DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
AND
DRAFT ENVIRONMENTAL MANAGEMENT PLAN

FOR

PROPOSED MINING OF LIME STONE

AT

Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya

AREA: 2.40 HA, PROPOSED CAPACITY: 89,959 MTPA (MAXIMUM)

PROJECT PROPONENT

Smt. Ailadmon Japang
New Majai, Bholaganj, East Khasi Hills District, Meghalaya

PREPARED BY

ENVIRO INFRA SOLUTIONS PVT. LTD.
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CHAPTER 1: INTRODUCTION

1.1 PURPOSE OF THE EIA REPORT

Environmental Impact Assessment (EIA) is one of the proven management tools for integrating environmental concerns in development process and for improved decision making as there is need to harmonize the developmental activities with the environmental concerns into the larger interest of the society. The growing awareness, over the years, on environmental protection and sustainable development, has given further emphasis to the implementation of sound environmental management practices for mitigating adverse impacts from developmental activities. EIA study plays a vital role in sustainable development of a country. Recognizing its importance, the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India has formulated policies and procedures governing the industrial and other developmental activities to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concern in project development.

Draft Environmental Impact Assessment report has been prepared to comply with the Terms of Reference (ToR), under EIA notification of the MoEF&CC dated 14th September, 2006 and amended thereof, for seeking environmental clearance for mining of limestone in the applied mining lease area.

1.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

The project is being proposed by Smt. Ailadmon Japang. The address of the proponent is given below:

New Majai, Bholaganj, East Khasi Hills District, Meghalaya

The proponent has applied for environmental clearance for mining lease over an area of 2.40 ha at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

1.3 BRIEF DESCRIPTION OF PROJECT

1.3.1 NATURE

The proposed mining is an opencast mining project where the entire activity will be done in a semi-mechanized way.

1.3.2 SIZE

The mine lease area is 2.40 Ha private non forest land land and the project is contemplated to extracted the mineral (limestone) by open cast method of mining.

1.3.3 LOCATION

The proposed lease of limestone Mine is situated at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The location and Salient feature of mining Lease area has been shown in **Table 1.1**. The google earth showing location map of the mine lease area have been shown in **Figure** 1.1.

Table 1.1: Location and Salient feature of Mining Lease Area

Sr. No.	Particular	Details
A.	**Nature of the Project**	**Limestone Mining Project.**
B.	Size of the Project	
1.	ML Area	2.40 Hectare (Non forest Land).
2.	Proposed Production Capacity	Total production in 5 years will be 4,48,085 MT and peak production will be 89,959 MT/annum.
3.	Lease Period of Mine	Lease was granted for a period of 30 Years.
C.	Method of Mining	
1.	Method	Open-Cast Manual Mining
2.	Blasting / Drilling	Blasting will be done by short holes with the permission of DGMS
D.	Project Location	
1.	Location	Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya
2.	Toposheet No.	78O/12 (restricted)
3.	Lease Area Coordinates	

Boundary Pillar no.	**Location (co-ordinates)**	
	Latitude	**Latitude**
1	N25°10'45.60"	E91°44'35.10"
2	N25°10'48.00"	E91°44'35.60"
3	N25°10'49.30"	E91°44'34.50"
4	N25°10'48.40"	E91°44'32.60"
5	N25°10'49.60"	E91°44'32.40"
6	N25°10'50.80"	E91°44'34.20"
7	N25°10'52.10"	E91°44'37.90"
8	N25°10'51.60"	E91°44'39.40"
9	N25°10'46.20"	E91°44'39.00"
10	N25°10'45.60"	E91°44'37.10"

E.	Cost Details	
1.	Project Cost	Rs. 22.0 Lakhs
F.	Water Demand	
1.	Requirement	4 cum
2.	Source of water	Nearby water sources
G.	Man Power Requirement	34
H.	Environmental Setting	

1.	Nearest Village	Bholaganj, 1.8 km
2.	Nearest Town	Bholaganj, 1.8 km
3.	Nearest National / State Highway	NH 40, 23 Km
4.	Nearest Railway Station	Guwahati Railway Station nearly 187 Km
5.	Nearest Airport	LGB Airport of Guwahati is at a distance of about 206Km northeast of the block.
6.	Ecological Sensitive Areas (National Park, Wild Life Sanctuaries, Biosphere Reserve etc.) within 10 km radius	There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area).
7.	Water bodies within 10 km radius of the mine site.	Thari river at 1.0 km from the project site
8.	Archaeological Important Place	None
9.	Seismic Zone	V

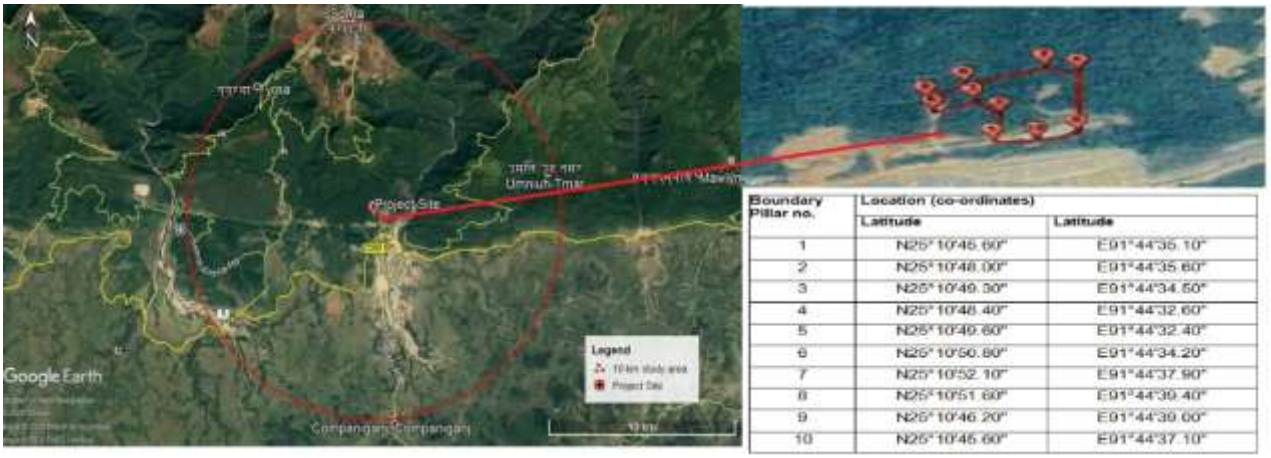

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Figure 1.1: Location Map of the mine lease area

1.4 PROJECT'S IMPORTANCE TO THE COUNTRY AND THE REGION

This project involves collection of limestone due to their most diversified use. It is a basic raw material required for manufacturing industries improving the construction activities like buildings, road, bridges infrastructure etc. The requirement for these minerals is always high in the nearby cities, towns and villages. Also, the project will generate direct and indirect employment opportunities to the nearby villages. Economy of the area will get a boost and there will overall growth of the region.

1.5 SCOPE OF THE STUDY

The SEAC in its meeting dated 21st to 22nd July, 2020 examined the proposal. After through discussion and deliberation, it has been conveyed by SEAC that draft EIA/EMP report shall be prepared as per approved ToR and after public consultation through Meghalaya Environment

Protection and Pollution Control Board the final EIA/EMP report shall be submitted after incorporating Public Hearing details to SEIAA, Meghalaya for Environmental Clearance.

1.6 POINT WISE COMPLIANCE

The present draft EIA/EMP report of the proposed project is prepared as per proposed TOR and in compliance with the ToR No. ML/SEIAA/MIN/EKH/P-59/2020/1508 dated 27 August, 2020 by State Environment Impact Assessment Authority, Meghalaya. The copy of the ToR has been attached as **Annexure I**. The point wise compliance of ToR has been shown in **Table 1.2:**

Table 1.2: Point Wise Compliance for TOR

Sr No.	ToR Points	Reference of Compliance
1.	Year-wise production details since I994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the, EIA Notification 1994 came into force " w' r. t. the highest production achieved prior to 1994.	The proposed lime stone mine is a new mine. Therefore the year wise production data since 1994 is not applicable.
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	The copy of LOI is attached as **Annexure II**.
3.	All documents including approved mine plan, EIA and public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	Complied
4.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery / Topo sheet, Topographic sheet, Geomorphology and Geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	The topo sheet for the proposed mine area is restricted. The study area google map has been shown in Figure 1.1 of Chapter 1.
5.	Information should be provided in Survey of India Topo sheet in l:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map of the proposed project has been shown in Figure 3.7 of Chapter 3.
6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State 'land use	The details have been have been described in Section 4.3 of Chapter 4.

	Board or the Concerned Authority.	
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures 'infringement/deviation/violation to bring into focus any of the environmental or forest norms/ conditions. The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and, /or shareholders or stakeholders at large, may also be detailed in the EIA Report.	Yes the details have been shown in Figure 6.1 of Chapter 6. The Institutional Arrangements for Environment Protection and Conservation has been described in section 6.2 of Chapter 6.
8.	Issues relating to Mine Safety, .including subsidence study in case of underground mining and slope-study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Complied
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	Complied
10.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	The land use map of the proposed project has been shown in Figure 3.7 of Chapter 3.
11.	Details of the land for any over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R & R issues, if any, should be given.	Provided in draft EIA/EMP Report. R & R issues are not applicable.
12.	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by. the Project Proponent regarding the status of forests, the site may be inspected by the State	No forest land is involved in the proposed mine. Non forest land certificate is attached as **Annexure III.**

	Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal committees.	
13.	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the proposed mine
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	Not Applicable
15.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding-and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area). Anticipated impact of mining on the same along with suggested mitigation measures are incorporated in section 4.8 of chapter 4.
16.	Location of National Parks, sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by chief wildlife warden. Necessary clearance, as may be applicable to such projects due to .proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area).
17.	A detailed biological study of the study area (core zone and buffer zone (10 km radius of the periphery of the mine lease) shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case	The detailed biological study of the study area core zone and buffer zone (10 km radius of the periphery of the mine lease) has been described in section 3.11 of Chapter 3.

	of any scheduled I fauna found in the study area, the necessary plan along-with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished..- Necessary allocation of funds for implementing the same should be made as part of the project cost.	
18.	R & R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R & R plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SQs /STs and other weaker sections of the society in the study area, d. need based sample survey, family wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village (s) including their R & R and socio-economic aspects should be discussed in the Report.	Not Required.
19.	one season (non-monsoon) [i.e. March-May (summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2oo9, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	The details of Ambient Air Quality have been described in section 3.5 of Chapter 3.
20.	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input	The Air quality modeling has been described in section 4.4 of Chapter 4.

	parameters used for modeling should be provided. The air quality contours may be shown on a-location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	
21.	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The details of Water requirement for the Project have been described in section 2.8 of Chapter 2.
22.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Not required.
23.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided	Not Applicable.
24.	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	The details have been described in section 4.2 of Chapter 4.
25.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed, Hydro Geological Study should be undertaken and Report furnished. The Report inter- alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished	Not Required.
26.	Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	No streams, seasonal nallahs or river is passing through the proposed the mine.
27.	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The details have been described in table 4.1 of Chapter 4
28.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and	The Greenbelt Development Plan have been described in section 9.9 of Chapter 9.

	quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	
29.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such - as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	The impact on Traffic has been mentioned in section 4.13 of chapter 4.
30.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	The temporary rest shelters and mobile toilets will be provided to the mine workers.
31.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	The details have been described in section 4.3 of Chapter 4.
32.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	The details have been described in section 4.10 of Chapter 4.
33.	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	Complied and Provided in EIA/EMP report

34.	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The details have been described in section 4.9 of Chapter 4.
35.	Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	The detailed Environmental Management Plan (EMP) has been described in Chapter 9.
36.	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Will be Complied. The project is in draft stage.
37.	Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the Project should be given.	No court case is pending in any court against the proposed project.
38.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The budget of Environmental Management Plan has been presented in Table 9.2 of Chapter 9. The budget of CER has been presented in Table 9.3 of Chapter 9.
39.	A Disaster management Plan shall be prepared and included in the EIA/EMP Report.	The detailed Disaster management Plan has been described in section 7.3 of Chapter 7.
40.	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	The detailed project benefits have been described in Chapter 8.
41.	The Action Plan on the compliance of the recommendations of the CAG as per Ministry's circular No. J-11013/71/2016-IA. I (M) dated 25.10.2017 need to be submitted at the time of appraisal of the project and included in the EIA/EMP Report	Complied
42.	Compliance of the Ministry's Office Notification No. GSR-94 (E) dated 25.01.2OI8 - mandatory implementation of Dust mitigation measures for construction and demolishing activities	Complied

43.	The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per Ministry's O.M. No.22-65/2O17- IA.II (M) dated 01.05.2018 and the action plan on the activities' proposed under CER shall be submitted at the time of the project included in the EIA/EMP Report.	The budget of CER has been presented in Table 9.3 of Chapter 9.
44.	Compliance of the Ministry's office Memorandum No. F:3- 50/2017-IA.III (Pt), dated 30.05.2018 on the Judgement of Hon 'ble Supreme Court, dated the 2"d August, 2Ol7 in Writ Petition (Civil) No.114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.	Complied
45.	Besides. the above, the below mentioned general points are also to be followed: -	
(i)	All documents to be properly referenced with index and continuous page numbering.	Complied
(ii)	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	Complied
(iii)	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Complied
(iv)	Where the documents provided are in a language other than English, an English translation should be provided	Complied
(v)	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Complied
(vi)	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-1 1013/4I/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed	Complied
(vii)	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of the SEIAA, Meghalaya with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure	Complied

	and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	
(viii)	As per the circular no. J-110/116L8/2O10-IA. II (l) dated 30.5.2012, certified report of the status of compliance of the conditions ' stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and climate change, as may be applicable.	Complied
(ix)	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Complied in mining plan and the approved mining plan have been attached as **Annexure IV.**
(x)	The PP should submit the EIA/EMP report as per the generic structure prescribed in Appendix-Ill of the EIA Notification, 2006, after incorporating the details of public hearing already conducted and covering the above mentioned issues, to take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under EIA Notification, 2006.	Complied

CHAPTER 2: PROJECT DESCRIPTION

2.1 TYPE OF PROJECT

The project is proposed for the excavation of lime stone over an area of 2.40 Ha. It is an opencast mining project where the entire activity will be done in a semi-mechanized way.

2.2 NEED FOR THE PROJECT

The Limestone containing 42% (min.) CaO and above is used for the manufacture of cement as per the chemical specifications suggested by the National Council for Cement & Building Materials, New Delhi. As per chemical analysis, the average grade of limestone of the area is CaO: 50.09%, MgO: 1.67. During 2013-14 cement was the major consuming industry accounting for 93% consumption, followed by iron & steel (4%) & chemical (1%). To cater such a high consumption of cement, cement grade limestone is in great demand.

2.3 LOCATION DETAILS

The proposed lease of limestone mine is situated at at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The lease co-ordinates and connectivity details are listed in table 2.1 below:

Table 2.1: Project site coordinates

Boundary Pillar no.	Location (co-ordinates)	
	Latitude	Latitude
1	N25°10'45.60"	E91°44'35.10"
2	N25°10'48.00"	E91°44'35.60"
3	N25°10'49.30"	E91°44'34.50"
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The Mine site is connected through 79 kms by road from state head quarter Shillong. The Guwahati railway station is at a distance 187 kms from the Mine area by road. The map and photographs of the project site has been shown in **Figure 2.1 and 2.2** respectively.

Figure 2.1: Map of the project site

Figure 2.2: Photographs of the project site

2.3.1 Lease Hold Area

The lease has been intended to allot vide Letter of intent (LoI) no. KH/8/ML/Limestone/68/7650 dated 22/03/2019. The copy of Letter of Intent (LOI) has been attached as **Annexure II**.

2.3.2 Details of the Lease Hold Area

Forest	Area (ha)	Non Forest Land	Area(ha)
Forest (specify)	None	2.40 hectares occupied by lesse/applicant	**2.40**
Total	**Nil**	**Total**	**2.40**

2.4 TOPOGRAPHY & GEOLOGY

Topography

The area covers a land of 2.40 ha. Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The area around the block represents a rolling topography with gorges/scarp faces and with numerous streams. Karst topography is prevalent with spiky surface with lots of sink-holes and solution cavities. Streams are semi-dendritic and flow towards east before taking southern turn towards Bangladesh. The project area has an highest altitude of 146 mRL and lowest altitude of 120 mRL.

