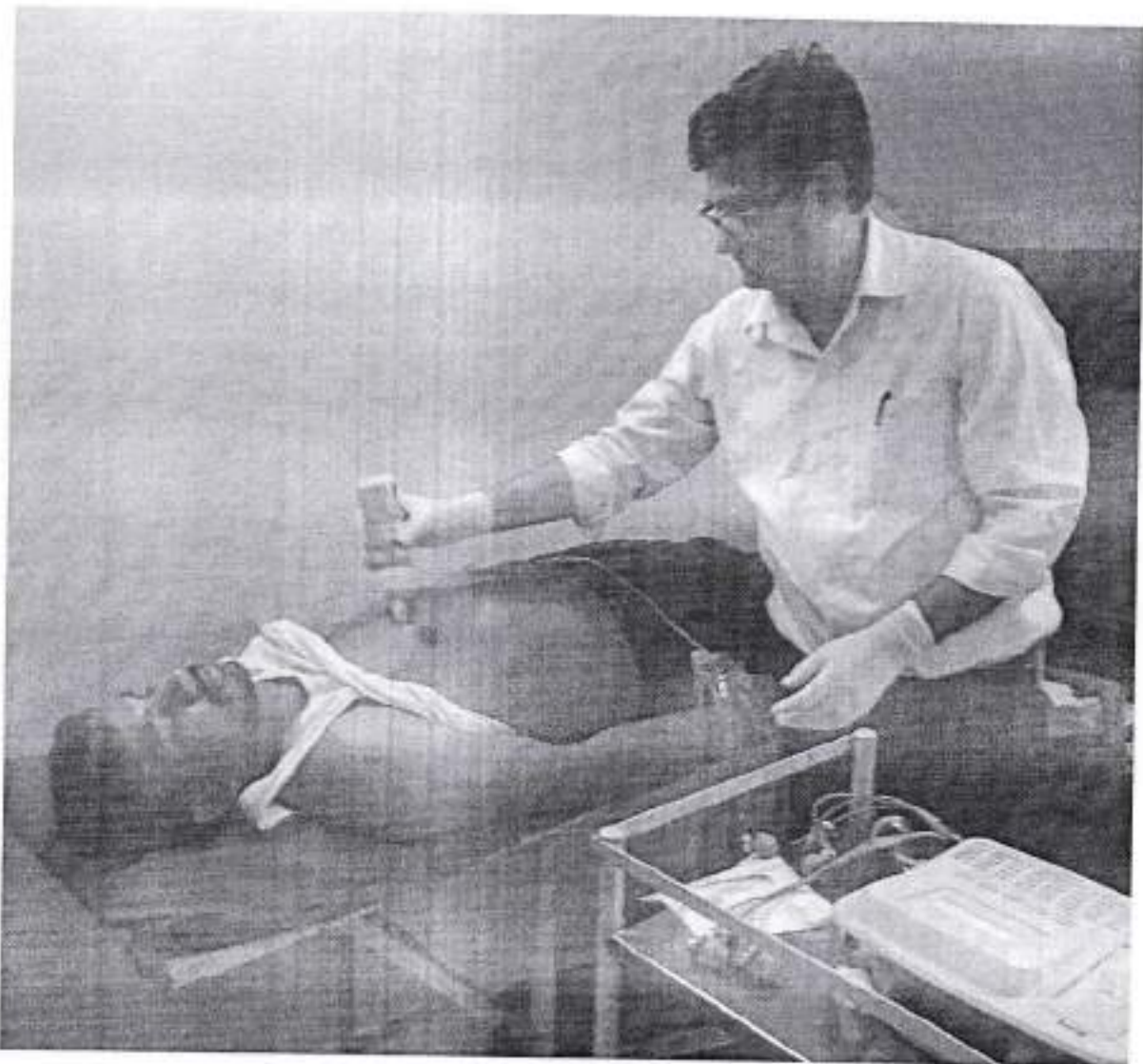
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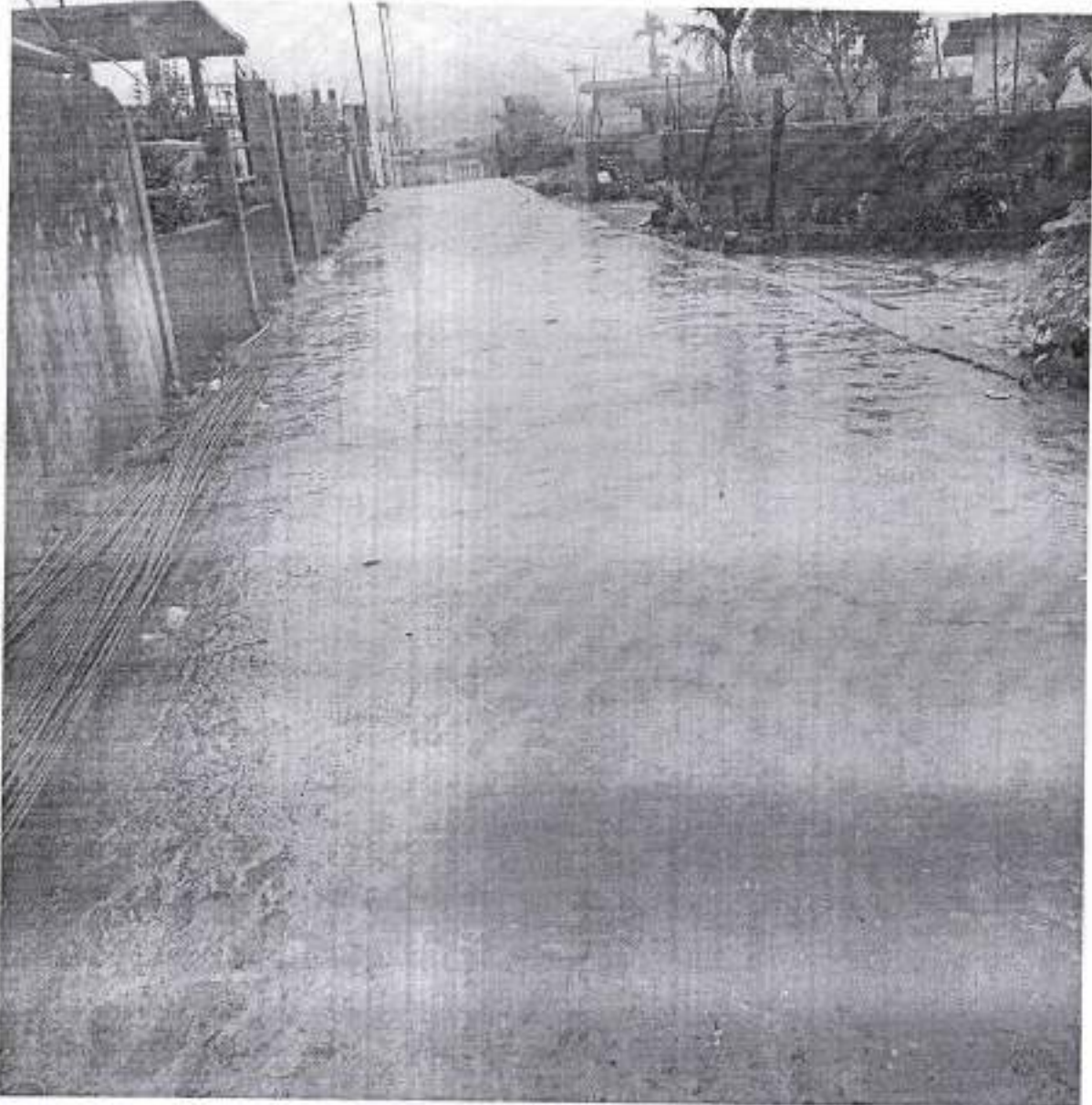
## 5. Infrastructure development of Hospitals/Schools:-