Regional Geology

In a regional scale it is obvious that the topographic expression is very rugged with the high hills and the following stratigraphic sequence is noted in this part of East Khasi Hills District hills of Meghalaya. Summarized Regional Geological set-up around the block has been presented in table 2.2.

Table 2.2: Summarized Regional Geological set-up around the block

Age	Group	Formation	Member	Rock types
Palaeocene to Eocene	Jaintia	Kopili Shella Langpar	Sylhet L.St Sylhet S.St	Argillaceous sediments Dominantly limestone Ferruginous sandstone Coarse S.St sandy L.St Calc shale
Cretaceous Jurassic	Khasi Sylhet trap	Mahadek		Conglomerate with coarse, feldspathic S.St with Purple, green clay bands Volcanic trap with vesicles of zeolite and agate
Proterozoic & Archaean (?)	Gneissic Complex			Migmatite, biotite schist and gneiss with quartz/pegmatite veins

Archaean Gneissic Complex of Proterozoic is exposed in the SW and north-central part of the country and is represented dominantly by migmatite, biotite gneiss and biotite schist It is intruded by basaltic rock which is equivalent to the Sylhet Trap of Jurassic age that attains a thickness of about 600 m. The Sylhet trap is hard, compact, massive, fine-grained and greenish in color with vesicles at the top. The upper and lower part of the trap rock is basaltic whereas the middle part is alkali basalt with rhyolite and tuff.

Local Geology

The proposed mining area is small and exposes only the limestone of the Sylhet limestone Formation. Table provides a glimpse of the Geology that is seen in the area

Local Geological set-up in the block

Geological age	Group	Formation	Summarized rock types
Recent	Newer alluvium	Unclassified	Unconsolidated soil, scree material
Eocene	Jaintia	Sylhet (=Shella)	Top part with grey/White limestone Bottom part with dark /steel grey limestone

The block exposes a monotonous litho-package of marly limestone. Limestone is greyish in colour, hard and compact. At places the limestone is steel grey in colour Fossil content is minimum with nummulites, discocyclina and with occasional crystals of calcite It is difficult to trace bedding plane as the surface is covered with thick calcareous deposition. Extensive weathering results in formation of ‘karst topography' on the surface resulting in spiked surface along slopes, Solution cavities caverns stylolites with variable magnitude and wave length are some of the other features seen on the limestone.

Overburden constitutes of unconsolidated fragments boulders, angular pebbles overlain by brownish soil horizon that rarely exceeds one meter in thickness.

Source: Approved Mining plan

2.5 SURFACE DRAINAGE PATTERN

The topography controls the drainage system as it divides the state into two watersheds namely the Brahmaputra system in the North and Meghna /Surma system in the South. Drainage of the district in the north flows toward the Brahmaputra River and in the south, the rivers flow towards the Bangladesh plains into Surma river. The important rivers in the northern part are Umtrew, Umiam and Umkhen. The Umtrew (or Digaru) River originates from the west of the Sohpetbneng range in East Khasi Hills District, near Lum Raitong. It flows towards the west till it meets the waters from the Umiam River which is being diverted by the Umiam Hydel Project. In the southern part, rivers Umiew (or Shella, also known as Bagra), Umngot, Umngi (Balat), etc. all tributaries of the Surma, originating from southern slopes of Khasi Hills, drain one of the world's heaviest rainfall areas and flow southwards into Bangladesh, have violent flows. The drainage pattern is structurally controlled and parallel to sub-parallel in nature.

The drainage pattern map is shown in **Figure 2.3.**

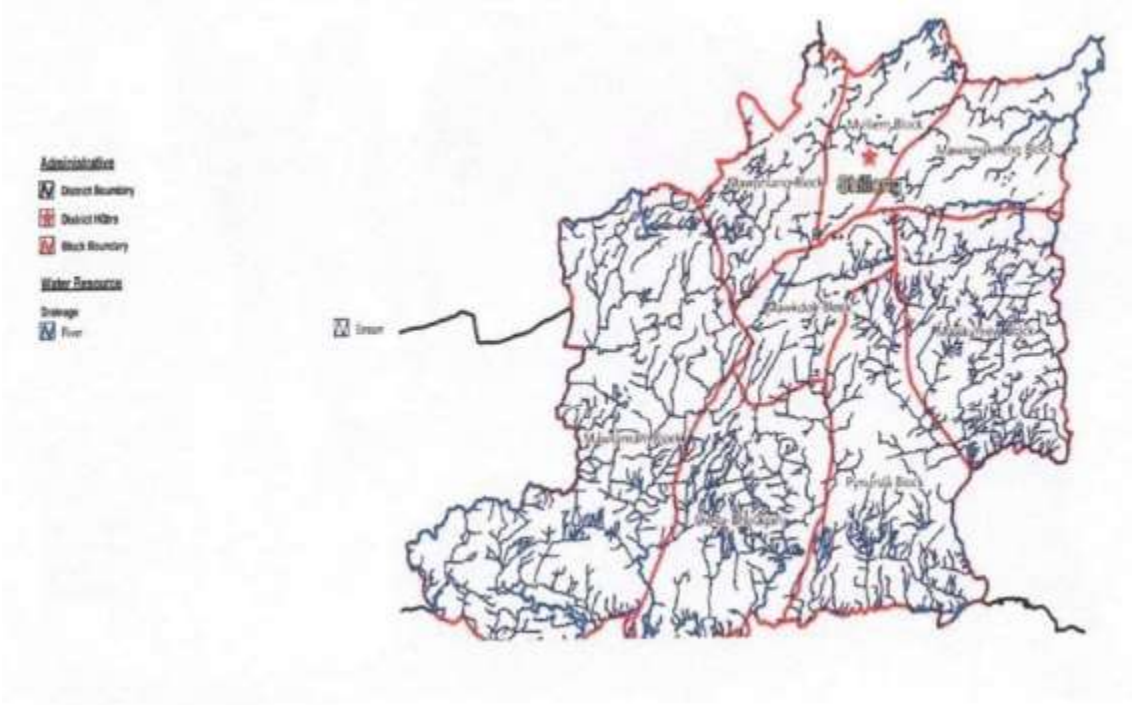


Figure 2.3: Drainage Map of the project district

2.6 PROPOSED METHOD OF MINING

The opencast method of mining with semi mechanization is proposed to excavate the mineral and waste and for other mining activities. Bench height and width are proposed 6 meters each considering semi mechanization. Approach roads will be provided up to the benches time to time. Blasting will be done by short holes with the permission of DGMS. The fencing around the pit/ excavation will be provided to check the inadvertent entry of human and livestock in the working zone. The soil if comes across during mining in small layer or cavity will be scraped and stacked separately to be used for plantation during each monsoon. Benches are to be formed and worked in a top to downward manner. Because of presence of loose rock mass, rarely drilling and blasting is to be performed for loosening of the rock mass. The rock will be mostly excavated and broken by excavators and rock breakers respectively.

Public water sources supply is available in nearby villages and stored in water pitchers at site office and near the working sites for drinking purpose and in cement tanks near the site office for other purpose.

The following works are proposed:

1. The barbed wire fencing will be provided around the proposed and existing workings to check the inadvertent entry of human and livestock in mining zone.
2. The soil which may come across during mining in patches or in cavities will be scraped and stacked separately to be used for plantation ion monsoon.

3. The proper plantation will be done in the lease area and nearby the lease area in each monsoon and will report to the department with photographs.
4. Garland drains with parapet walls will be provided around the pit to check the entry of monsoon flowing water towards working pit.
5. Drinking water will be brought from tube well and stored in water pitchers for drinking purpose and in cement tanks for other purpose.
6. The workings will be done by maintaining the proper benches.
7. The waste will be dumped at one place in the lease area. Some waste will be dumped outside the lease area in lessee's land.
8. The site services, site office, water tanks, workshops, kitchen, bathrooms etc will be provided near the lease area.

2.7 RESERVE (AVAILABLE QUANTUM) AND PRODUCTION (EXTRACTABLE QUANTUM)

Resources have been divided into two categories such as Proved Reserve & Probable Reserve.

Up to an average depth of 34 meters (from ground level) has been taken as Proved Reserve category on the basis of Limestone exposed in the mining face of the nearby mines & also from the exposure on hill top and slope as well as from the nala cutting section around the applied area and further up to a depth of 5 meters has been taken as Probable Reserve category.

Mineable reserve is based on the mineable part of the reserve Mineable mineral (limestone) reserve has been calculated from the geological reserve in the area considering the stone which is to be left out and maintained as Safety Barrier of 7 5 meters within mine lease boundary arid in consideration of ultimate pit limit. Proved and Probable reserves has been given in table 2.3 below.

Table 2.3: Proved and Probable reserves

Category of Resource	Mineable Reserves in Tonnes	Non Mineable in Tonnes	
Proved	1061235	Feasibility Mineral Resources	1494207
Probable	17604	Pre-Feasibility Mineral Resources	327618
TOTAL	**1078839**		**1821825**

Summary of total mineable reserve has been presented in table 2.5.

Table 2.4: Summary of total mineable reserve

Category of Reserve	Total Reserve in Tonnes
Mineral Proved Resources	1494207
Mineral Probable Resources	327618
TOTAL	**1078839**

Anticipated life of the mine:

The mineable reserve would be **1078839** tonnes with an average annual production of **89903 (1078839/12=89903)** Tonnes. The average annual production of limestone may be different from annual production of five years plan period Thus 448085 tonnes of the total mineable reserve will be worked out in first 5 years and the balance mineable reserve i.e. 630754 Tonnes will be mined out in further 7 years@90107 tonnes per year. Therefore the life of the mine will be 12 years (five years in plan period + seven years in conceptual period)

The approach roads up to faces will be provided time to time for movement of vehicles. The bench height and width are proposed 6 meters but the lessee may take permission from DGMS for bench height more than 6 meters. The bench slope will be providing 45°. The loading will be from pits or from stocks.

The lessee will work as per proper benches and develop the benches as required. The length and width of workings will be as per the situation at field. Proposed Year-wise Production has been presented in table 2.5.

Table 2.5: Proposed Year-wise Production

Year	Mineral Lime Stone in tones
I	89,705
II	89,959
III	89,581
IV	89,456
V	89,384
Total	**4,48,085**

Man Power Requirement:

Owing to the topography of the area, which is a rough terrain, mining activity is needed as the primary source of income for the locals. The mine will provide employment to about 34 workers. It will provide employment to the people residing in vicinity and also indirectly by the development of supporting infrastructure and allied activities. The manpower requirement for the proposed project is shown in **Table 2.6** along with the breakup.

Table 2.6: Details of Manpower requirement

Employment	Number
Manager	1
Supervisor	1
Junior Supervisor	1
Blaster	1
Blaster Helper	1
Storekeeper	1
Attendance clerk- cum register keeper	1
Excavator operator	1
Compressor operator	2
Jackhammer Drill operator	4
Tipper Driver	1
Rock Breaker operator	1
Water Tanker Driver	1
Semi- Skilled Miners (inclusive of absentees & leave)	12
Unskilled	5
Total	34

Solid Waste Generation & its Disposal

In lime stone mine the maximum quantity of excavated rock is sailable.

Top Soil Management

During mining operation, a great extent of gritty soil will be removed and would dumped at southern corner of the area with suitable precautions (such as cultivation of dwarf species of grass and construction of toe wall and garland drain) Some extent of it would be used for road dressing and plantation. After conceptual stage of working de-stoned area of mine will be reclaimed to the possible extent. As precautionary measure garland drain shall be cut at the lowest RL of the mine to collect the runoff water and this shall be connected to be used for plantation, water sprinkling on haul road and daily washing of machineries / transport vehicles.

2.8 SITE FACILITIES AND UTILITIES

Water Supply

Total Water requirement for the proposed project is 4 KLD. Water will be used for the workers for drinking & domestic purpose and also for dust suppression. Fresh water will be only used for drinking purpose. The break up for water requirement is shown in **Figure 2.4.**

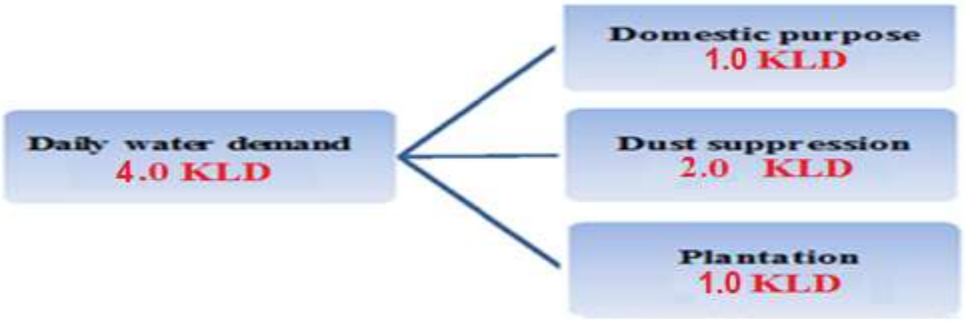


Figure 2.4: Details of water requirement

Temporary Rest Shelter:

A temporary rest shelter will be provided for the workers near to the site for rest.

- Provisions will also be made for following in the rest shelter
- First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any.
- Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

2.9 STATUTORY REQUIREMENTS

It is accepted that effective resource management cannot be done in isolation. The proponent therefore vigorously pursues approaches towards coordination and integration where possible, so as to lead to coordinated regulatory systems.
Various acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of include inter alia, the following:

- Meghalaya Mineral Policy, 2011
- Meghalaya Minor Mineral Concession Rules, 2001
- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980

CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT

3.1 PREAMBLE

Baseline environmental studies were conducted to monitor micro-meteorology, Ambient Air Quality, Ground and Surface water quality, Noise Levels, present land use pattern, soil quality, biological environment, socio-economic status, health status etc. within a study area of 10 Km. radius around the project site. To establish the existing physical, natural, socio-economic and cultural environment condition of the study area, data has been collected through primary sources (consultation with the key persons) in addition to information gathered from various secondary sources. All project relevant secondary data has been collected on regional environmental and social features from various reports pertaining to Government Agencies / Institutions and through literature reviews. Relevant data has been compiled from the census data of 2011, for obtaining details regarding the demographic and socio-economic features in the study area.

The main aim of the impact assessment study depends mainly on two factors. One of the estimation of impact from proposed project on the environment and second one is the assessment of the environmental condition. Both are key factors to arrive at the post project scenario. The estimated impact due to the mine lease area can be superimposed over the existing conditions to arrive at the post project scenario. The scope of the baseline studies includes detailed characterization of following environmental components, which are most likely to be influenced by the setting up of a mine lease area.

- Metrological conditions
- Ambient Air Quality
- Noise levels
- Water Quality (Surface and Ground water)
- Soil Quality
- Socio economic status

3.2 STUDY AREA AND PERIOD

The base-line data has been collected at the project site and 10 km buffer zone for prominent environmental attributes like Ambient Air Quality, Ambient Noise Level, Water quality and Soil profile. Primary and Secondary data has also been collected for other environmental attributes for the preparation of EIA/EMP report. The baseline study for the project was conducted during December 2019 to February 2020 (winter season). The baseline data monitoring procedures conforms to the requirement of EIA Notification, 2006 (as amended on 14.09.2006). The monitoring and analysis was done through Noida Testing Laboratory which is NABL and MoEF&CC accredited.

Study area map comprising direct impact area is shown in **Figure 3.1**

Figure 3.1: Study Area Map (10 km radius)

3.3 METHODOLOGY / APPROACH

3.3.1 Methodology of EIA

Environmental Impact Assessment study has been conducted within an area of 10 km radius around the ML area. The various steps involved in the study for this project are divided into three following phases.

- Identification of significant environmental parameters and assessing the baseline status within the study area and assessment of pollutants envisaged due to proposed activities and the polluting activities in the study area on various environmental parameters.
- Evaluation of impacts after superimposing the predicted pollution load over the baseline condition.
- Prepare Environmental Management Plan for mitigation of impacts on environment arising out of the proposed activity.

3.3.2 Approach

Environmental monitoring in order to establish the baseline environmental status of the study area for Ambient air, Water, Soil, Land use, ecology, etc.

- Collection of site specific meteorological data at the mine site.
- Carrying out a detailed biological study for the Core and Buffer Zone.
- Literature review that includes identification of relevant data and articles from various publications, various government agencies and other sources for socio-economy, meteorology, land use, ecology, etc.

- Identify various existing pollution loads due to mining and domestic activities in the buffer zone.
- Evaluate the predicted impacts on the various environmental attributes in the study area by using scientifically developed and widely accepted Environmental Impact Assessment (EIA) Methodologies.
- Preparation of an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality.

Accordingly, field studies were carried out during the study period (December 2019 to February 2020) to establish the existing baseline conditions.

3.4 METEOROLOGICAL CONDITIONS

Meteorology is the key to understand the air quality. The essential relationship between meteorology and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A meteorological station was set up at the proposed mine premises. Meteorological data was generated during the winter monitoring period.

The following parameters were recorded at hourly intervals continuously during monitoring period, except rainfall which was recorded on daily basis.

- Wind speed
- Wind Direction
- Air Temperature
- Rainfall

3.4.1 Climate of the project district

Climate of the area is semi-arid zone type. The average rain fall remains around 10000mm per year to 12000mm per year. The maximum, mean and lowest temperature remains around 34 ºC, 24 ºC and 4 ºC. Maximum precipitation takes place during month of July and August. The hottest months are May and June and coldest are of December and January.

3.4.2 Wind speed/Direction

Generally, light to moderate winds prevail throughout the year with speed ranging from 1 to 19 kmph. Winds were light and moderate particularly during the morning hours, while during the afternoon hours the winds were stronger. The wind rose diagram developed during the study period is shown in **Figure 3.2** reveals that pre-dominant wind direction is from South West in project site and the average wind speed is 3.6 kmph.

Table 3.1 (a) shows the Meteorological Data Parameters at the project site whereas **Table 3.1 (b)** shows the Meteorological Data Parameters of Shillong district (Nearest IMD from the proposed project) for the months of December, 2019 to February, 2020.

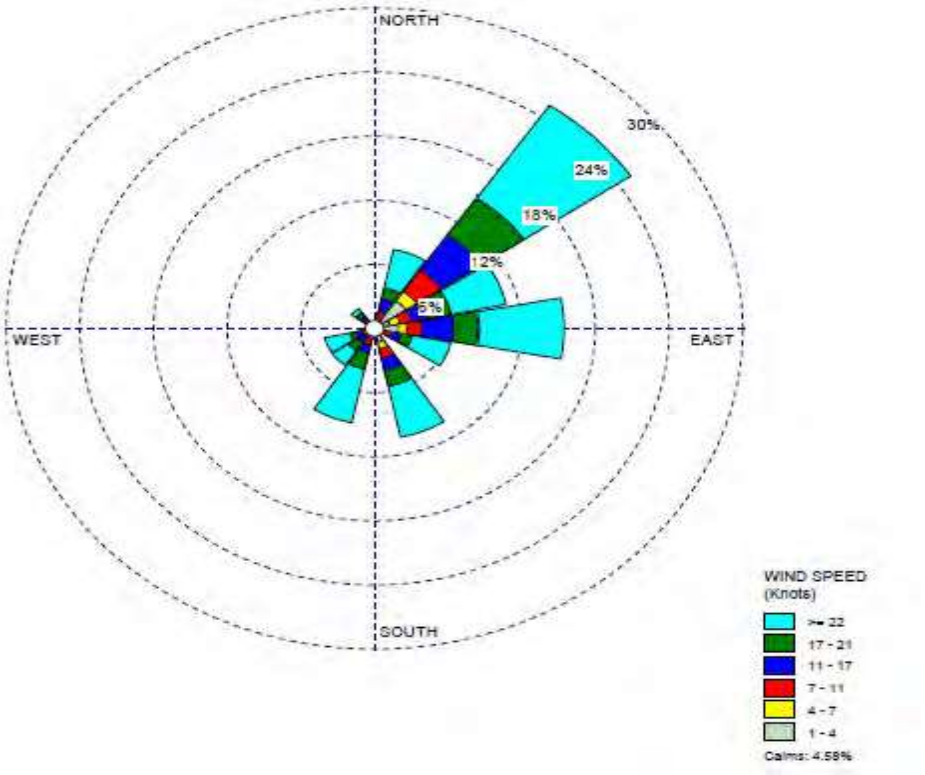
Table-3.1 (a): Meteorological Data Parameters at Project site for the months of December, 2019 to February, 2020

Date	Temperature, deg C			Humidity, %			Pressure, hPa			Wind Speed, km/Hr	Predominant Wind Direction (from)	Rainfall mm
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg		
December	6.2	23.7	12.9	64	85	76	871.8	873.2	872.4	2.8	E	21.4
January	4.8	21.2	10.5	65	82	74	871.2	872.5	871.9	3.4	NE	17.3
February	5.7	25.4	11.2	63	79	71	869.6	871.8	870.5	4.5	SW	57.2

Source: Weather station

Table-3.1 (b): Meteorological Data Parameters at Shillong district (Nearest IMD from the proposed project) for the months of December, 2019 to February, 2020

Date	Temperature, deg C			Humidity, %			Pressure, hPa			Wind Speed, km/Hr	Predominant Wind Direction (from)	Rainfall mm
	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Avg		
December	3.8	19.3	12.8	60	89	75.6	841.3	843.5	842.6	3.4	SE	12.8
January	2.7	18.4	10.2	61	87	73.2	840.2	842.3	841.5	3.7	SW	13.8
February	3.6	20.7	13.7	58	76	65.9	839.6	841.5	840.8	5.4	W	19.3



Source: IMD

Figure 3.2: Wind-rose of the project site (December, 2019 to February, 2020)

3.5 AIR ENVIRONMENT

3.5.1 Ambient Air Quality

The Ambient Air Quality was monitored in the impact area as per MoEF&CC guidelines and as per approved ToR by SEIAA, Meghalaya. The study area represents mostly rural environment. The prime objective of the baseline air quality study was to assess the ambient air quality of the mining lease area.

3.5.2 Methodology Adopted for the Study

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality network. The design of monitoring network in the air quality surveillance programme has been based on the following consideration.

- Meteorological parameters covering upwind, downwind and cross wind direction
- Topography of the study area
- Representative of regional background air quality for obtaining baseline status
- Representative of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at 5 locations, one in core zone and the other four in the study area of 10 km with due consideration to the above mentioned points. AAQM locations were selected in downwind and upwind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.3** and shown in **Table-3.2**.

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for 12 weeks during the study period. The common air pollutant namely Particulate Matter-10 (PM_{10}), Particulate Matter-2.5 ($PM_{2.5}$), Sulphur-dioxide (SO_2), Nitrogen dioxide (NO_2), Carbon monoxide (CO) and free Silica has been measured through a planned field monitoring. The baseline values of the air pollutants of concern are presented in **Tables 3.3 (a) to Tables 3.3 (f)** below statistical parameters like minimum, maximum, average and 98^{th} percentiles have been computed from the observed field data for all sampling stations**.** These are compared with the standards prescribed by National Ambient Air Quality Standards 2009.

Table 3.2: Location of Ambient Air Quality Monitoring Stations

S. No.	Location Name	Direction	Distance from the project site (in km)
AAQ1	Project Site	-	0
AAQ2	Mawkliaw	NE	9.0
AAQ3	Mawmluh	N	9.4
AAQ4	Mawlong	NW	6.2
AAQ5	Sohbar	N	3.7

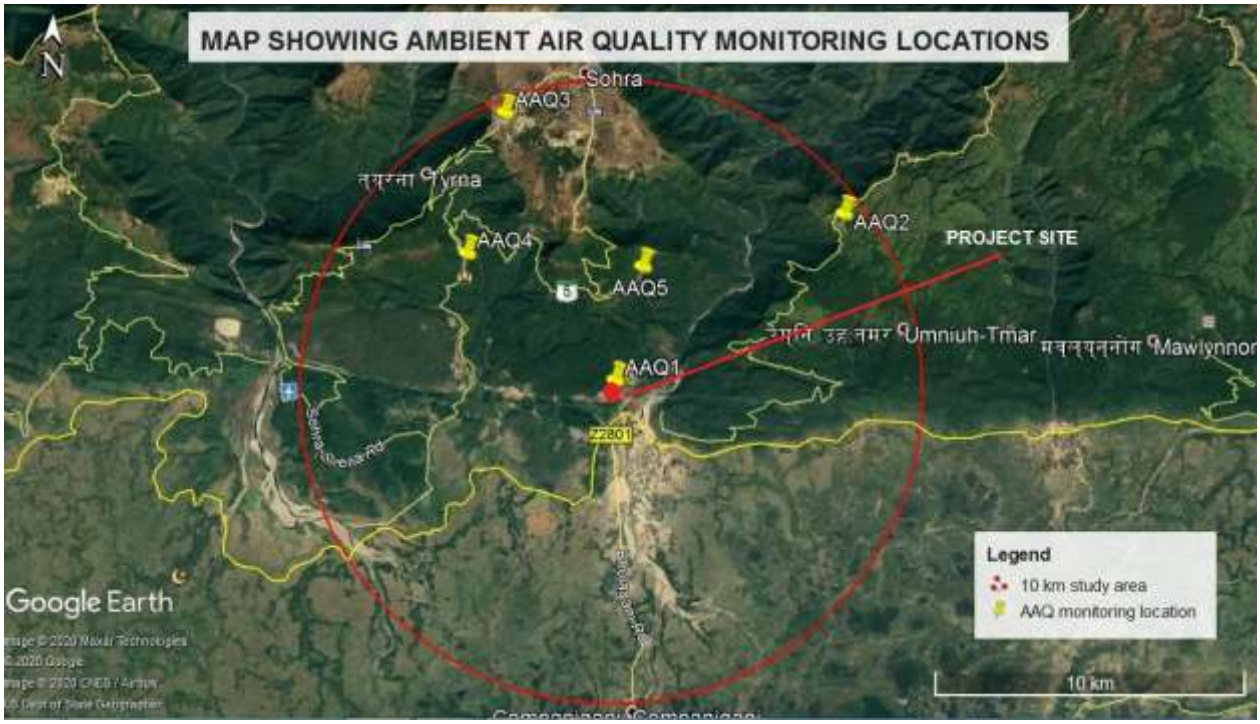


Figure 3.3 Ambient Air Quality Monitoring Stations

Table-3.3 (a): Ambient Air Quality in the Study Area PM_{10}

Location		PM10 (µg/m^3)			
Code	Name of the Station	Min	Max	Average	98$^{\%}$ percentiles
AAQ-1	Project Site	53.8	75.2	64.5	74.6
AAQ-2	Mawkliaw	61.3	76.5	70.8	75.7
AAQ-3	Mawmluh	64.2	81.6	75.4	80.5
AAQ-4	Mawlong	57.4	71.2	64.3	70.4
AAQ-5	Sohbar	50.7	68.6	61.5	66.4
NAAQ Standards	100 (24 hr)				

Table-3.3 (b): Ambient Air Quality in the Study Area $PM_{2.5}$

Location		PM2.5 (µg/m^3)			
Code	Name of the Station	Min	Max	Average	98th percentiles
AAQ-1	Project Site	19.4	27.2	23.1	26.0
AAQ-2	Mawkliaw	20.7	31.5	25.8	30.4
AAQ-3	Mawmluh	24.3	37.8	30.5	26.2
AAQ-4	Mawlong	19.1	29.2	24.3	28.1
AAQ-5	Sohbar	17.5	25.3	22.2	24.7
NAAQ Standards	60 (24 hr)				

Table-3.3 (c): Ambient Air Quality in the Study Area SO_2

Location		SO2 (µg/m^3)			
Code	Name of the Station	Min	Max	Average	98th percentiles
AAQ-1	Project Site	5.9	7.8	6.7	7.1
AAQ-2	Mawkliaw	7.7	11.5	9.1	10.8
AAQ-3	Mawmluh	8.1	12.0	10.5	11.3
AAQ-4	Mawlong	6.1	8.2	7.0	7.3
AAQ-5	Sohbar	5.4	7.5	6.3	6.8
NAAQ Standards	80 (24 hr)				

Table-3.3 (d): Ambient Air Quality in the Study Area NO_2

Location		NO2 (µg/m^3)			
Code	Name of the Station	Min	Max	Average	98th percentiles
AAQ-1	Project Site	10.7	14.3	12.5	13.7
AAQ-2	Mawkliaw	13.2	17.5	15.6	16.8
AAQ-3	Mawmluh	14.2	19.5	16.7	18.7
AAQ-4	Mawlong	10.1	14.3	12.5	13.4
AAQ-5	Sohbar	9.6	13.2	11.1	12.6
NAAQ Standards	**80 (24 hr)**				

Table-3.3 (e): Ambient Air Quality in the Study Area CO

Location		CO (mg/m^3)			
Code	Name of the Station	Min	Max	Average	98th percentiles
AAQ-1	Project Site	0.340	0.470	0.410	0.430
AAQ-2	Mawkliaw	0.520	0.670	0.590	0.620
AAQ-3	Mawmluh	0.610	0.780	0.690	0.740
AAQ-4	Mawlong	BDL	BDL	BDL	BDL
AAQ-5	Sohbar	BDL	BDL	BDL	BDL
NAAQ Standards	**4 (24 hr)**				

Table-3.3 (f): Ambient Air Quality in the Study Area free Silica

Location		Free Silica (µg/m^3)			
Code	Name of the Station	Min	Max	Average	98$^{\%}$ percentiles
AAQ-1	Project Site	0.62	1.38	0.97	1.25
AAQ-2	Mawkliaw	0.60	1.45	0.84	1.34
AAQ-3	Mawmluh	0.65	1.59	1.12	1.46
AAQ-4	Mawlong	0.58	1.32	0.96	1.24
AAQ-5	Sohbar	0.50	1.27	0.80	1.16

3.5.3 Baseline Scenario

a) Suspended Particulate Matter (PM10)

Suspended particulate matter in general terms is the particulate matter in suspension in ambient air. It includes dust, smoke etc. In general some of the important sources of suspended particulate matter are mines. The following sources of suspended particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from mining operations

The minimum and maximum level of PM_{10} recorded within the study area was in the range of 50.7 µg/m^3 to 81.6 µg/m^3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

The 24 hourly average values of PM_{10} were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100 µg/m^3 for PM_{10} in Industrial, Residential, Rural and other areas.

b) Particulate Matter (PM2.5)

Fine particulate matter in general terms is the particulate matter in suspension in ambient air. It includes dust, smoke etc. In general some of the important sources of suspended particulate matter are mines. The following sources of suspended particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from mining operations

The minimum and maximum level of $PM_{2.5}$ recorded within the study area was in the range of 17.5 µg/m^3 to 37.8 µg/m^3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

The 24 hourly average values of $PM_{2.5}$ were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60 µg/m^3 for $PM_{2.5}$ in Industrial, Residential, Rural and other areas.

c) Sulphur Dioxide (SO2)

Sulphur dioxide gas is an inorganic gaseous pollutant. Sulphur dioxide emissions are expected to be emitted wherever combustion of any fuel containing Sulphur takes place. The Sulphur in the fuel will combine with oxygen to form Sulphur dioxide. The following sources of Sulphur dioxide in the study area are identified:

- Emissions from domestic/consumption of fuel (coal, diesel, etc)

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of producing illness and lung injury. Further it can combine with water in the air to form toxic

acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants. Sulphur dioxide is an irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes bronchial asthma and other breathing related diseases as it affects the lungs.

The minimum and maximum concentration of SO2 recorded within the study area was 5.4 to 12.0 µg/m^3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

The 24 hourly average values of SO2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Industrial, Residential, Rural and other areas.

d) Nitrogen Dioxide (NO2)

The important sources of oxides of Nitrogen are from utilities and auto exhaust due to vehicular movement in mine lease area. The following sources of oxides of nitrogen in the study area are identified.

- Emissions from field burning of coal.
- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. The minimum and maximum level of NO2 recorded within the study area was in the range of was 9.6 µg/m^3 to 19.5 µg/m^3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

The 24 hourly average values of NO2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Industrial, Residential, Rural and other areas.

e) Carbon Oxide (CO)

The important sources of oxides of Carbon are from utilities and auto exhaust due to vehicular movement in mine lease area. The following sources of oxides of nitrogen in the study area are identified.

- Emissions from field burning of coal.
- Emissions from vehicular movements in the study area.

The minimum and maximum level of CO recorded within the study area was in the range of was 0.340 mg/m^3 to 0.780 mg/m^3. The minimum concentration was recorded at project (AAQ1) and the maximum concentration was recorded at Mawmluh (AAQ3).