School infrastructure is what influences student learning so that it can run optimally. The improvements focused on stimulation, individualization, and naturalness. Infrastructure as a support system (such as schools, hospital) develops the quality of human capital by imparting quality and technical education and health facilities. This raises the standard and quality of living and helps the economy to eradicate major economic problems like poverty, unemployment and inequality. Meghalaya Cements has contributing major roles towards the developments of Infrastructure. The Company has spent Rs. 21000 for Purchasing of Health checkup kits for routine check-up of Villagers.



## 6. Cement Distribution Programme:-

Cement is important material for development of a society. Meghalaya Cements limited has distributed Cement to the Villagers on Cheap rate for development of their society roads, drains, House, Church, Schools and other Infrastructures. Company has distributed Rs. 2,540,315 in terms of cements toward them for development of their available infrastructures on low subsidized rate.



## 7. Plant (Species) Distribution Programme.

**Environmental Benefits:** - Trees offer many environmental benefits. Trees reduce the urban heat island effect through evaporative cooling and reducing the amount of sunlight that reaches parking lots and buildings. This is especially true in areas with large impervious surfaces, such as parking lots of stores and industrial complexes. Trees improve our air quality by filtering harmful dust and pollutants such as ozone, carbon monoxide, and sulfur dioxide from the air we breathe. Trees give off oxygen that we need to breathe. Trees reduce the amount of storm water runoff, which reduces erosion and pollution in our waterways and may reduce the effects of flooding. Many species of wildlife depend on trees for habitat. Trees provide food, protection, and homes for many birds and mammals.

In view of the above Meghalaya Cements Limited has distributed Local Species worth of Rs. 13,980 in Plantation drive. Total 600 Local species has planted in the period of April-2022 to September-2022.







## **8. Donation to Churches, Road & House / Community Center Repairing etc.**

Villages Infrastructure like Churches, Roads, House and Community Centers are very essential requirements for the Villagers. Company has contributed Rs. 55200 for the repairing of Churches, Roads, House and Community Center in the period of April-2022 to September-2022. Also Company has contributed for Funeral Programme for the villagers.



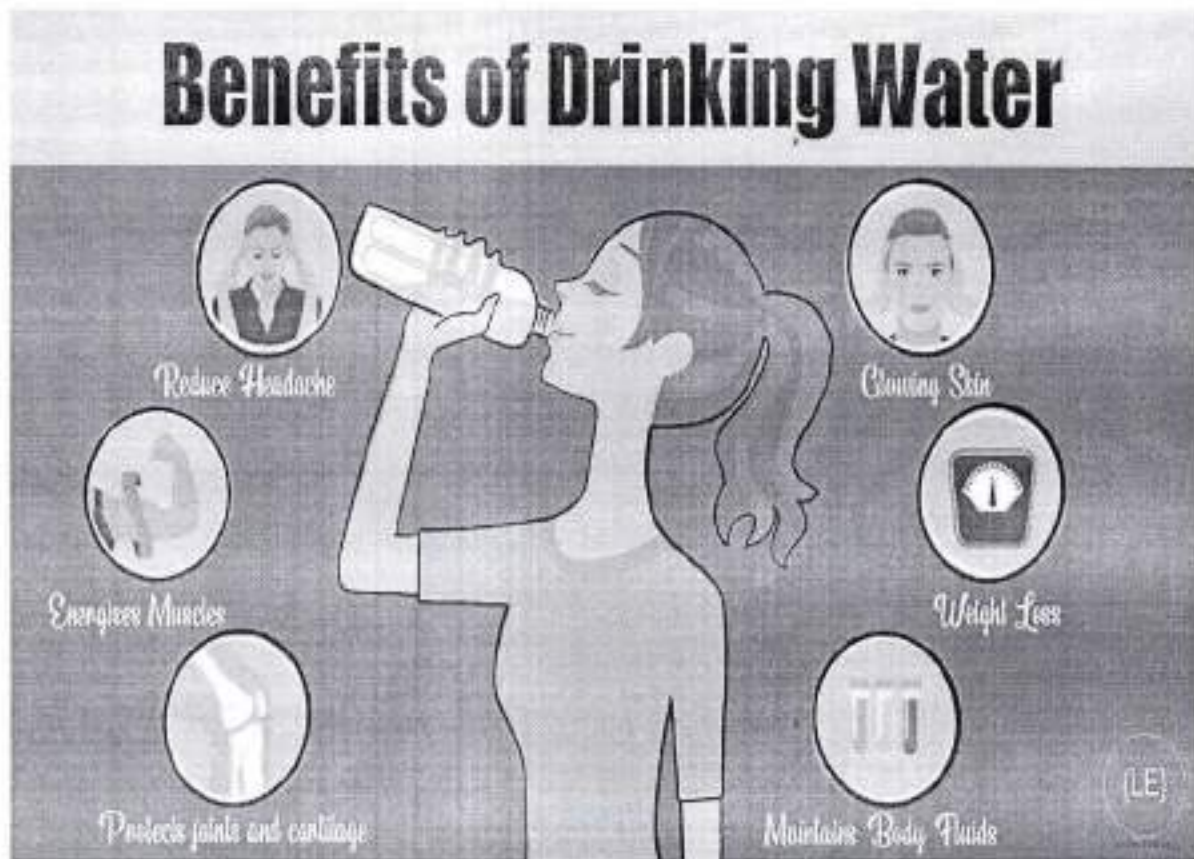
## 9. Community Feast

Community feast means the provision of ready-to-eat food for an Anishinaabe cultural or spiritual purpose, where no monetary exchange is necessary or expected. Company has organized Community feast for the villagers and spent Rs. 41,468 for the same in April-2022 to September 2022.