The 24 hourly average values of CO were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 4 µg/m^3 for Industrial, Residential, Rural and other areas.

f) Free Silica

The minimum and maximum level of free silica recorded within the study area was in the range of was 0.50 µg/m3 to 1.59 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

3.6 NOISE ENVIRONMENT

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as insidious or harmful as air and water pollutants but it affects human health and well-being and can contribute to deterioration of human well-being in general and can cause neurological disturbances and physiological damage to the hearing mechanism in particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the proposed site.

3.6.1 Source of Noise

The main sources of noise in the study area are domestic activities, industrial activities and vehicular traffic. The main occupation of the villagers in the study area is agriculture and business.

3.6.2 Noise Level in the Study Area

The baseline noise levels have been monitored at 5 locations, one in core zone and four within the study zone during winter period, using a sound level meter and noise level measurement locations were identified for assessment of existing noise level status, keeping in view the land use pattern, industrial area, Silence Zone, residential areas in villages etc., if available within 10 km radius of the study area. The day levels have been monitored during 6.00 AM to 10.00 PM and night noise levels, during 10.00 PM to 6.00 AM. The noise monitoring stations are shown in **Figure 3.4** and represented in **Table 3.4**. The results are presented in **Table 3.5.**

Table 3.4: Noise Level Monitoring Stations in the Study Area

S. No.	Location Name	Direction	Distance from the project site (in km)
NQ1	Project Site	-	0
NQ2	Mawkliaw	NE	9.0
NQ3	Mawmluh	N	9.4
NQ4	Mawlong	NW	6.2
NQ5	Sohbar	N	3.7

Table 3.5: Leq Noise Level in the Study Area (during day and Night) (January 2020)

Location Code	Noise levels dB(A), Day (Leq)	Noise levels dB(A) Night, (Leq)	Noise Limits in dB(A), Leq Day Time	Noise Limits in dB(A), Leq Night Time	Area
NQ1	51.4	37.2	**75**	**70**	Mine Site (Industrial)
NQ2	58.6	40.3	**65**	**55**	Commercial
NQ3	60.7	41.6	**65**	**55**	Commercial
NQ4	50.9	39.5	**55**	**45**	Residential

NQ5	50.2	38.4	**55**	**45**	Residential

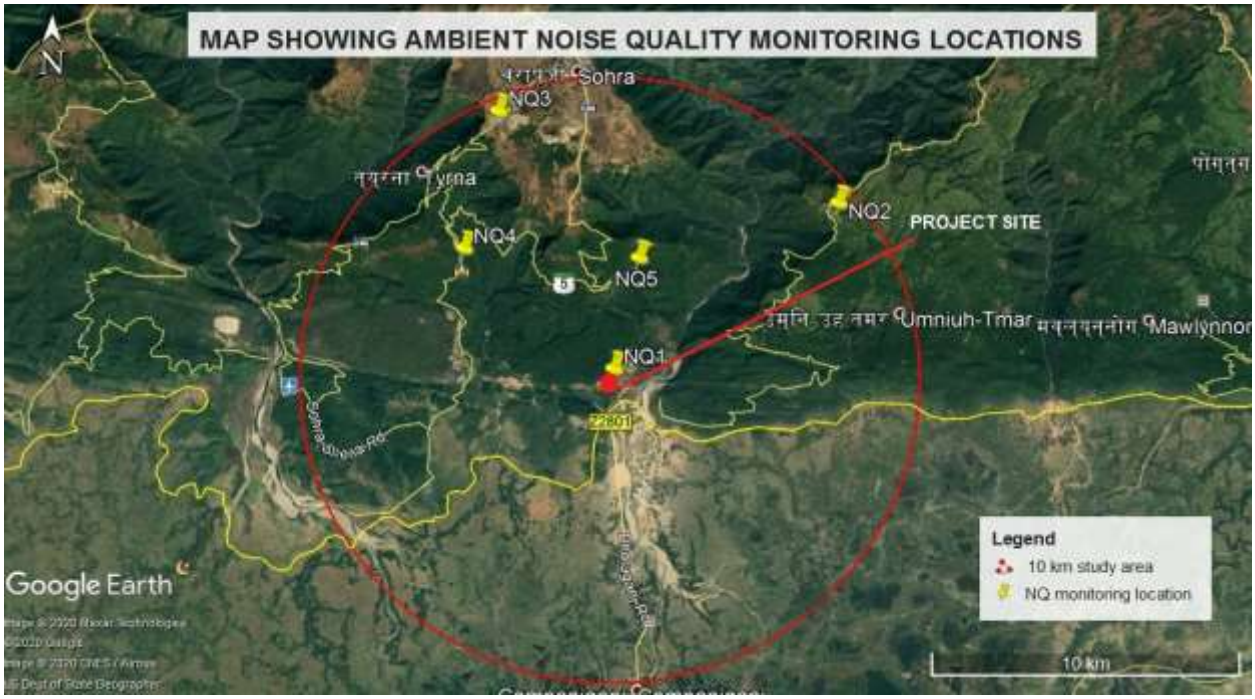


Figure 3.4: Ambient Noise Level Monitoring Locations

3.6.3 Ambient Noise Standards

Ministry of Environment, Forest and Climate Change (MoEF&CC) has notified the noise standards vide gazette notification dated February 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in **Table-3.6**

Table 3.6: Ambient Quality Standards in respect of Noise

Area Code	Category of Area	Noise dB (A) Leq	
		Daytime*	Night time*
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note:

1. Daytime is from 6.00am to 10.00 pm and Nighttime is from 10.00 pm to 6.00 am.
2. Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones

3.6.4 Baseline Scenario

The values of noise observed in some of the areas are primarily owing to vehicular traffic and other anthropogenic activities. The noise level in day time lies between 50.2 dB(A) to 60.7 dB(A) and in night time between 37.2 dB(A) to 41.6 dB(A).

The status of noise quality within the 10 km zone of the study area is, therefore, within the MoEF&CC standards

3.7 WATER ENVIRONMENT

3.7.1 Water Quality

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of ground water has been studied in order to assess proposed water-uses in dust suppression, drinking and green belt watering purpose.

The water quality within the study area was monitored during the study period. The water samples were collected once in month. The water sampling locations marked within the study are presented in **Table 3.7** and the result of the monitoring and analysis are presented in the **Table 3.8. Figure 3.5 shows** the Water Quality Monitoring Locations marked within the Study Area.

Table 3.7: Location of Water Sampling Sites

S. No.	Location Name	Direction	Distance from the project site (in km)
GW1	Near Project Site	-	1.2
GW2	Mawkliaw	NE	9.0
GW3	Mawmluh	N	9.4
GW4	Mawlong	NW	6.2
SW1	Sohbar	N	3.7

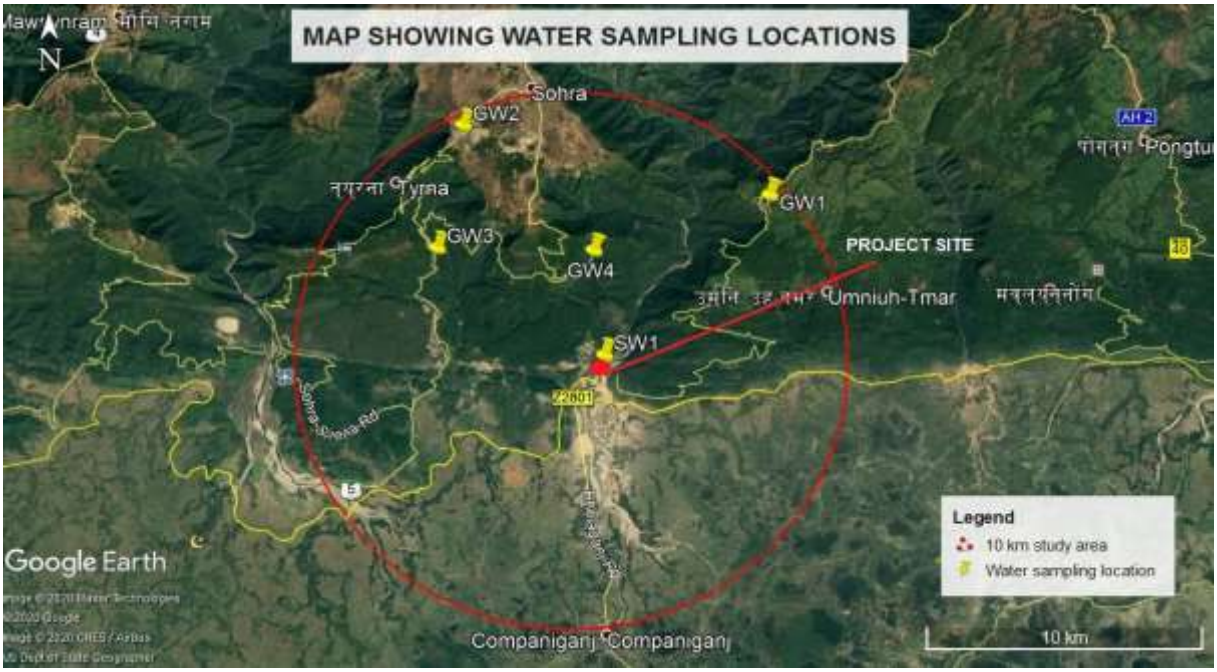


Figure 3.5: Location Map of Water Sampling Sites

Table 3.8: Water Quality during the month of January 2020

Sl. No.	Parameters	Unit	Limit (as per IS:10500-2012)		GW1 (Tap water)	GW2 (Tap water)	GW3 (Tap water)	GW4 (Tap water)	SW1 (River)
			Desirable Limit	Permissible Limit					
1.	pH	-	6.5-8.5	No Relaxation	7.91	8.14	8.27	7.52	7.23
2.	Colour	Hazen	5	25	<5	<5	<5	<5	<5
3	TSS	Mg/l	-	-	BDL	BDL	BDL	BDL	6.2
4	Dissolved Oxygen	% By Mass	5	10	5.3	5.9	6.1	5.5	7.2
5	BOD (at 27^0C 3-Days)	mg/l	-	-	BDL	BDL	BDL	BDL	7.4
6	COD	mg/l	-	-	BDL	BDL	BDL	BDL	25.9
7	TKN	mg/l	-	-	2.1	2.9	3.2	2.7	3.5
8	Total Hardness (as CaCO3)	mg/l	200	600	110.09	126.21	134.99	128.52	94.99
9.	Calcium (as Ca)	mg/l	75	200	23.7	24.9	31.2	23.2	19.3
10	Magnesium (as Mg)	mg/l	30	100	12.4	15.6	13.9	17.2	11.4
11	Ammonia (NH3)	mg/l	-	-	BDL	BDL	BDL	BDL	1.9
12	Electrical Conductivity	Microm /hos/c m	-		247.78	250.94	283.62	264.02	245.97
13	Chloride (as Cl)	mg/l	250	1000	24.2	19.7	32.5	36.3	40.8
14	Sulphate (as SO4)	mg/l	200	400	6.2	4.8	5.6	7.2	5.3
15	Phosphates	mg/l	-	-	<0.1	<1.0	<1.0	<1.0	<1.0
16	Nitrate (as NO3)	mg/l	45	No Relaxation	0.26	0.31	0.45	0.41	0.78
16	Fluoride (as F)	mg/l	1	1.5	0.21	0.27	0.19	0.15	0.10
17	Arsenic (As)	mg/l	-	-	BDL	BDL	BDL	BDL	BDL

18	Lead (as Pb)	mg/l	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
19	Mercury(as Hg)	mg/l	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
20	Phenols	mg/l	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
21	Cyanides	mg/l	-	-	BDL	BDL	BDL	BDL	BDL
22	TDS	mg/l	500	2000	161.06	163.11	184.35	171.61	159.88
23	Iron (as Fe)	mg/l	0.3	1.0	0.47	0.51	0.59	0.32	0.23
24	Alkalinity as (CaCO3)	mg/l	200	600	127	139	142	118	94
25	Sodium (as Na)	mg/l	-	-	15.2	10.3	11.9	14.3	20.7
26	Potassium (as K)	mg/l	-	-	2.9	4.1	3.6	2.2	5.2
Bacteriological Parameters									
1.	Faecal Coliform	MPN/1 00 ml	Shall Not be Detectable		Absent	Absent	Absent	Absent	710
2.	Total Coliform	MPN/1 00 ml	Shall Not be Detectable		Absent	Absent	Absent	Absent	1160

3.7.2 Sampling Frequency and Sampling Techniques

Parameters for analysis of water quality were selected based on the utility of the particular source of water as per MoEF&CC guidance. Hence quality of ground water was compared with IS: 10500: 1991 (Reaffirmed 1993 With Amendment No -3 July 2010) for drinking purposes. Surface water quality was monitored for parameters as per Methods of Monitoring & Analysis published by CPCB and it was rated according to the CPCB Water Quality Criteria against A, B, C, D & E class of water. Water samples were collected as Grab water sample from sampling location. The samples were analyzed as per standard procedure / method given in IS: 3025 (Revised Part) and standard method for examination of water and wastewater Ed.21st, published jointly APHA, AWWA and WPCF.

The surface water quality is compared with CPCB water quality criteria mentioned in **Table 3.9** below:

Table 3.9: Water Quality Criteria as per Central Pollution Control Board

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source afterconventional treatment disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

3.7.3 Result & Conclusion:

- The pH limit fixed for drinking water samples as per IS-10500 Standards is 6.5 to 8.5 beyond this range the water will affect the mucus membrane or water supply system. During the study period, the pH was varying for ground water from 7.52 to 8.27. The pH values for all the samples collected in the study area during study period were found to be within the limits.
- The desirable limit for total dissolved solids as per IS-10500 Standards is 500 mg/l whereas the permissible limits in absence of alternate source is 2000 mg/l, beyond this palatability decreases and may cause gastro intestinal irritation. In ground water samples collected from the study area, the total dissolved solids in ground water are varying from 161.06 mg/l to 184.35 mg/l. The TDS of the samples were above the desirable limit but within the permissible limit of 2000 mg/l.
- The desirable limit for chlorides is 250 mg/l as per IS-10500 Standards whereas, permissible limit of the same is 1000 mg/l beyond this limit taste, corrosion and palatability are affected. The chloride level in the ground water samples collected in the study area were ranging from 19.7 mg/l to a maximum of 36.3 mg/l. The chloride samples are within the desirable limits.
- The desirable limit as per IS-10500 Standards for hardness is 200 mg/l whereas the permissible limit for the same is 600 mg/l beyond this limit encrustation in water supply structure and adverse effects on domestic use will be observed. In the ground water samples collected from the study area, the hardness is varying from 110.09 mg/l to 134.99 mg/l.

Overall all the samples collected from the study area were found to be fit for consumption, Most of ground water samples are well within the permissible limits, as per IS-10500. Most of the heavy metals in all samples are below detectable limits.

Comparing the values of pH, DO, BOD and total coliforms with ‘Use based classification of surface waters’ published by Central Pollution Control Board; it can be seen that all the analyzed surface waters can be compared with class ‘B’ and can be used as Outdoor bathing (Organized).

3.8 SOIL CHARACTERISTICS

The composite soil samples were collected from site and the study area and were analyzed for characterization. The locations of the monitoring sites are depicted in **Figure 3.6** and given in **Table 3.10** Showing Soil Sample Collection Points marked within the Study Area.

3.8.1 Methodology

The soil samples were collected in the month of **January 2020.** Soil samples were collected from 5 locations. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis. The test results are given in **Table-3.11**.