## 10. Drinking water supplying scheme:-

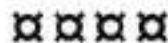
Getting enough water every day is important for your health. Drinking water can prevent dehydration, a condition that can cause unclear thinking, result in mood change, cause your body to overheat, and lead to constipation and kidney stones. Meghalaya Cements Limited has distributed drinking water among the villegers on daily basis and spent Rs. 179,101 for distribution of Drinking Water.





## 11. Village Development Funds

An action plan for the economic and social upliftment of Villages and It aims at improving the quality of life of people living in Villages, Meghalaya Cements Limited has contributing major role under CSR for Villagers. In the period of April-2022 to September-2022, Company has spent Rs. 237,500 in terms of Free Cement distribution & subsidized cement issued to the villages for Village Road, Church, school development work (Chiehruphi, Thangskai & Whaijer village).



# Meghalaya Cements Limited

Thangskai, Meghalaya

DOWNSTREAM WATER ANALYSIS REPORT FOR THE YEAR 2022-23 (Um-Lunar River)

Date:-22.09.2022

Sl. No.	Parameters	Obtained Values In							Average	Permissible Limit
		Apr'2022	May'2022	Jun'2022	Jul'2022	Aug'2022	Sep'2022			
1	pH	7.2	7.4	7.1	7.6	7.3	7.4	7.33	6.5 - 8.5	
2	Dissolved Oxygen (mg/Lit)	11.26	10.39	10.48	11.34	11.69	11.73	11.15	-	
3	Total Dissolve Solids (mg/Lit)	176	182	149	167	149	194	169.50	<500	
4	Conductivity (mg/Lit)	134	162	143	139	171	152	150.17	-	
5	Total Hardness (mg/ Lit)	222	233	205	227	210	201	216.33	<300	
6	Calcium Hardness (mg/Lit)	151	164	129	163	149	142	149.67	<200	
7	Magnesium Hardness (mg/Lit)	71	69	76	64	61	59	66.67	<100	
8	Alkalinity (mg/Lit)	86	69	71	64	72	63	70.83	<200	

Prepared By

*Arif Saiggh*  
Arif Saiggh

Checked & Verified By

Ujjwal Anurag



## Meghalaya Cements Limited

Thangskai, Meghalaya

UPSTREAM WATER ANALYSIS REPORT FOR THE YEAR 2021-22 (Um-Lunar River)

Date:-28.09.2022

Sl. No.	Parameters	Obtained Values In						Average	Permissible Limit
		Apr'2022	May'2022	Jun'2022	Jul'2022	Aug'2022	Sep'2022		
1	pH	7.2	7.4	7.1	7.3	7	6.9	7.15	6.5 - 8.5
2	Dissolved Oxygen (mg/lit)	12.1	12.3	11.9	13.2	12.9	12.2	12.43	-
3	Total Dissolve Solids (mg/Lit)	169	153	156	173	164	136	158.50	<500
4	Conductivity (mg/Lit)	159	143	158	147	139	149	149.17	-
5	Total Hardness (mg/Lit)	250	226	241	224	215	223	229.83	<300
6	Calcium Hardness (mg/Lit)	161	153	165	158	143	157	156.17	<200
7	Magnesium Hardness (mg/Lit)	89	73	76	66	72	66	73.67	<100
8	Alkalinity (mg/Lit)	71	69	64	70	64	67	67.50	<200

Prepared By

Arti Singh

Checked & Verified By

Ujjwal Anurag



# MEGHALAYA CEMENTS LIMITED

Annex - XX

## Six Monthly Ambient Air Quality Survey Report, South Khliehleri Limestone Mine (31.05 Ha), 2022-2023

Pollutants	Location	Apr' 2022	May' 2022	Jun' 2022	Jul' 2022	Aug' 2022	Sep' 2022	Avg.	Permissible Limits for Rural Areas (By MSFCR 24 hrs Monitoring)
Particulate Matters PM10 (µg/m <sup>3</sup> )	A1. North-East (Near Soil Dump)	53.21	49.62	33.93	29.61	32.59	36.48	39.24	100 µg/m <sup>3</sup>
	A2. North - West(Near Haul Road)	55.69	51.89	37.12	34.57	37.96	41.59	43.14	100 µg/m <sup>3</sup>
	A3. Southern side (Near Lease Boundary)	48.43	43.71	29.03	26.48	29.57	33.47	35.12	100 µg/m <sup>3</sup>
Particulate Matters PM2.5 (µg/m <sup>3</sup> )	A1. North -East (Near Soil Dump)	31.58	32.09	17.41	19.53	24.13	27.50	25.37	60 µg/m <sup>3</sup>
	A2. North - West(Near Haul Road)	36.79	37.46	23.77	20.84	23.09	26.91	28.14	60 µg/m <sup>3</sup>
	A3. Southern side (Near Lease Boundary)	33.24	29.58	14.79	13.09	16.48	19.24	21.07	60 µg/m <sup>3</sup>

Prepared By  
*(Arif Singh)*

Checked & Verified By  
*(Ujjwal Anurag)*





# MEGHALAYA CEMENTS LIMITED

Annex - XV

## Six Monthly Ambient Air Quality Survey Report, South Khliehleri Limestone Mine (31.05 Ha), 2022-2023

Pollutants	Location	Apr' 2022	May' 2022	Jun' 2022	Jul' 2022	Aug' 2022	Sep' 2022	Avg.	Permissible Limits for Rural Areas (By MSPCB 24 hrs Monitoring)
SO <sub>2</sub>	A1. North -East (Near Soil Dump)	17.69	15.36	13.86	11.71	13.08	15.29	14.50	80 µg/m <sup>3</sup>
	A2. North - West (Near Haul Road)	12.34	09.61	10.24	07.64	09.27	11.92	10.17	80 µg/m <sup>3</sup>
	A3. Southern side (Near Lease Boundary)	14.48	13.84	09.67	06.39	08.96	07.36	10.12	80 µg/m <sup>3</sup>
NOx	A1. North -East (Near Soil Dump)	08.72	09.24	07.37	13.93	10.76	11.31	10.22	80 µg/m <sup>3</sup>
	A2. North - West (Near Haul Road)	05.91	06.89	08.82	09.21	05.86	08.04	7.46	80 µg/m <sup>3</sup>
	A3. Southern side (Near Lease Boundary)	07.57	05.28	07.58	08.64	06.49	04.19	6.63	80 µg/m <sup>3</sup>

Prepared By

*(Arvi Singh)*  
(Arvi Singh)

Checked & Verified By

*(Ujjwal Anurag)*  
(Ujjwal Anurag)



# MEGHALAYA CEMENTS LIMITED

Annex - XX

## Six Monthly Fugitive Emission Report, South Khilchiehri Limestone Mine (31.05 Ha), 2022-2023

Location	Apr' 2022	May' 2022	Jun' 2022	Jul' 2022	Aug' 2022	Sep' 2022	Avg.	Permissible Limits for Rural Areas (By MSPCB 24 hrs Monitoring)
Drilling Area	1523	1496	1586	1641	1853	1769	1644.67	5000 µg/m <sup>3</sup>
Blasting Point	1653	1429	1767	1589	1476	1519	1572.17	5000 µg/m <sup>3</sup>
Loading Point	1926	2043	1869	1843	1997	1876	1925.67	5000 µg/m <sup>3</sup>
Unloading Point	1561	1459	1486	1538	1396	1579	1503.17	5000 µg/m <sup>3</sup>

Prepared By  
*(Afti Singh)*  
(Afti Singh)



**PROFORMA****INFORMATION ON  
AFFORESTATION / RECLAMATION / REHABILITATION**

1.	Name of the Mine	South Khliehjari Limestone Mine
2.	Owner's Name	Shri Ramesh Kumar Pareek
3.	District / State	East Jaintia Hills/Meghalaya
4.	Mineral Worked	Limestone
5.	Category of the Mine	A
6.	QUARTER ENDING	<b>JUNE (1<sup>st</sup> April to 30<sup>th</sup> June) ✓</b>
		SEPTEMBER (1 <sup>st</sup> July to 30 <sup>th</sup> September)
		DECEMBER (1 <sup>st</sup> October to 31 <sup>st</sup> December)
		MARCH (1 <sup>st</sup> January to 31 <sup>st</sup> March)
		(Please Tick, Whichever is applicable)

**AFFORESTED DURING THE QUARTER**

No. of trees planted		Area covered (in Ha.)		No. of trees survived		Survival rate	
WML	OML	WML	OML	WML	OML	WML	OML
1	2	3	4	5	6	7	8
217	Nil	0.1729	N/A	167	N/A	76.96%	N/A

**CUMULATIVE AS ON QUARTER ENDING**

No. of trees planted		Area covered (in Ha.)		No. of trees survived		Survival rate	
WML	OML	WML	OML	WML	OML	WML	OML
9	10	11	12	13	14	15	16
2817	1194	1.3881	0.4523	2164	890	76.82 %	74.54%

Note: - WML- within Mining Lease; OML- Outside Mining Lease

**RECLAMATION & REHABILITATION DURING THE QUARTER**

No. of Pits	No. of pits reclaimed During the quarter	Total area (in Hect.) reclaimed During the quarter.	Total area (in Hect.) reclaimed During the Year (2022-23)	Cumulative total area (in Hect.) Where reclamation & rehabilitation is all ready completed.
1	NIL	NIL	NIL	NA (Not yet matured)



**PROFORMA****INFORMATION ON  
AFFORESTATION / RECLAMATION / REHABILITATION**

1.	Name of the Mine	South Khliehjari Limestone Mine
2.	Owner's Name	Shri Ramesh Kumar Pareek
3.	District / State	East Jaintia Hills/Meghalaya
4.	Mineral Worked	Limestone
5.	Category of the Mine	A
6.	QUARTER ENDING	JUNE (1 <sup>st</sup> April to 30 <sup>th</sup> June)
		SEPTEMBER (1 <sup>st</sup> July to 30 <sup>th</sup> September) ✓
		DECEMBER (1 <sup>st</sup> October to 31 <sup>st</sup> December)
		MARCH (1 <sup>st</sup> January to 31 <sup>st</sup> March)
		(Please Tick, Whichever is applicable)

**AFFORESTED DURING THE QUARTER**

No. of trees planted		Area covered (in Ha.)		No. of trees survived		Survival rate	
WML	OML	WML	OML	WML	OML	WML	OML
1	2	3	4	5	6	7	8
95	Nil	0.0757	N/A	68	N/A	71.57 %	N/A

**CUMULATIVE AS ON QUARTER ENDING**

No. of trees planted		Area covered (in Ha.)		No. of trees survived		Survival rate	
WML	OML	WML	OML	WML	OML	WML	OML
9	10	11	12	13	14	15	16
2912	1194	1.4638	0.4523	2232	890	76.64 %	74.54%

Note: - WML- within Mining Lease; OML- Outside Mining Lease

**RECLAMATION & REHABILITATION DURING THE QUARTER**

No. of Pits	No. of pits reclaimed During the quarter	Total area (in Hect.) reclaimed During the quarter.	Total area (in Hect.) reclaimed During the Year (2022-23)	Cumulative total area (in Hect.) Where reclamation & rehabilitation is all ready completed.
1	NIL	NIL	NIL	NA (Not yet matured)



## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, S.S. Road, Guwahati-781006  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCM8079P12M, CIN No: U26942ML2003PLC007125