Particulars	Details
Frequency	One grab sample from each station once during the Study Period
Methodology	Composite grab samples of the topsoil were collected from 3m depth, and mixed to provide a representative sample for analysis. They were stored in airtight Polythene Bags and analyzed at the laboratory

Table 3.10: Soil Sample Collection Points

S. No.	Location Name	Direction	Distance from the project site (in km)
SQ1	Project Site	-	0
SQ2	Mawkliaw	NE	9.0
SQ3	Mawmluh	N	9.4
SQ4	Mawlong	NW	6.2
SQ5	Sohbar	N	3.7

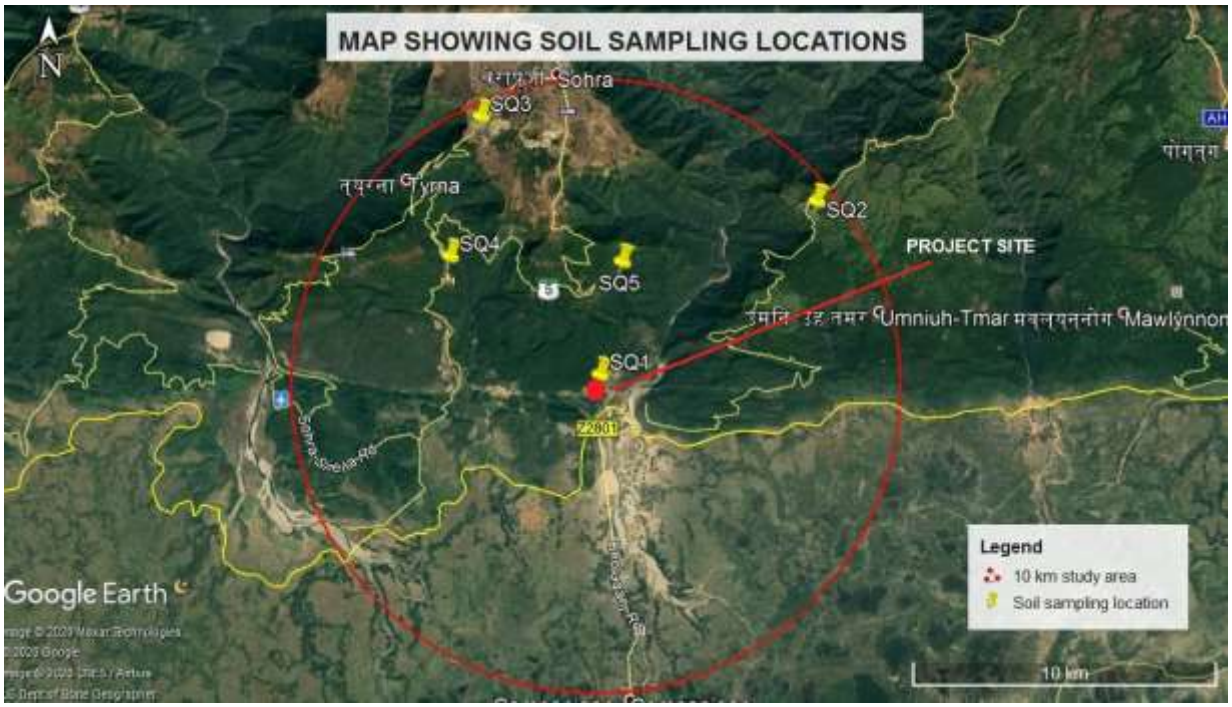


Figure 3.6: Location Map of Soil Sampling Sites

Table 3.11: Physiochemical Properties of Soil (January 2020)

Sr.No.	Parameters	Test Method	Unit	SQ1	SQ2	SQ3	SQ4	SQ5
1	pH	TS:2720	-	6.28	6.13	6.87	6.54	6.10
	Bulk Density	TS:2720	gm/cm3	1.22	1.17	1.34	1.14	30
	Conductivity	TS:2720	micro mhos/cm	342	326	412	335	375
	Moisture	TS:2720	%	9.3	10.2	9.8	8.5	8.9
2	Texture	TS:2720	-	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay	Sandy Clay
3	Sand	TS:2720	%	50.6	48.9	51.7	50.9	49.5
4	Clay	TS:2720	%	32.5	31.2	34.8	36.2	33.7
5	Silt	TS:2720	%	16.9	19.9	13.5	16.8	16.9
6	Sodium sulphate	TS:2720	mg/kg	13.4	12.7	14.8	20.5	18.3
7	Potassium (as K)	TS:2720	mg/kg	123.8	126.2	138.5	131.9	112.7
8	CEC	TS:2720	meq/100gm	6.1	6.8	9.4	8.2	7.3
9	Nitrogen	TS:2720	% by mass	0.052	0.068	0.045	0.076	0.065
10	Organic Matter	TS:2720	%	3.9	4.5	4.1	5.6	5.2
11	Phosphorous	TS:2720	mg/Kg	13.4	11.9	12.7	10.8	12.2
12	Calcium	TS:2720	meq /100gm	3.47	3.21	3.76	4.66	3.95
13	SAR	TS:2720	-	4.20	4.68	5.24	4.93	4.56
14	Magnesium	TS:2720	mg/kg	27.6	30.8	29.5	24.3	21.7

3.8.2 Results of Analysis of the Soil

Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal

ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly acidic (6.10 to 6.87). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 326 – 412 µmhos/cm.

The soils with low bulk density have favorable physical condition where as those with high bulk density exhibit poor physical conditions for agriculture crops.

3.9 LAND USE/LAND COVER MAPPING

- **Coordinates of the mine lease area**

Land use map of 10 km radius area has been presented in **Figure-3.7**.

To assess the land use pattern surrounding the 10 km radius of the site, a detailed study was carried out. The land use pattern study reveals that the 10 km environs is predominantly forest, wetland and agriculture area. The land use details are given in **Table-3.12.**

Table 3.12: Land use of the study area

Sr. No.	Particulars	Area (ha)	Percentage
1	Settlements	978.4	3.12
2	Water bodies	2345.7	7.47
3	Waste land	849.2	2.7
4	Crop land	9416.5	29.99
5	forest area	17810.2	56.72
	Total	**31400**	**100**

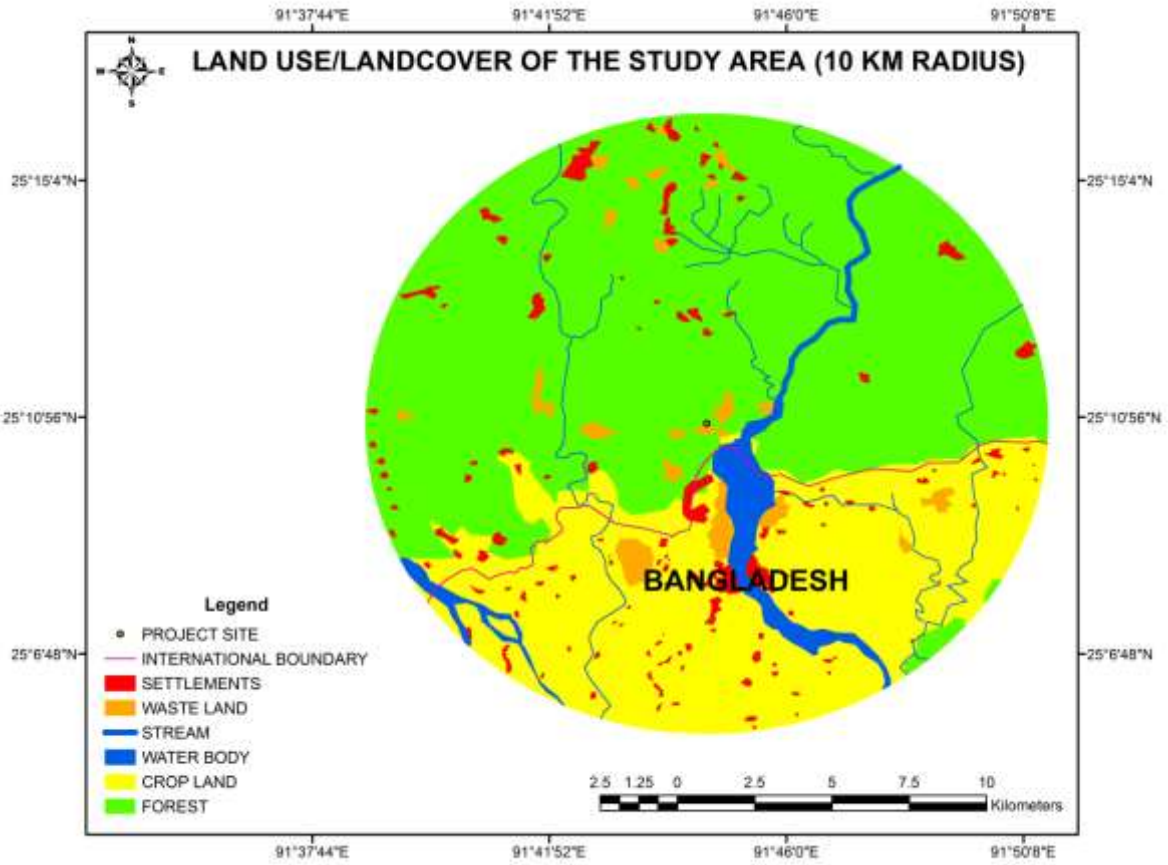


Figure 3.7 Land use delineation of 10 km radius area

3.10 TRAFFIC STUDY

Traffic study is carried out by understanding the existing carrying capacity of the road in the vicinity of site and flow towards highway in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity as recommended by Indian Road Congress (IRC). The existing volume of traffic and, the Level of Service are given in **Table-3.13 (i).**

Table 3.13 (i): Existing Traffic Scenario & LOS

Road	V (PCU/day)	C (PCU/day)	Existing V/C Ratio	LOS
MDR 27	800	1400	0.57	B

V= Volume in PCU's/day & C= Capacity in PCU's/ day

During Mine operation

Total Capacity of mine : 89,959 TPA

No. of working days : 300 days

Total Capacity of mine/day : 89,959 /300 = 300 tonnes/day

Truck Capacity : 10 tonnes

No. of trucks deployed per day : 300/10 = 30 trucks per day

No. of trucks deployed/day to & fro : 30*2= 60 trucks

Increase in PCU/day : 132

The addition to traffic by the proposed project during its operation is given in Table 3.13(ii).

Table 3.13 (ii): Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Modified V/C Ratio	LOS
MDR 27	932	1400	0.66	B

From the above analysis it can be seen that the V/C ratio is likely to be changed to 0.66 on MDR 27 with LOS remains “B” which is “Good” as per the classification. So the additional load on the carrying capacity of the concerned roads is not likely to have much significant adverse effect.

3.11 BIOLOGICAL ENVIRONMENT

Biological diversity comprises the variability of species, genus and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly it can be divided in to two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for the sustainable development as it not only provides the food, fodder and medicine but also contribute in improvement of essential environmental attributes like air, water, soil, etc.

Before starting any Environmental Impact Assessment study, it is necessary to identify the baseline of relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project.

3.11.1 Methodology for the study

Detailed survey was conducted to evaluate floral and faunal composition of the study area. Primary data on floral and faunal composition was recorded during site visit and secondary data was collected from the Forest department and published relevant literature. Inventory of flora and fauna has been prepared on the basis of collected data.

Field study period: The ecological survey has been conducted for one season (December, 2019 to February, 2020). All data were collected in winter. Mode of data collection & parameters considered during the survey have been presented in Table 3.14

Table 3.14: Mode of data collection & parameters considered during the survey

Aspect	Data	Mode of data collection	Parameters monitored
Terrestrial Ecology	Primary data collection	By conducting field survey	Floral and Faunal diversity
	Secondary data collection	From authentic sources like Range office and Forest Department of Meghalaya and available published literatures	Floral and Faunal diversity and study of vegetation, forest type, importance etc.
Aquatic Ecology	Primary data collection	By conducting field survey	Floral and Faunal diversity
	Secondary data collection	From authentic sources like Range office and Forest Department of Meghalaya and available published literatures	Floral and Faunal diversity and study of vegetation, forest type, importance etc.

3.11.2 Physical Environment of the study area:

East Khasi Hills is an administrative district in the state of Meghalaya in India. The district headquarters are located at Shillong. The district occupies an area of 2752 km² and has a population of 825,922 (as of 2011). As of 2011 it is the most populous district of Meghalaya's seven districts. East Khasi Hills District forms a central part of Meghalaya and covers a total geographical area of 2,748 km2. It lies approximately between 25°07" & 25°41" N Lat. And 91°21" & 92°09" E Long.

3.11.3 Type of Forest

Meghalaya, situated in the north eastern region of India is a narrow stretch of land, running between Bangladesh on the South and West and Assam on the North and East, Meghalaya lies between 24° 58’ N to 26° 07’N latitudes and 89° 48’E to 92° 51’ E longitudes. The state has three distinct regions namely, Gao Hills, Khasi Hills and Jainta Hills. The climate is monsoonal with distinct warm-wet and cold dry periods and soil largely lateritic. The forests of Meghalaya can be broadly grouped into tropical, subtropical and temperate types. The Indian Institute of Remote Sensing have classified the vegetation of Meghalaya into tropical evergreen, tropical semi-evergreen, tropical moist deciduous, subtropical broad leaved, subtropical pi Mesua ferrea, Terminalia myriocarpa, Vitex peduncularis, Mechelia champaca, Amoora wallichii etc which have economical and medicinal significanceand animal biodiversity like Hoollock Gibbon, Serow, Slow Loris, Sloth Bear, Irrawaddy Squirrel, Otter, Mongoose, varieties of fruit Bats etc.ne and temperate forest types, grasslands and savanna. The entire forest is rich in plant like Terminalia myriocarpa, Vitex peduncularis, Mechelia champaca, Amoora wallichii etc which have economical and medicinal significance and animal biodiversity like Hoollock Gibbon, Serow, Slow Loris, Sloth Bear, Irrawaddy Squirrel, Otter, Mongoose, varieties of fruit Bats etc.

The proposed mine lies in East Khasi Hills district. The forest cover map of Meghalaya is given in Figure 3.8.

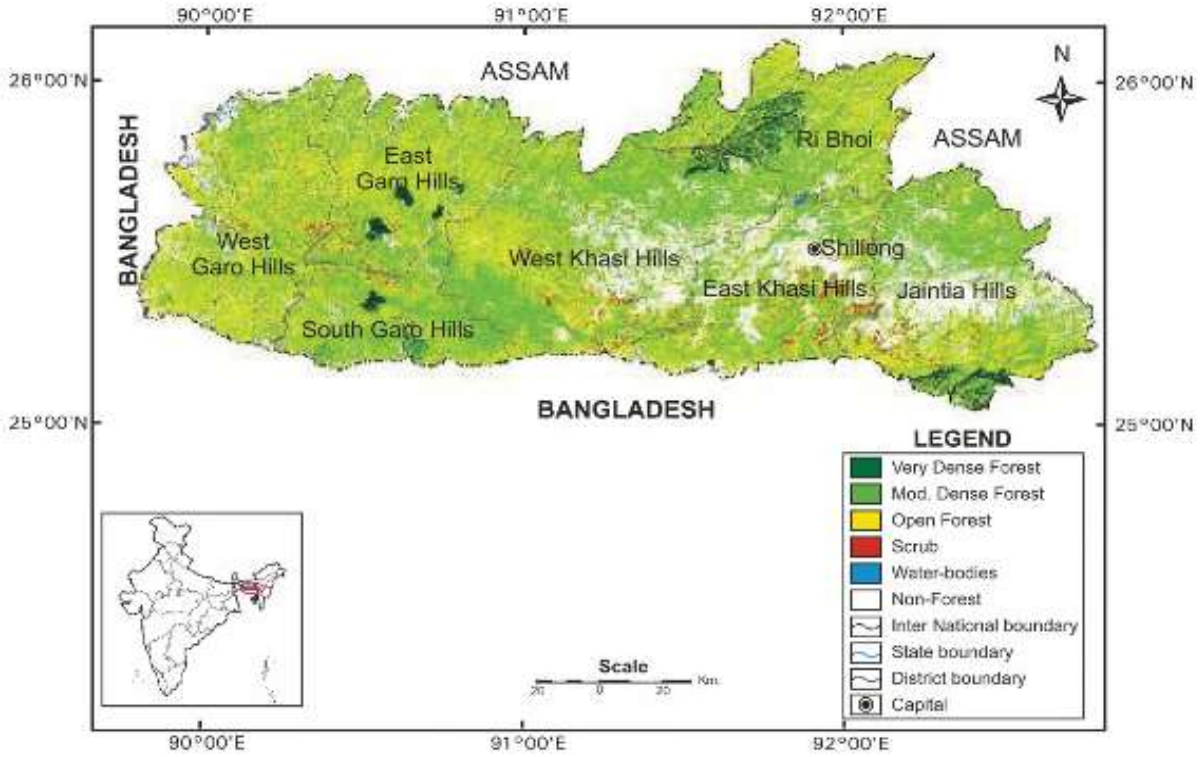


Figure 3.8: Forest cover map of Meghalaya

3.11.4 Flora and Fauna

Flora

The following Trees, Scrub species, Herb Species and Grass Species are present in the study area. (Table 3.15 to 3.19)