## PURCHASE ORDER

<b>To,</b> ENGINEERING AND ENVIRONMENTAL SOLUT 4/1309, NEW SIR SYED NAGAR ALIGARH Phone No: Fax No: Email : Contact Person Mehtab Ahmad Contact No. 82798 64665 GST No:09AAPCE6837M12I	<b>Invoice To</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia GST- 17AADCM8079P12M <b>Delivery Address</b> MEGHALAYA CEMENTS LTD Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lumshnong-793210 MeghalayaIndia	<b>Purchase Group</b> : KOLKATA <b>PO No</b> : 4500049013 <b>PO Date</b> : 07.09.2022 <b>Quotation No</b> : 735/D/19-20 <b>Quotation Date</b> : 29.07.2019
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Dear Sir,  
 We are pleased to place order to you for the following on the terms & conditions given below:

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
00010	LBENV0029	TELEMETRIC PIRZOMETER WITH DATA SEVER\14.09.2022		1	NO	80,000.00 /1 NO		80,000.00

Page Total	80,000.00
Other Page Total	0.00
Grand Total	80,000.00

Tax Code	: IGSY INPUT- 19%	P & P	: 0.00
Payment Terms	: 100% AGAINST PERFORMA INVOICE	OTHER CHARGES	: 0.00
Inco Terms	: BY ROAD	Loading/Unloading	: 0.00
Transporter	: Ex-Aligarh, Freight Charges: To Pay	CGST	: 0.00
Inspection	: You will intimate us in advance the readiness of the material.	SGST	: 0.00
		IGST	: 14,400.00
		CESS	: 0.00
		TDS	: 0.00
		TCE	: 0.00
		Insurance Value	: 0.00
		Total with Tax	: 94,400.00
		P & P (AT)	: 0.00
		Discount (AT)	: 0.00
		Total	: 94,400.00

Amount In Words: NINETY FOUR THOUSAND FOUR HUNDRED Rupees INR

## General Terms &amp; Conditions

- Original Document required along with the materials.
- Purchase Order No. & Material Code must be mentioned in invoice.
- All related documents & manuals need be attached along with the invoice copy & should come in two sets, among which one set needs to be sent to branch office & the other one along with the material.
- Others Terms & Condition as per ANNEXURE-1
- Issued Under GST Act, 2017

Remarks: Indent No: 1100052055 Dated: 02.09.2022, Amendment

On accepting this order it is understood that you agree to the terms & conditions shown above and on continuation sheet all which are made part thereof

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

For MEGHALAYA CEMENTS LIMITED

THANGSKAI  
 Authorised Signatory

## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangekai, Dist. - East Jaintia Hills, PO-Lunshnong-793210, Meghalaya, India

Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781035

Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862

Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)

Ph. 033-23340304/666, Fax : 033-23340505.

GST No: 17AADCM8079P12M, CIN No: U26942ML2003PLC007125

PO No : 4590049013 PO Date:07.09.2022

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
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Prepared By _____		Checked By _____		Page Total : 0.00 FOR MEGHALAYA CEMENTS LIMITED THANGSAI <i>W. K. W. K.</i> Authorised Signatory Page 2 of 6	
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## MEGHALAYA CEMENTS LTD

Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-792210, Meghalaya, India

Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005

Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 94014 53861 / 860 / 862

Kolkata Office: BB-77, Saltlake City, Sector-I, Kolkata - 700064 (W.B.)

Ph. 033-23340004/566, Fax : 033-23340505.

GST No: 17AADCM6079P12M, CIN No: U26942ML2003PLC007125

PO No : 4500049013 PO Date: 07.09.2022

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		Telemetric Piezometer (Battery run Solar Panel(50W) based) along with Data Server and Connectivity Solutions/Next Sense Technologies Model no.: -GML3-01 Descriptions: - 1 Online Ground water level recorder. 2 Continuous Data Logging Facility. 3 Data transfer to server available along with 100 m cable. 4 Imported pressure transducer (sensor) with capability of measuring till 100 meters depth. 5 Factory-calibrated sensor. 6 Facility for Wall/Pipe counting. 7 IP 65 grade rated enclosure. 8 Durable and rugged design 9 Including Telemetry for online Data transfer and one year free of cost Server 10 Data can be uploaded on Cloud Server 11 Battery backup 4 to 5 days 12 Powerless backup provided by solar based. Specifications: - • Accuracy: 0.25 % F.S • Compensated Temperature: -200C to +850C. • Operating temperature:						

Prepared By _____		Checked By _____		Page Total : 0.00 FOR MEGHALAYA CEMENTS LIMITED THANGSKAI Authorized Signatory <i>[Signature]</i>
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## MEGHALAYA CEMENTS LTD



Regd. Office: Vill-Thangskai, Dist.- East Jaintia Hills, PO-Lushohong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G.S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/12/23/24, Fax: 2345419 Mobile: 94014 53851 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-1, Kolkata - 700064 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCN807991XM, CIN No: U16942ML2003PLC007125

PO No : 4500049013 PO Date: 07.09.2022

## PURCHASE ORDER

Sl.	Material Code	Item Name\Delivery Date	HSN	Qty.	Unit	Rate INR	Discount %	Total Value
		-400C to -1250C - Current consumption: SoA - Wetted Material: 17-4PH or 316L Stainless Steel Port. 316L Stainless Steel Snubber - Vibration: ±20g, MIL-STD-810C Dielectric strength: 2kV 2500VAC, 1min - Display: 16x2 LCD display - Enclosure: IP65 - Data Output: Microsoft Excel format - Clock: Real time internal clock - Cable Length: 50m or as per requirement - Input Power: 220V 50Hz AC - Power Adapter output: 12V, 1A DC - Lithium Ion Battery Pack 11.1 V 4.4Ah - Free server connectivity. - 10 years sensor warranty. - Battery backup upto 4 to 5 days. - Data directly Download in excel format through online or offline. - Data can be shown in both graphical and tabular form. - 8 GB internal storage. - Data transfer every 1 hour interval.						

Page Total : 0.00

For MEGHALAYA CEMENTS LIMITED  
 THANGSKAI  
 Authorised Signatory

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_



## MEGHALAYA CEMENTS LTD



Regd. Office: VIII-Thangskai, Dist.- East Jaintia Hills, PO-Lunshnong-793210, Meghalaya, India  
 Corporate Office: Mega Plaza, 4th Floor, Christian Basti, G. S. Road, Guwahati-781005  
 Ph. No. (0361) 2345421/22/23/24, Fax: 2345419 Mobile: 98014 53851 / 860 / 862  
 Kolkata Office: BE-77, Saltlake City, Sector-I, Kolkata - 700066 (W.B.)  
 Ph. 033-23340004/666, Fax : 033-23340505.  
 GST No: 17AADCN8079P12M, CIN No: U26942ML2003PLC007125

PO No : 4500049013 DO Date: 07.09.2022

## PURCHASE ORDER

Sl.	Material Code	Item Name \ delivery date	ESN	Qty.	Unit	Rate INR	Discount %	Total Value
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Make: Engineering &  
Environmental Solutions

Technical Details as per  
Annexure-II

Installation :

1. VEHICLE FOR ONWARD  
JOURNEY FROM GUWAHATI ( AS AVAILABLE AT SITE) WILL BE PROVIDED BY US.

2. THE BOARDING & LODGING AT SITE WILL PROVIDED BY US FREE OF COST AS AVAILABLE AT SITE.

3. YOU WILL PROVIDE YOUR SERVICE ENGINEER FOR FREE OF COST FOR INSTALLATION/SUPERVISION OF ERECTION & COMMISSIONING.

AMENDMENT DATED ON 09.09.2022 CHANGE OF VENDOR NAME & GST NO.

NEW NAME: ENGINEERING AND ENVIRONMENTAL SOLUTIONS PRIVATE LIMITED

Prepared By \_\_\_\_\_

Checked By \_\_\_\_\_

Page Total : 0.00  
 For MEGHALAYA CEMENTS LIMITED  
 THANGSKAI  
 Authorised Signatory



## ANNEXURE - 1

Purchase Order No : 4500049013

Date: 07.09.2022

1. Technical Specification & scope of supply \* As per Purchase order
2. Performance Guarantee \* You guarantee that the materials will perform as per the specification. You further guarantee that if the normal performance is found by us not satisfactory within a period of 18 months from the date of last dispatch or 12 months from the date of commissioning whichever is earlier, you will carry out performance test in our presence, as per standard engineering practice.
3. Design, Material & Workmanship Warranty \* The design, the materials and the workmanship of/for the equipment will be first class and for the purpose they are intended You will thoroughly inspect / test the materials before manufacture, the workmanship during manufacture and the entire equipment before despatch to ensure long trouble free service. You undertake to make good by repair/ replacement any defects arising out of faulty design, defective materials or workmanship within 18 months of the date of last despatch or 12 months from the date of commissioning whichever is earlier.
4. Supervision of Erection & Commissioning \* Supplier will provide engineers for the supervision of Erection & Commissioning at free of cost (If required). For such visit purchaser will provide to & fro. suitable free lodging / boarding facilities and local conveyance at site. Your Engineer will also give training to our plant person at the time of Supervision.
5. Liquidated Damages \* In the event of failure to complete the delivery within Delivery Schedule of this note liquidated damages on account of delays that are solely attributable to supplier, @ 0.5% of the Contract price of the total contract price, per week, up to a maximum of 5 % of the total Contract price shall be payable by you.
6. Insurance \* Your responsibility for delivery is ex-works. Transit insurance to cover all risks for the supplies to be effected by you from your / your sub-suppliers works / godown / warehouse to our plant site shall be arranged by us.  
\* Immediately after dispatch you shall intimate us the LR number, Delivery challan number and the value of the consignment to enable us to arrange transit insurance.
7. Price Escalation \* The price shall remain firm till completion of the order and no escalation on any account shall be payable.
8. Rejection Clause \* In case of any quality rejection/shortage, the freight charges for re-supply/replacement will be borne by the supplier.
9. Packing & forwarding \* Inclusive ( proper goods wooden Cartoon / box) Weather proof packing its included in your Scope.
10. Energy Performance \* All products, equipment or service related to consumption of Energy or which can have an impact on significant energy use will be evaluated on the basis of energy Performance.
11. Jurisdiction and Arbitration \* The court is Guwahati, Assam shall have the jurisdiction over matters arising out of this PO.
12. Miscellaneous \* All the materials shall be adequately packed to protect them against all damages, rust etc., during the transit and from atmosphere. Packaging shall be adequate and suitable for transport by road as required.  
Labeling on packages will suitably indicate the contents and instructions regarding the handling and storage.

## MEGHALAYA CEMENTS LIMITED

### Six Monthly Testing Report for ETP Waste Waste, South Khlichjeri Limestone Mine (31.05 Ha), 2022-2023

Sr. No.	Parameters	Units	Quarter-I (Apr to June 2022)	Quarter-II (July to Sept 2022)	Avg.	Desirable Limits
01.	pH	--	6.59	6.76	6.67	5.5 - 9.0
02.	Temperature	OC	25.9	24.3	25.1	Shall not exceed 5°C above the receiving water temperature
03.	Total Suspended solid	mg/l	24.0	27.0	25.5	100
04.	BOD (3 days @27°C)	mg/l	19.0	22.0	20.5	30
05.	COD	mg/l	83.0	76.0	79.5	250
06.	Oil & Grease	mg/l	<3.0	<4.0	<3.5	10
07.	Total Residual Chlorine	mg/l	<0.01	<0.01	<0.01	1.0
08.	Ammonical Nitrogen (as N)	mg/l	13.0	15.0	14.0	50
09.	Total Kjeldahl Nitrogen (as NH <sub>3</sub> )	mg/l	51.0	48.0	49.5	100
10.	Free Ammonia (as NH <sub>3</sub> )	mg/l	<0.01	<0.01	<0.01	5.0

Prepared By

*Arfi Singh*  
(Arfi Singh)