Table 3.15: Trees species present in the study area

Sl. No.	Botanical Name	Local Name	English Name
1.	*Ammora wallichii*	Amari	---
2.	*Lagerstroemia*	Ajhow, Jarul, Sida	Crepe Flower
3.	*Phoebe goalparensis*	Bonsum	---
4.	*Ailanthus grandis*	Borpat	---
5.	*Tetrameles nudiflora*	Bhelu	False Hemp Tree
6.	*Chukrassla velutina*	Bogipoma	Bastard cedar / Chittagong wood
7.	*Dysoxylum binecteri ferum*	Bandordima	Cup-Calyx White Cedar
8.	*Morus laevigata*	Bola	Himalayan Mulberry
9.	*Terminalia bellirica*	Bahera, Bhomda	Belliric Myrobalan/ Bahera

10.	*Michelia champaca*	Champ, Sopa	Champa
11.	*Canarium resiniferum*	Dhuna	Black Dammar/ Black Dhup
12.	*Gmelina arborea*	Gamari	Gamhar
13.	*Cinnamomum spp.*	Gonsordi	--
14.	*Terminalia myriocarpa*	Hollock	Hollock
15.	*Castanopsis indica*	Hingori	Indian Chestnut / Oak Chestnut
16.	*Pterospermum acerifolium*	Hatipolia	Kanak Champa

Table 3.16: General Trees species present in the study area

Sl. No.	Scientific Name	Family (Known English/ Local Name)	English Name
1.	*Lannea coromandelica*	Anacardiaceae (Poison oak)	Indin Ash Tree
2.	*Mangifera indica*	Anacardiaceae	Mango
3.	*Spondias piñata*	Anacardiaceae	Wild Mango
4.	*Spondias axillaris*	Anacardiaceae	Hog Plum
5.	*Areca catechu*	Arecaceae	Betel Nut /Areca Nut
6.	*Caryota urens*	Arecaceae	Fish-Tail Palm
7.	*Bombax ceiba*	Bombacaceae	Red Silk Cotton Tree
8.	*Calophyllum polyanthum*	Clusiaceae	Poonspar Tree
9.	*Anogeissus acuminata*	Combretaceae	Button Tree
10.	*Terminalia bellirica*	Combretaceae	Belliric Myrobalan/ Bahera
11.	*Terminalia myriocarpa*	Combretaceae	Hollock
12.	*Dillenia pentagyna*	Dilleniaceae	Dog Teak
13.	*Shorea robusta*	Dipterocarpaceae	Sal Tree
14.	*Glochidion arborescens*	Euphorbiaceae	Alpine Cheese Tree

Table 3.17: Scrub species present in the study area

Sl. No.	Scientific Name	Family	English Name
1.	*Mimosa rubicaulis*	Fabaceae	Himalayan Mimosa
2.	*Bauhinia acuminata*	Leguminosae	Dwarf White Orchid Tree
3.	*Ficus tinctoria*	Moraceae	Dye Fig
4.	*Canthium gracillipes*	Rubiaceae	---
5.	*Glycosmis mauritiana*	Rutaceae	Orange Berry
6.	*Brugmansia suaveolens*	Solanaceae	Angel's Trumpet
7.	*Solanum kurzii*	Solanaceae	---
8.	*Symplocos chinensis*	Symplocaceae	Sapphire Berry
9.	*Daphne cannabina*	Thymelaeaceae	Indian Paper Plant

Table 3.18: Herb species present in the study area

Sl. No.	Scientific Name	Family	English Name
1.	*Adhatoda vasica*	Acanthaceae	*Malabar Nut*
2.	*Andrographis wrightiana*	Acanthaceae	---
3.	*Justicia simplex*	Acanthaceae	*Water Willow*
4.	*Achyranthes aspera*	Amaranthaceae	*Prickly Chaff Flower*
5.	*Alternanthera sessilis*	Amaranthaceae	*Sessile Joyweed*
6.	*Amaranthus spinosus*	Amaranthaceae	*Prickly Amaranth*
7.	*Hydrocotyl javanica*	Apiaceae	*Java Pennywort*
8.	*Acorus calamus*	Araceae	*Sweet Flag*
9.	*Alocasia acuminate*	Araceae	---
10.	*Arisaema tortuosum*	Araceae	*Whipcord Cobra Lily*

Table 3.19: Grass species present in the study area

Sl. No.	Scientific Name	Family	English Name
1.	*Cyperus diffusus*	Cyperaceae	Dwarf Umbrella Grass
2.	*Cyperus distans*	Cyperaceae	Slender Cyperus
3.	*Cyperus rotundus*	Cyperaceae	Nut Grass /Nut Sedge
4.	*Fimbristylis dichotoma*	Cyperaceae	Tall Fringe Rush
5.	*Kyllinga bulbosa*	Cyperaceae	Whitehead Spike sedge
6.	*Cynodon barberi*	Poaceae	--
7.	*Cynodon dactylon*	Poaceae	Bermuda grass
8.	*Eragrostis gangetica*	Poaceae	Slim-Flower Love grass
9.	*Eragrostis nutans*	Poaceae	Futiu, Chikatu

Fauna

A study and survey of Birds (resident, migratory), land animals including mammals, reptiles and insects and fauna including fish species was undertaken during the study period. Though More than 110 mammal species are reported from the Meghalaya Forests, but none is endemic to the state. There are no National Parks or Sanctuaries or Biosphere Reserves or other protected areas within the study area. The following (Table 3.20 to 3.23) Avi Fauna, Mammalian Fauna, Reptilian Fauna and Fishes (Pisces) are presented in the study area.

Table 3.20: Avi fauna species present in the study area

Sl. No.	Common Name	Latin name	Residential status	WPA Schedule
1.	Little cormorant	*Phalacrocorax niger*	Local migrant	IV
2.	Eastern Grey Heron	*Ardea cinerea*	Local migrant	IV
3.	Little egret	*Ardea alba*	Local migrant	IV
4.	Cattle Egret	*Bubulcus ibis*	Local migrant	IV
5.	Common Pochard	*Aythya ferina*	Local migrant	IV

6.	Black winged kite	*Elanus caeruleus*	Local migrant	IV
7.	Indian Red jungle Fowl	*Gallua gallus murghi*	Resident	IV
8.	Common sandpiper	*Tringa hypoleucos*	Resident	IV

Table 3.21: Mammalian fauna present in the study area

Sl. No.	Common Name	Latin name	IUCN status	WPA Schedule
1.	Rhesus monkey	*Macaca mulatto mulatto*	Common	II
2.	House shrew	*Suncus murinus*	Common	II
3.	Indian fulvus fruit bat	*Rousettus leschenaultia*	Common	II
4.	Jackal	*Canis aureus*	Occasional	II
5.	Jungle cat	*Felis chaus affinis*	Occasional	II

Table 3.22: Reptilian fauna present in the study area

Sl. No.	Common Name	Latin name	IUCN status	WPA Schedule
1.	Garden Lizards	*Calotes versicolor*	Common	IV
2.	Lizards	*Gecko gecko*	Common	II
3.	House Gecko	*Hemidactylus brooki*	Common	II
4.	Common skink	*Mabuya craniata*	Common	IV
5.	Rat snake	*Ptyas korros*	Common	II

Table 3.23: Fishes (Pisces) species present in the study area

Sl. No.	Latin name	Common name	Local name (Khasi)	Status
1.	*Cirrhinus mrigala*	Mrigala	Kha mirka	Very common
2.	*Cyprinus carpio*	Carp	Kha dkhar	Very common
3.	*Labeo bata*	Major Carp	Kha bah	Common

4.	*Labio rohita*	Rohu		Very common
5.	*Barilius barila*		Kha Ilong	Common
6.	*Mystus vittatus*		Kha tynkriong	Very Common
7.	*Anabas testudineus*	Climbing Perch	Kha Koi	Scarce
8.	*Channa orientalis*	Murrels	Dohthli	Common
9.	*Puntius chola*	Major Carp	Shalynni	Common

3.11.5 Cropping Pattern:

The main crops grown in nearby areas are Wheat, rice, potatoes and pulses. In terms of productivity, rice is the predominant crop in Meghalaya. Beside these crops fruits like Banana, Citrus etc. and vegetables are also cultivated.

3.12 SOCIO-ECONOMIC ENVIRONMENT

Socio-Economic status of the population is an indicator for the development of the region. Any development project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Similarly, the proposed activities will have its share of socio-economic influence in the study area. The section delineates the overall appraisal of society relevant attributes. The baseline data collection of project on socioeconomic aspects in the study area has been done through the analysis of secondary data (Census 2011) available for the study area of 10 km radius around the project site. The information in the context was gathered on the following socio-economic parameters viz.

- Demographic profile
- Education levels
- Occupational Profile
- Cropping Pattern
- Other Socio-Economic Parameters.

3.12.1 Socio-Economic Impact Assessment

Socio-Economic Impact Assessment (SEIA) refers to the systematic analysis of various social and economic characteristics of the human beings living in the geographical / study area around the proposed project location. SEIA is carried out separately but concurrently with Environment Impact Assessment (EIA) study. The SEIA focuses on the likely effects of the project on social and economic well-being of the community. The impact(s) may be direct or indirect, positive or negative. In this Chapter of the EIA Report an attempt has been made to assess the composite Socio-Economic Impact of the project.

3.12.1.1 Steps taken to prepare the SEIA Report

Various steps taken to prepare the SEIA report were as follows

- Literature review
- Identification of habitations in the study area with the help of google earth and toposheet
- Visit to project site
- Collection of secondary data
- Planning and designing of the field survey for collection of primary data
- Formulation of Data collection tools (Schedule/Questionnaire)
- Field testing of Schedule/Questionnaire through a pilot survey
- Briefing of field staff
- Scrutiny of filled-in-schedules
- Data processing and tabulation
- Data analysis and preparation of report.

3.12.1.2 Approach

Research approach plays an important role to decide suitable methodology. It helps to develop research design and increase the effectiveness of research study. In the present study inductive approach has been adopted, which is a bottom top approach. Under this approach first data is collected both from primary and secondary sources. After scrutiny, tables are generated in pre-designed formats. Subsequently, draft report is prepared after detail analysis of data. The final report is prepared after incorporating the comments and suggestions of the client.

3.12.1.3 Objectives of SEIA

The prime objective of the current study is to assess the likely impact of the project on socio-economic characteristics of people living in the study area. Further, it is to be gauged whether the impact would be direct or indirect and whether the said impact would be positive or negative. Lastly, it is to be comprehended if the impact is negative and how the same could be mitigated.

3.12.1.4Scope

The Scope of the study is as follows:

a) Collection of baseline data of the study area.

b) Collation of data, analyses and generation of tables.

c) Comprehension of socio-economic status of the people living in the study area.

d) Identification and inventory of probable impacts of the project on social and economic aspects in the study area.

e) Assessment of the probable impacts of the project on the people living in the study area.

f) Facilitation of sustainability of positive impact by recommending community development initiatives in the study area.

g) Suggestion of mitigation measures in case of adverse impact.

3.12.2 Methodology

For composite Socio-Economic Impact Assessment of projects, the consultant carries out systematic analysis of the various socio-economic characteristics, both in terms of quality and quantity. Accordingly, both qualitative and quantitative data was collected from secondary sources. The secondary data was collected from the published data / information of the Census Authority. Records of the state and district administration were also referred. For collection of primary data, a sample survey was conducted in the study area which spans a radius of 10 km from the periphery of the boundary of the project site. In each selected habitation, a specified number of representative households were selected for collection of information through face to face interviews with head of the household or any responsible member of the family.

3.12.2.1 Census Survey

To assess the likely impacts of the project, Census data (viz. Population Census Abstract and Amenities- 2011) of all the habitations identified were taken into consideration to prepare the data base. It is treated as a census survey because all habitations located in the area were considered for the collection of information. Sample Survey was conducted for substantiating of socio-economic data got through the Census. Further, in selected habitation a household survey was conducted by drawing representative sample of households. Since, collection of information from all the households in a habitation is time consuming and expensive, the sample survey approach was adopted for collection of information from the selection of villages and households in the village(s) / town(s).

3.12.3 East Khasi Hills (Project District)

East Khasi Hills is an administrative district in the state of Meghalaya in India. The district headquarters are located at Shillong. The district occupies an area of 2752 km² and has a population of 825,922 (as of 2011). As of 2011 it is the most populous district of Meghalaya's seven districts. East Khasi Hills District forms a central part of Meghalaya and covers a total geographical area of 2,748 km2. It lies approximately between 25°07" & 25°41" N Lat. And 91°21" & 92°09" E Long.

3.12.4 Population Profile

The description of the project district is presented in **Table 3.24**. According to the 2011 census of India, East Khasi Hills has a population of 825922.

Table 3.24: Demographic details of Project District and Tehsil

S.No.	District/Tehsil	Households	Population					
			Total	Male	%	Female	%	Sex ratio
1.	East Khasi Hills	164046	825922	410749	49.73	415173	50.27	1011

Source: Census of India, 2011

3.12.5 Caste Wise Distribution of Population

Table 3.25 provides detailed information about the SC, ST population in East Khasi Hills district as well as on the Project area. The total SC population in East Khasi Hills district is 5642 which is 0.68% of the total population, while ST population is 661158 which is 80.05% of the total population.

Table 3.25: Caste wise distribution of population

Sl. No.	District/Project Area	Schedule Caste (SC)		Schedule Tribes (ST)	
		Total	% of SC	Total	% of ST
1	East Khasi Hills	5642	0.68	661158	80.05

3.12.6 Literacy Rate

District East Khasi Hills: The literate population in East Khasi Hills district is 578030, out of which male & female are 287270 and 290760respectively. The male literates represent 84.51 % while female represent 83.81% of the total population.

The details of literacy rate and literate people in East Khasi Hills district is provided in **Table 3.26.**

Table 3.26: Literacy Rate of Project District and Project Area

S. No	District/Project Area	Number of Literate			Literacy Rate %	
		Total	Male	Female	Male	Female
1	East Khasi Hills	578030	287270	290760	84.51	83.81

Source: Census of India, 2011

3.12.7 Religion and Culture

East Khasi Hills is Christian majority city with approximately 65.79 % of district population as Christian. Hindu is second most popular religion in district with approximately 17.55 % following it. In East Khasi Hills district, Muslim religion is followed by 1.72 %. **Table 3.27** shows the Religious wise distribution of Population of East Khasi Hills District.

Table 3.27: Religion wise distribution of Population of East Khasi Hills

Description	Total	Percentage
Hindu	144949	17.55
Muslims	14206	1.72
Christian	543374	65.79
Sikh	2478	0.30
Buddhist	3139	0.38

Jain	330	0.04
Others	115629	14.0
Not Stated	1900	0.23

Source: Census of India, 2011

3.12.8 Economic Structure

The main occupation in the District is the coal mining business. However the inhabitant of the southernmost part of the District bordering Bangladesh sustain their livelihood by Bettle-Nut plantation.

The **Table 3.28** given below describes two sections of workers main and marginal with a third category which is non-worker; the total number of workers at district level is 326786 which is 39.57 percent of total population out of which main workers are 35.06 percent and marginal workers have a share of 4.51 percent while rest nearly 60.43 percent workers are non-workers.

Table 3.28: Main Workers, Marginal Workers and Non-workers of Project District and Project Area

Sl. No.	District/ Project Area	Total workers	Total worker %	Main workers	Main workers %	Marginal workers	Marginal workers %	Non-workers	Non-workers %
1.	East Khasi Hills	326786	39.57	289576	35.06	37210	4.51	499136	60.43

Source: Census of India, 2011

3.13 SOCIO-ECONOMIC IMPACT ASSESSMENT

3.13.1 Impact on Population Composition

No impact is envisaged on the population composition of the study area as there will be no in-migration or out-migration of villagers. Those who will be engaged in lime stone mining will be recruited locally.

3.13.2 Impact on Employment

For extraction of limestone the project proponent has ensured that only local people will be recruited for the operation of the upcoming mine. The exact number of people to be recruited will depend upon quantity of the minerals to be extracted over a period of time. In the initial period the number of such people will be less but gradually it will go up when the production will increase in a phased manner. The project proponent has planned to recruit 34 local peoples for the operation of the upcoming mine. Though marginally, the dependency rate in the study area will decline by one percent with the commencement of the above mine. This is a positive impact of the project.

3.13.3 Impact on Approach Roads

Movement of trucks and other vehicles to and fro the quarry site is expected to increase substantially, when the operation of the mine will commence. The existing roads connecting the quarry with highways are mud roads and they are narrow. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them

paved roads. Hence, there is a wide scope for road development in the area. This is a positive impact of the upcoming mining project.

3.13.4 Impact on Law & Order

Since the workers will attend to their duties from their residence and return to their homes after the day's work is over there will be no law & order problem as such. On the other hand, if the workers are migrants and live in shanties closed to the mining area it may create law & order problem and ethnic issues. To meet any untoward incident one police post may be set up close to the project area.

3.13.5 Impact on Vulnerable Groups of People

No impact is envisaged on vulnerable groups of people that include hospital patients, children, pregnant women and elderly persons. There will be no re-habilitation and resettlement issues that may adversely affect the people living adjoining the mine lease area. The social welfare activities to be taken up by the mine owner will definitely make positive impact on the living conditions of people including those who fall under vulnerable groups.

3.13.6 Income to Government

The proposed mining will bring income for the state government in the form of royalty, dead rent and taxes. This is a positive impact of the project.

Extraction of limestone may pose health risks if it is not handled carefully Hence, preventive measures should be taken to protect oneself from the exposure of lime stone, while working in a lime stone mine. This is a negative impact of lime stone mining. The project proponent will undertake the following preventive measures, in order to protect the workers from the exposure of lime stone:

1) Consult to Physician

A physician will be consulted if anyone develops any sign or symptom caused due to exposure to lime stone.

2) Regular medical surveillances

Regular medical surveillances of the workers will be made. In case anyone get adversely affected due to lime stone mining the miner will be medically examined and provided medical assistances regularly. They will also be medically checked annually.

3) Provision of First Aid at mining site

To meet any emergency during extraction of the minerals from the mining site and subsequent loading in the transport vehicles, provision for First Aid will be

made by the project proponent. Before the affected person is removed to a doctor or health institution for necessary medical aid, the miner will be provided with First Aid.

4) Tie up with the nearest PHC for medical help

At present there are no adequate health facilities available in the mining village. To meet the medical needs of the mine workers, tie-ups with nearest hospital or Primary Health Center (PHC) will be made. Few beds will exclusively be reserved for the mine workers in the above health institutions. This will ensure timely medical aid to the affected persons.

5) Supply of Masks and Gloves

The mine workers are subject to respiratory diseases, muscular-skeletal and gastro-intestinal disorders and skin diseases. For protection from dust it will be made compulsory for all mine workers to wear masks and gloves while working in the mines.

6) Health Camps

Health Camps will be organized at regular intervals preferably in every quarter. Further, free medical facilities will be made available to the workers and their family members.

7) Administration of Anti-venom injections

Provision of Anti-venom therapy will be made available at the nearest health institution. Anti-venom injections will be administrated to the mine workers in case of snake, spider and insect bites, while working in the mines.

8) Special telephone number

A special telephone number will be available to the mine workers. In case of emergency the miners can dial the above number for medical assistances. Vehicle will be provided to the patients in short duration for shifting to the health institution.

9) Special Group Insurance Scheme

All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

3.14 CONCLUSION

The implementation of the mining project at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State – Meghalaya will generate both direct and indirect employment. It will also promote legally valid mining in the area and bring income to the state exchequer. At present agriculture & horticulture is the main occupation of the people. With the implementation of the proposed mining project the occupational pattern of the people in the area may change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agricultural sector to mining and industry. Due to industrialization of the area, employment opportunities will further increase.

The study area is still lacking in infrastructure. It is expected that the same will improve to a great extent due to proposed mining project and associated industrial and business activities. It is therefore suggested that the commencement of the mining operation may be taken up on priority basis as employment opportunists are intended for the local aspirant.

CHAPTER 4: ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

4.1 DETAILS OF THE INVESTIGATED ENVIRONMENTAL IMPACTS

This chapter provides a brief overview of the potential impacts on various environmental components due to the proposed opencast mining activities. The opencast mining operations in general cause environmental degradation and if adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause irreversible damage to the eco-system. The environmental parameters most commonly affected by mining activities are:

- Topography and drainage;
- Air quality including Climate
- Noise levels and ground vibrations;
- Water resources and quality;
- Land use Pattern;
- Soil quality;
- Flora and Fauna;
- Socio-Economic conditions; and
- Occupational Health.

Various environmental impacts, which have been identified due to the mining activities, are discussed in the following Chapters and mitigation measures are suggested.

4.1.1 Impact on Drainage

South flowing Tharia River is the nearest river at a distance of about 1km from the block. The area is highly sloping and workings will be kept restricted above ground water table. There exists no surface water body in the vicinity of the proposed area of mining. The proposed area with its surroundings is gently sloping. The proposed mining operation being semi-mechanized would not affect environment adversely.

However, adequate control measures will be taken to prevent water pollution/contamination like toe wall will be constructed with weep - holes & garland drains will also be provided as precautionary measures.

As stated above, the mine excavation shall not intervene the water table However there is chance of accumulation of water during monsoon, For this, a sump shall be made at the bottom RL of pit to collects this water, which shall be pumped out by diesel driven pump.

Pumped out pit water shall be used for road sprinkling & plantation irrigation (green belt development) etc. As such, there is no impact on water regime due to mining activities.

4.2 IMPACT ON WATER ENVIRONMENT

The mining process will not divert and utilize the surface & ground water. Quantity of water will remain the same. The existing background level of water quality as indicated by the baseline data revealed that impact on water environment will be insignificant in this project.

4.2.1 Anticipated Impacts

Because of the open Cast & semi mechanization method in the mining activity, the impact of mining operations on water quality is also expected to be insignificant. There would be no impact on the quality/quantity of ground water as existing ground water level in study area is deep. Surface water is also not diverted or disturbed. Therefore, there would not be any impact on surface water and ground water quality. The lease area is Hilly and Stony where only direct precipitation flows down the slope during rains. The water comes across in the workings during monsoon. The water will fill in the working pits. Some water will flow by joints and cracks and rest water has to dewater during and after the monsoon. The monsoon water which directly precipitates over the working will fill in the pit and rest water which precipitates outside the pit will flow down towards lower altitude side by slope of the area.

The rubble stone walls are constructed towards lower side of the dumps to check the wash off during monsoon. During rains the rainwater flow on natural slope of the surface.

Since the mining process is totally dry, no effluent will be generated hence no adverse impact on water is anticipated. During the entire lease period, the deposit will be worked from the top surface to above ground water table, whichever comes first neither water table (aquifer) will be intersected by the mining activities. Hence there will not be any adverse impact either on the quality or quantity of ground water. There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

Domestic Effluent

No domestic effluent is generated at the mine site due to absence of any settlement in the mining area. Hence the question of contamination of ground water does not arise. Any adverse impact on the ground water regime is not expected from the domestic effluent.

Surface Run-Off

The land of the study area is semi-arid and the Landscape is hilly and stony. The threat of pollution of due to surface run-off is also not possible as because entire study area does have any natural surface water course.

Mitigation Measures

There is a sufficient gap between proposed workings up to conceptual and level of ground water table, thus ground water will not be encountered in the workings at any stage.

4.3 IMPACT ON LAND USE

➢ Land use Pattern in Core Zone

Mining is essentially an excavation of mineral. The land environment is greatly affected by it. Specially, in case of mining which is being carried out by opencast method / semi- mechanized, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, Topography, Drainage pattern and geological features of the mine site as well as the study area.

Various components of land environment have been identified for study of impact of the mining operations. Details of the same are given below:

Impact on land use & land cover

There is no forest land or agriculture in the mine lease area. Land use pattern for preoperational, operational & conceptual stage of the mining as per mine plan for the proposed mine site is given below in Table 4.1:

Table 4.1: Land use pattern

Existing land Use pattern

Category	Area in Hectares
Excavated Land	**0.00**
Road	0.01
Total area in use	**0.01**
Balance unused area	2.39
Total Applied Lease Area	**2.40**

Land Use pattern after first five years plan period

Category	Area in Hectares
Excavated land including road	1.20
Green belt in Safety Barrier	0.27
Dump with Parapet Wall and Garland Drain	0.18
Total area in use	**1.65**
Balance unused area	0.35
Total Applied Lease Area	**2.40**

Land Use pattern after life of the mine

Category	Area in Hectares
Excavated land including road	1.88
Green belt (within Safety Barrier)	0.52
Total area in use	**2.40**
Balance unused area	0.00
Total Applied Lease Area	**2.40**

Source: Mine plan

The existing land use / land cover pattern within the study area (10 Km, Buffer including core Area) as studied through Site survey & satellite imagery is given as follows. Table 4.2

Table 4.2: Existing Land use of the 10 KM Study Area

Sr. No.	Particulars	Area (ha)	Percentage
1	Settlements	978.4	3.12
2	Water bodies	2345.7	7.47
3	Waste land	849.2	2.7
4	Crop land	9416.5	29.99
5	Forest area	17810.2	56.72
	Total	**31400**	**100**

As per the mine plan reclamation will be done by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir. The soil come across during mining will be scraped and stacked separately in 0.01 ha area. The soil will be used for plantation in each monsoon.

4.4 IMPACT ON AIR ENVIRONMENT

4.4.1 Change in Ambient air and GLC

The air pollution impact of excavation is directly dependent upon construction methodology, annual rate of excavation, mode of transport within the construction site, mode of screening and method of crushing. The air pollution sources at the proposed project site can be broadly classified into three categories, viz. area source, line source and instantaneous point source.

Excavation by various activities in project area is construed as an area source which includes excavation pit(s) and activities happening in the excavation area like digging, dozing, hauling and loading/unloading. The dust emission from these areas will be fugitive in nature. The excavator operations, loading/unloading operations will also cause dust emission though it will be confined to the area of operation of the machinery. The gaseous emission from their operation shall be minimal and limited within the project.

Transportation of excavated material from the project site to dumping sites area categorized as line source. Since the dumper movement on haul road will be within the project area, no adverse impact shall be felt in the settlement area.

4.4.1.1 Dust Dispersion Modeling for Excavation Operation

In the present study, United States Environmental Protection Agency (USEPA–42 series) approved mathematical equations have been used to predict concentrations for different operations in project including the material transportation. To predict the particulate emissions, Envitrans AERMODCloud. (Air Dispersion Modeling Software) an interface based on ISCST3 – was used to predict changes in air quality i.e., maximum ground level concentration (GLC's) of Particulate Matter. Short term model options were opted for uniform emissions rates. The concentration of other gaseous pollutants i.e. SO2 and Nox was found to be much lower than the threshold limit (80 µg/m3), the air modeling was restricted to determination of PM10 and

PM2.5 in the present case. The emission factors adopted for various project operations are mentioned below:

Emission Factor for Excavation and Material Loading/unloading

For excavation and material handling the emission factor for PM_{10} has been adopted as per USEPA – 42 series.

For Dozing Operation:

$EFPM_{10}$ (kg/hr) = 0.34 X s1.5 (%) / M1.4 (%)

Where,

$EFPM_{10}$ (kg/hr) = emission factor in kg/hr

S = silt contents in percentage by weight

M = moisture content in percentage by weight

For Material Loading/unloading:

$EFPM_{10}$ (kg/hr) = 0.34 [0.119 / M0.9]

Where,

$EFPM_{10}$ (kg/hr) = emission factor in kg/ton

M = moisture content in percentage by weight.

Emission Factor for Material Haulage within Project:

The emission rate is dependent on several factors which include soil properties, climatic conditions, vehicular traffic, wind forces and machinery operation. The Empirical equation for calculation of emission rate is as under.

E= k*(1.7) *(s/12) *(S/48) *(W/2.7)0.7*(W/2.7)0.7 (w/4)0.5 * (365-p/365) g/VKT

Where,

E=Emission Rate

K = Particle size multiplier

s=Silt Content of the Road surface material

S= Mean Vehicle Speed (km/hr)

W=Mean Vehicle Weight (tons)

w=Mean number of wheels

p= Number of days with at least 0.254mm of precipitation per year

Note: The emission factor for PM2.5 has been considered 60% of PM10.

The Isopleths developed are shown in **Figure 4.1 (a)** and **Figure 4.1 (b) for PM_{10}** and **$PM_{2.5}$ respectively.** The maximum GLC due to excavation, loading & unloading activities for PM_{10} and $PM_{2.5}$ was found to be 6.5 and 3.8 µg/m3 respectively and has been shown in **Table 4.3**.

Table 4.3: Maximum Concentration at receptors

Location	Pollutants	N-Cord.	E-Cord.	GLC (µg/m^3)
Project site	PM_{10}	25.180262°	91.743470°	6.5
Project site	$PM_{2.5}$	25.180262°	91.743470°	3.8

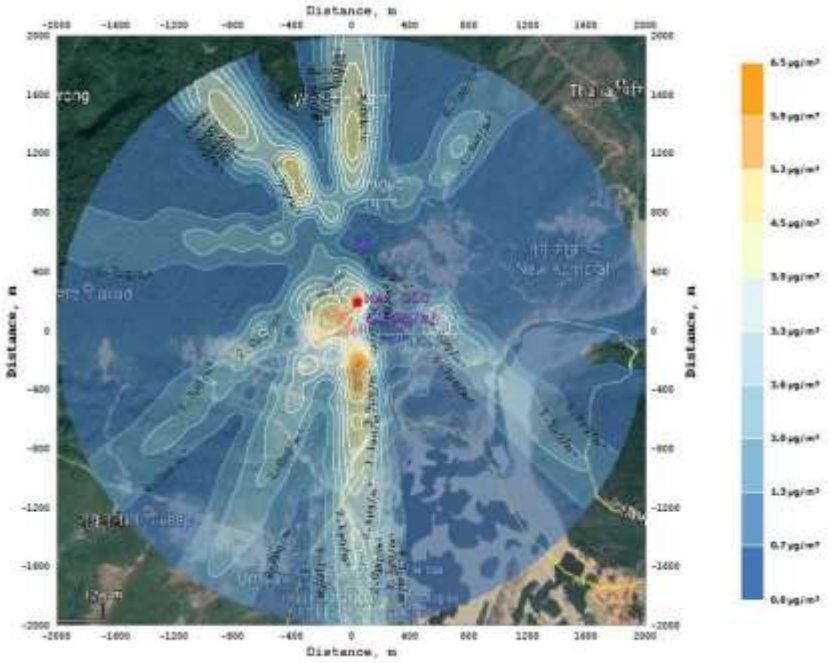


Figure 4.1 (a): Isopleth of Maximum Predicted 24 hourly Ground – Level Concentrations for PM_{10}

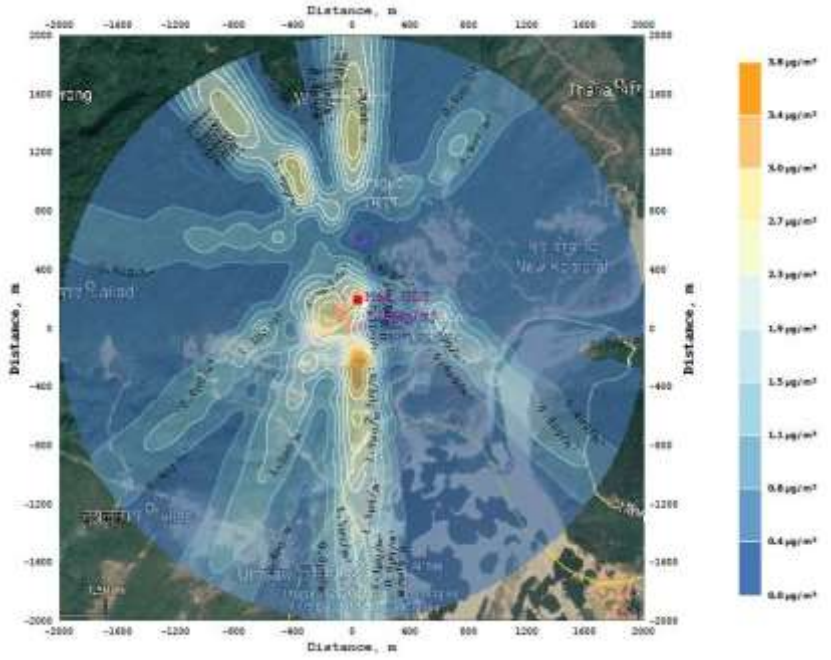


Figure 4.1 (b): Isopleth of Maximum Predicted 24 hourly Ground – Level Concentrations for $PM_{2.5}$

4.4.1.2 Resultant Impact

The resultant impact due to construction activities (excavation and crushing) on the ambient air quality for PM_{10} and $PM_{2.5}$ at monitoring station project site respectively is presented in **Table 4.4** which shows that, the resultant concentration level is within the NAAQS.