Checked & Verified By

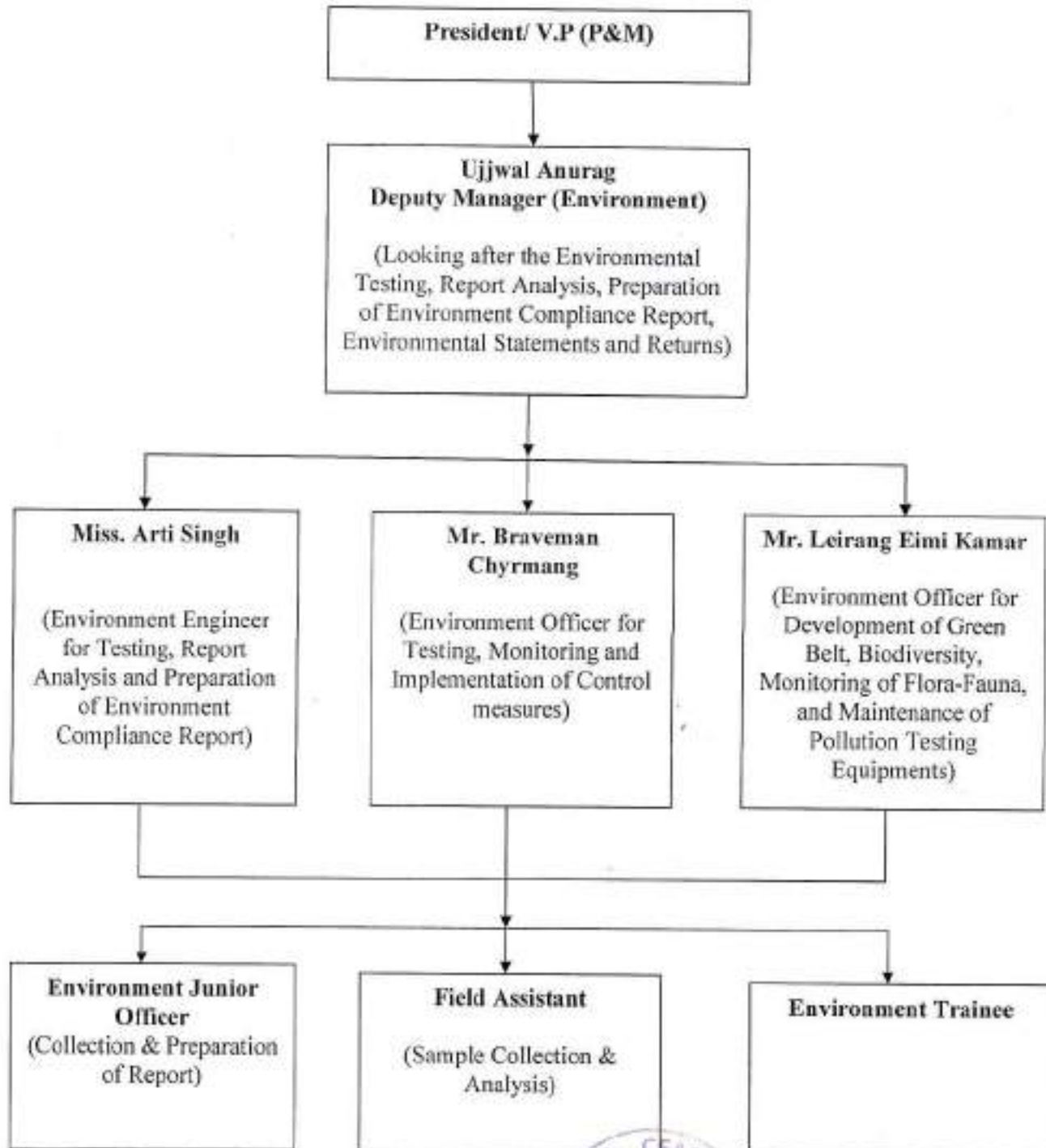
*Ujjwal Anurag*  
(Ujjwal Anurag)

**Meghalaya Cements Ltd.**  
Vill: Thangskai, P.O. Lumshnong, East Jaintia Hills, Meghalaya-793210

**Environment Management Cell**

Dept: Environment

Doc. No: MCL/IMS /PAMR/DS



HOD

**M/s MEGHALAYA CEMENTS LIMITED**

VIII- Thangskal, P.O - Lumshnong  
East Jaintia Hills, Meghalaya-793210

Expenditure incurred against Environmental Protection Measures of South Khliehjari during the year 2020-21 (from April, 2022 to September, 2022)			
1	2	3	4
Sl no	Head	Subhead	Total Expenditure incurred (in lakh)
1	Plantation	Pre plantation cost to develop the area for ready for plantation	3.39
		i. Dumping & dozing of soil to make the area plain	
		ii. Spreading of Topsoil	
		Sappling & Plantation cost	
		Maintenance cost	
		i. Manuring	
		ii. Watering in (13 days) - 1 days a week	
iii. Watching (one permanent labour Rs 11000/-per month)			
		iv. Fencing	
2	Dust suppression	Cost against Water sprinkler used in haul road, loading & unloading point	1.79
3	Preparation of Retaining wall, Checkdam, Siltation Tanks and Garland drains	Maintenance of Retaining wall (1181 m)	1.44
		Maintenance of Siltation Tanks (4 nos)	
		Maintenance of Garland drains (701 m)	
5	PPE supply to mine workers	Nose Mask	3.09
		Ear Muffs	
		Safety Shoe	
		Safety Helmet	
		Safety Goggles	
		Safety Hand Gloves	
Reflective Jacket			
6	Water Treatment	Capital investment for Water Treatment Plant	0.60
		Recurring cost for water treatment	
7	Maintenance of Effluent Treatment Plant	Chemical consumption for treatment of effluents (lime, bleaching powder, alum etc.)	0.60
		Power cost	
		Manpower cost	
8	Dump Compaction	Compaction of dumps by compactor	1.35
		<b>Total</b>	<b>11.66</b>





# MEGHALAYA CEMENTS LIMITED

CIN- U26942ML2003PLC007125



Ref: - MCL/Env/MSPCB/2022-2023/14

Date: - 23/06/2022

To,  
The Member Secretary,  
Meghalaya State Pollution Control Board,  
'ARDEN' LUMPYNGGAD  
Shillong.

Subject: Submission of Form 'V' of 31.05 Ha. South Khliehji lime stone mine for the financial year 2021- 2022.

Dear Sir,

We are herewith submitting the Annual Environmental Statement of 31.05 Ha. South Khliehji Limestone Mine for the financial year 2021-2022.

Thanking You,

Yours faithfully,

For Meghalaya Cements Limited

*R.K. Pareek*  
R.K. Pareek  
(President)



Sales & Marketing Office :  
Mega Plaza, 4th Floor, Christie Road  
G.S. Road, Dibrugarh - 781 005  
Tel. : 0361 2345421/2223, Fax : 0361 2345418  
E-mail : gswkhat@topcem.in  
Web : www.topcem.in

Kolkata Page 1 of 4  
BE-77, Salt Lake City  
Sector-1, Howrah - 700 084  
Tel. : 033 2334 0888 / 0004  
Fax : 033 2334 0505  
E-mail : kolkata@topcem.in

Registered Office :  
Village Thangskai, P.O. & P.S. Lunglei  
District : East Jaintia Hills, Meghalaya, PIN: 782110  
Tel. : 0365 270024 / 363 / 364  
Fax : 0365 270027  
E-mail : meghstpa@topcem.in



HELPLINE NO : 18001233666

## ENVIRONMENT PROTECTION RULES 1986

[FORM-V]  
(See rule 14)Environmental Audit report for the period  
[From 01-04-2021 to 31-03-2022]

## PART - A

(i) Name and address of the owner/occupier of the industry, operation or process:-

Shri R.K. Pareek  
M/s Meghalaya Cements Limited,  
Vill: - Thangskai,  
P.O: - Lumshnong  
Meghalaya, Pin-793210

(ii) Industry category: - South Khliehjarl Lime Stone Mine - 31.05 ha.

[Primary (STC Code- AADCM8079PST001)  
Secondary (SIC Code- 3241)]

(iii) Production capacity (per Year): - 2240740 Unit: - MT

(iv) Year of establishment: - 2017

(v) Date of the last environmental statement submitted: - 29<sup>th</sup> June'2021.

## PART - B

## Water and Raw Material Consumption

(i) Water consumption m<sup>3</sup>/dProcess : - Not Applicable  
Cooling : - Not Applicable  
Domestic : - Not Applicable

## Process water consumption per unit of products output

Name of products	During the previous financial year 2020-21	During the current financial year 2021-22
	(1)	(2)
(1)	Not Applicable	Not Applicable
(2)	Not Applicable	Not Applicable
(3)	Not Applicable	Not Applicable

(ii) Raw Material consumption

*Name of raw material	Name of products	Consumption of Raw material per unit of output	
		During the previous financial year 2020-21	During the current financial year 2021-22
Limestone	Cement grade Limestone	904099 MT	1130502 MT

\* Industry may use codes disclosing details of raw materials would violate contractual obligations, otherwise all industries have to name the raw materials used.



## PART - C

## Pollution discharged to environment / unit of output

(Parameters as specified in the consent issued)

(i) Pollutants	Quantity of pollutants discharged mass / day	Concentrations of pollutants discharges (mass/ volume)	Percentage of variation from prescribed standards with reasons
(a) Water	Not Applicable	Not Applicable	Not Applicable
(b) Air			Concentration of pollutants is within the prescribed limit.
i) PM <sub>10</sub>	100 µg/m <sup>3</sup>	58.13 µg/m <sup>3</sup>	
ii) PM <sub>2.5</sub>	60 µg/m <sup>3</sup>	35.79 µg/m <sup>3</sup> (Average of last three months)	

## PART - D

## Hazardous Waste

[As specified under Hazardous Wastes (Management and Handling) rules, 1989]

Hazardous Wastes	Total Quantity (kg)	
	During the previous financial year 2020-21	During the current financial year 2021-22
(a) From process	Not Applicable	Not Applicable
(b) From pollution control facilities	Not Applicable	Not Applicable

## PART - E

## Solid Waste

Solid Wastes	Total Quantity	
	During the previous financial year 2020-21	During the current financial year 2021-22
(a) From process	Not Applicable	Not Applicable
(b) From pollution control facilities	Not Applicable	Not Applicable
(c) (1) Quantity recycled or re-utilized within the unit	Not Applicable	Not Applicable
(2) Sold	Not Applicable	Not Applicable
(3) Disposed	Not Applicable	Not Applicable





**PART - F**

Please specify the characteristics (in terms of composition of quantum) of Hazardous as well as Solid waste and indicate disposal practice adopted for both the categories of wastes :- **Not Applicable.**

**PART - G**

Impact of pollution abatement measures taken on conservation of natural resources and on the cost of production: - **The low grade limestone is being used along with the high grade limestone through blending as per need of lime content for maintaining the raw-mix quality. Hence the material is consumed in totality.**

**PART - H**

Additional measures/investment proposal for environmental protection including abatement of pollution, prevention of pollution: - **Already pollution control measures are taken and functioning properly .Thus regular maintenance will be done as and when required.**

**PART - I**

Any other particulars for improving the quality of environment: - **We are adopting plantation activities for improving the environment. We have planted total of 595 nos. of species of different plants up to 31<sup>st</sup> March, 2022 since inception within and outside the mining lease area and their rate of survival is satisfactory.**



# The Shillong Times

AKOYA  
DRAMA  
Dance  
containing booklets  
ACS  
June 2011  
4th June 2011  
11th June 2011  
IN CONVENTION  
192401/2/3

RNI Regn No.: 13759/57

Total no of pages - 12

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Information Office, Shillong. For general enquiries, the office  
New Meghalaya Press Compound, Shillong. Ph: 91382005900

"Meghalaya Cements Limited has started the mining activity in South Khliehjar Mines over an area of 31.05 Ha, falling under the village Thangskai of Elaka Narpuh and they are conducting their activity in good manner and maintaining the environmental hazards within the limit."

ONE MONTH CONSTRUCTION CONTRACTS  
RIGID E-TENDER NOTICE  
Availability of Bidding Documents to download  
From 31.05.2018 upto 14.06.2018  
Till 12.00 Noon (12 PM) on 14.06.2018  
and will set arrangements for suitable transportation service to  
the concerned location. Refer www.meghalaya.gov.in  
For A. Finance Dept. ZOMA, Shillong

OFFICE OF SATEL. W. PHIRAI, PRESIDENT  
OFFICER IN CHARGE, SHILLONG  
COUNCIL, COURT AT SHILLONG  
Electoral Sec. No. 2 of 2016  
Shillong

For No. 03 VEP 2018-1992  
For Honoraria (Property)  
Date: 19.05.2018  
Proposer's Name  
Office: P.O. of Secretary, Shillong. Ph: 91382005900

Have to respect people's  
MDA justifi

Regular Education VS Vectors Academy

Regular Education includes: School, Medical Engineering Coaching, Home.

Vectors Academy includes: Vectors Academy, Home.

Separate classes-School | Tuition | Coaching

Time Wastage in travel

NO TIME for self study

Time Saving

Appropriate time for self study

Appropriate Teaching Approach in School and Coaching

Appropriate Teaching Approach for Board Ex

MEGHALAYA  
THANASSKAI  
Diphu