Table 4.4: Resultant levels due to excavation

Station Name	Pollutants	Sampling Station	Max. Conc. (µg/m3)	Predicted GLC (µg/m3)	Resultant concentration (µg/m3)	NAAQS (µg/m3)
Project site	PM10	AAQ 1	75.2	6.5	81.7	100
Project site	PM2.5	AAQ 1	27.2	3.8	31.0	60

4.5 PROPOSED MITIGATION MEASURES

Control of Fugitive Emissions

- Use of Personal Protection Equipment's (PPE) like dust masks, ear plugs etc. by the mine workers.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.
- Rock breaker will be used for breaking over size boulders in order to reduce dust and noise generation, which otherwise would be generated due to secondary blasting.
- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.

Prevention and control of Gaseous Pollution

- Open cast manual method will be adopted in this case. The main source of gaseous emissions would be transportation.
- Approx. 300 tonnes of lime stone will be produced per day and the transportation will be done with covered materials to prevent any spillage and also prevent fugitive dust emission due to wind.
- Any gaseous emission transportation will be negligible and not impact the ambient quality.
- Exhaust emission will be monitored of the trucks and to be kept below the permissible limit.
- Proper maintenance of machines improves combustion process & makes reduction in the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

The sources of pollutants from mining activities are given in **Table-4.5**.

Table 4.5: Sources of Pollutants

Sr. No.	Source	Type of Pollutant
1	Transport of Overburden or soil for dumping/ backfill	SPM
2	Dumping of waste	SPM
3	Loading of ore	SPM
4	Transportation of ore	SPM, NOx

4.6 NOISE ENVIRONMENT

4.6.1 Noise Impact on Working Environment

As mining will be done by semi-mechanized means, noise will only be generated due evacuation, transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area. The impact of noise on the villages is negligible as the villages are far located from the mine workings. Since there is no involvement of major machinery, the impact of noise levels will be minimal.

4.6.2 Noise Abatement and Control

In this mine the noise level will be upto tolerable limit (90 dbA) and the noise level can be reduced by:

- Proper maintenance, oiling and greasing of transport vehicles at regular intervals will be done to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads, around office building and mine area will be done to minimize the propagation of noise.
- Personal Protective Equipment (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Periodical noise level monitoring will be done.

Frequency levels and associated mental and physical response of humans are given in **Table-4.6.**

Table 4.6: Noise Exposure Levels & Its Effects

Noise Levels dB (A)	Exposure Time	Effects
85	Continuous	Safe
85-90	Continuous	Annoyance and irritation
90-100	Short term	Temporary shift in hearing threshold, generally with complete recovery
Above 100	Continuous	Permanent loss of hearing
	Short term	Permanent hearing loss can be avoided
100-110	Several years	Permanent deafness
110-120	Few months	Permanent deafness

120	Short term	Extreme discomfort
140	Short term	Discomfort with actual pain
150 and above	Single exposure	Mechanical damage to the ear

Source: Hand Book of EIA, Rao & Wooten

4.7 GREENBELT AND PLANTATION

Proposed Plantation at the Mine Site

The main aim of plantation in the mined out areas is to stabilize the land to protect it from rain and wind erosion. The plantation scheme broadly covers the following areas:

- Greenbelt around peripheral portions of the ML; and
- Plantation will be raised along the boundaries of the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, etc. in consultation with the local DFO/Agriculture department.

Greenbelt Development in ML area

435 nos. of trees will be planted on 0.27 ha of land and plantation will be done on the periphery of the reclaimed area and van panchayat land. Precautionary measures will be taken for care of the forestation made by regular watering in the afforested area, to protect from grazing animals and proper manuring.

4.8 BIOLOGICAL ENVIRONMENT

The baseline flora and fauna has been depicted in Section-3.11 of Chapter-3. There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area) hence there shall be no impact on wildlife sanctuary due to mining activities. However, most of the area surrounding to project site are covered with forest land. No loss of forest resource is envisaged due to the project.

4.8.1 Impact on Biodiversity

Present data have been collected through direct inventory as well as various Government Departments such as forests, agriculture, fisheries, animal husbandry and various offices to establish the pre-project biological environmental conditions. There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area) hence there shall be no impact on wildlife sanctuary due to mining activities. Save the flora/fauna around the project area, is one of the basic objective of present project. For this, mine owner agency planted a good roadside plantation along both side of the mine road.

The mitigative measures proposed are:

- Prior to mining, short awareness program will be conducted for labors to make them aware for way of working.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.

- No track or new road for movement of labors or vehicles be laid in adjoining area, this will prevent fragmentation, encroachment and human – animal encounter.

4.9 SOCIO - ECONOMIC ENVIRONMENT

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. The proposed mine will be providing employment to local population and it will give preference to the local people whenever there is requirement of man power.

Probable Impact Assessment

Impact on population composition

The impact of the proposed mining project on population composition will be marginal as there will be no major immigration of people from distant areas. Only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. Similarly, there is no scope for emigration of people and there will be no displacement of people due to land acquisition. The Project Proponent will ensure that all the unskilled workers deployed for mining activities are local recruits. Further, no mining operation will be carried till it is assured that local people has been recruited and deployed for mining operation.

Impact on employment generation

The proposed mining project is expected to provide Direct and Indirect employment opportunities to local people of different skills and trades. It is a positive impact that needs to be encouraged. It has been estimated that 34 workers of various categories will be employed directly.

The employment potentiality of the project is expected to ameliorate the economic condition of the families of those persons who will get employed in the proposed mining project. Further, the project will provide indirect employment to people who will be involved in segregation of extracted mining materials, petty business and service oriented industries.

Impact on Health

Mining damages water supply as also a health hazard. Scarring of the lungs are the most frequently reported impacts of contact with polluted water and breathing problem due to mining dust.

Impact on consumption pattern

The field survey has revealed that people in the study generally poverty ridden. Increased household income may slightly change and enhance the consumption pattern of few who are burdened with poverty.

Impact on road development

Movement of trucks and other vehicles to and fro the quarry is expected to increase, when mining will start. The existing roads connecting the quarry with the highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas. It is suggested that concerned department in the Government of the state to undertake widening and strengthening of existing roads connecting the mining sites on priority basis. There should also be budgetary support for road development in and around the mining areas.

Impact on law & Order

As local people will be employed to run the quarry, no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work is over. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area.

4.10 OCCUPATIONAL HAZARDS AND SAFETY

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health in mining project are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.
- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a Medical Officer
- First Aid facility is provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

4.11 PUBLIC HEATH IMPLICATIONS

With the mitigation measures in relation to air pollution, water pollution, soil contamination and noise pollution proposed to be adopted at the mine along with green belt plantation along the

periphery of Mining Lease boundary, it is expected that there will be no impact of mining on the population in the impact zone. However, the following measures shall be adopted:

- Health check of all villagers in the immediate vicinity of the mine shall be carried out periodically. In case any person or a group of persons is found to be suffering from any ailment, directly related to bauxite mining, their medical treatment will be carried out free of cost.
- Surface water management shall be adopted to ensure that run-off from the mining are does not adversely affect natural water streams or other water bodies.
- All water bodies sources in the vicinity of the mine, shall be periodically tested for any pollution related to mining operations and remedial action taken, if warranted.
- Operators of all transport vehicles shall be instructed not to honk unnecessarily while passing through villages or near schools.

4.12 CORPORATE ENVIRONMENTAL RESPONSIBILITY

Corporate Environmental Responsibility (CER) refers to responsibility of a company to ensure positive impact on environment, consumers, employees, communities, stakeholders and all other members of public sphere. The CER activities are increasingly being taken up by the project proponents not only as fulfilling of mandatory provisions but also for the formation and or enhancement of brand image. Besides the above, CER is seen more as a responsibility towards society rather than a business promotion activity.

The activities to be undertaken for the local people under CER have already been identified. It is expected that this will improve the socio-economic status of the local people and at the same time the popularity of the mining project will enhance. It is proposed to spend 2 percent of the total cost of the project for the benefits of the local community under CER activities. The total cost of the project is around Rs. 22.0 Lacs and the amount for CER activities has been worked out to Rs. 0.44 Lac. Funds for the various activities proposed to be taken up under CER programme has been shown in **Table 4.7**.

The list of activities proposed to be taken up is indicated below:

a) Health Camps

b) Drinking Water Facilities

c) Maintenance of foot track

d) Donation for Temple Construction

e) Donation for cultural activities in the surrounding areas

Table 4.7: Funds for the various activities proposed to be taken up under CER programme

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	12,000
2	Drinking Water Facilities	7,000
3	Maintenance of foot track	15,000
4	Donation for Temple Construction	5,000

5	Donation for cultural activities in the surrounding areas	5,000
Total		**44,000**

4.13 IMPACT ON TRAFFIC

Traffic study is carried out by understanding the existing carrying capacity of the road in the vicinity of site and flow towards highway in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity as recommended by Indian Road Congress (IRC). The existing volume of traffic and, the Level of Service are below. Table 4.8(i) and 4.8(ii).

Table 4.8 (i): Existing Traffic Scenario & LOS

Road	V (PCU/day)	C (PCU/day)	Existing V/C Ratio	LOS
MDR 27	800	1400	0.57	B

V= Volume in PCU's/day & C= Capacity in PCU's/ day

During Mine operation

Total Capacity of mine : 89,959 TPA

No. of working days : 300 days

Total Capacity of mine/day : 89,959 /300 = 300 tonnes/day

Truck Capacity : 10 tonnes

No. of trucks deployed per day : 300/10 = 30 trucks per day

No. of trucks deployed/day to & fro : 30*2= 60 trucks

Increase in PCU/day : 132

The addition to traffic by the proposed project during its operation is given table below**:**

Table 4.8 (ii): Additional Traffic Scenario & LOS due to proposed project

Road	V	C	Modified V/C Ratio	LOS
MDR 27	932	1400	0.66	B

From the above analysis it can be seen that the V/C ratio is likely to be changed to 0.66 on MDR 27 Road with LOS remains "B" which is "Good" as per the classification. So the additional load on the carrying capacity of the concerned roads is not likely to have much significant adverse effect.

CHAPTER 5: ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 SITE ALTERNATIVES UNDER CONSIDERATION

The lime stone mine has been identified based on the result of geological investigations and exploration carried out during prospective mining.

The mining projects are site specific as such alternate sites were not considered.

5.2 ANALYSIS OF ALTERNATIVE TECHNOLOGY

5.2.1 Choice of Method of Mining

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization and automation, workforce requirements wage rates, land reclamation, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be made in the opening up of a mine.

Surface or open pit mining is used for large, near-surface mineral deposits. Mineral is excavated, loaded into trucks, and hauled to a facility where it is crushed and ground to a uniform size for further processing. Surface mining requires the removal and disposal of layers of top soil and underlying rock commonly called the overburden. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

The open cast mining method will be adopted because of the following reasons:

- The opencast mining operations ensure higher mineral conservation.

The method used for mining is efficient for lime stone mining, so no alternative mining method is proposed.

CHAPTER 6: ENVIRONMENTAL MONITORING PROGRAMME

6.1 INTRODUCTION

The industrial development of any area needs to be intertwined with judicious utilization of non-renewable resources of the study area and within the limits of permissible assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged into the environment without affecting the designated use and is governed by dilution, dispersion and removal due to physico-chemical and biological processes.

The Environment Monitoring Programme is required to ensure sustainable development in the study area (10 km) of the project site, hence it needs to be an all-encompassing plan for which the plant authorities, Government, Regulating agencies like Pollution Control Board etc. working in the region and more importantly the affected population of the study area need to extend their co-operation and contribution.

6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

The mitigation measures suggested in Chapter-IV will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in **Table-6.1**.

Table 6.1 Implementation Schedule

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution control measures	Before commissioning of respective units	Immediate
2	Water pollution control measures	Before commissioning of the mine	Immediate
3	Noise control measures	Along with the commissioning of the mine	Immediate
4	Ecological preservation and upgradation	Stage-wise implementation	Immediate & Progressive

6.2.1 Administrative Aspects & Environmental Monitoring Program

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring.

Usually, as in the case of the study, an Impact Assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities.

Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality.

6.2.2 Institutional Arrangements for Environment Protection and Conservation

The mine will be supervised and controlled by an independent Mines Manager supported by adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi-skilled, unskilled and other categories.

The organizational structure for Environment Cell for mining operations is shown in **Figure-6.1**. This Environment Cell is responsible for the management and implementation of the environmental control measures. Basically, this department will supervise the reclamation planning & management, air & water pollution control management, Liasoning with State & Central Statutory agency & Committee.

In case the monitored results of environmental pollution are found to exceed the allowable limits, the Environment Management Cell will suggest remedial action and get these suggestions implemented through the concerned authorities.

The Environment Management Cell will also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and greenbelt development. The Environment Management Cell will review Corporate Environmental performance along with the reporting of non-compliances.

Figure-6.1 Organization Structure for Environment Management

6.3 ENVIRONMENT MONITORING PROGRAMME

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The environmental monitoring will be conducted in the mine operations as follows:

- Air quality;
- Water and wastewater quality;
- Noise levels;
- Soil Quality; and
- Greenbelt Development

The details of post project monitoring are presented in **Table 6.2.**

6.4 REPORTING SCHEDULES

Post project monitoring will be carried out as per conditions stipulated in environmental clearance letter issued by MoEF&CC, consent issued by SPCB as well as according to CPCB guidelines. The project site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone, where some impacts may be observed on physical and biological environment. In the buffer zone, slight impact may be observed and that too is occasional, table below **(Table 6.2)** showing the details of Post Project Monitoring programme.

Table-6.2 Post Project Monitoring Programme

Attributes	Sampling		Measurement Method	Test Procedure
	Network	Frequency		
A. Air Environment				
Meteorological • Wind direction • Relative humidity • Rainfall	Minimum 1 site in the project impact area	Regularly in one season by Weather Monitoring Station	Mechanical/automatic weather station	-
Pollutants PM10, PM2.5	5 locations in the project impact area (Minimum 2 locations in upwind side, 2 sites in downwind side / impact zone and 1 in core zone)	Once in a season.	Gravimetric method	-
			Gravimetric method	-
SO2			EPA Modified West & Geake method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II).
NO2			Arsenite modified Jacob & Hochheiser	Absorption in dil. NaOH and then estimated colorimetrically with sulphanilamide and N (I Nepthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
B. Water Environment				

pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium, Magnesium, Chloride, Fluoride, Sulphate, Sodium, Potassium Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury,	Set of grab Samples during pre and post-monsoon for ground and surface Water in the vicinity.	Diurnal and Season wise	As per IS 10500	Samples for water quality should be collected and analyzed as per : IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public Health Association
Arsenic, Cyanide, Lead, Zinc, Chromium, Aluminum, Boron, Phenolic Compounds				.
C. Noise				
Noise levels at Day & night time - Leq dB (A)	Mine Boundary, High noise generating areas within the lease.	Quarterly / Half yearly	As per CPCB norms	As per CPCB norms
D. Soil				
pH, Bulk Density, Soil texture, Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical Conductivity, Organic Matter, Chloride	5 locations in the project impact area	Yearly/half yearly	As per USDA Method	As per USDA Method
E. Socioeconomic				
• Demographic structure	Socioeconomic survey is based on proportionate, stratified and random	Minimum for two phases of the project	Primary data collection through Questionnaire	Secondary data from census records, statistical hard books, topo sheets, health

• Infrastructure resource base • Economic resource base • Health status: Morbidity pattern • Cultural and Aesthetic attributes • Education	sampling method			Records and relevant official records available with Govt. agencies

CHAPTER 7: ADDITIONAL STUDIES

7.1 PUBLIC HEARING

In consonance with the EIA notification dated 14th September 2006, vide section 1 (a) related to Public Hearing, the draft EIA/EMP report shall be submitted to the Meghalaya State Pollution Control Board (MSPCB) for public hearing**.**

7.2 RISK ASSESSMENT

The complete mining operation will be carried out under the management control and direction of a qualified mine manager. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation.

- Accident due to explosives;
- Accident due to mining equipment; and

In order to take care of above hazard/disasters, the following control measures will be adopted:

- All safety precautions and provisions of Mine Act 1951, Metalliferous Mines Regulations 1961 and Mines Rules,1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- Firefighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Training programmes for all the employees working in hazardous premises; Under Mines rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads and loading & unloading points ;
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

7.2.1 Blasting

Blasting will be done by short holes with the permission of DGMS.

7.2.2 Overburden

The overburden (soil) dumps may cause landslides. High overburden dumps created at the quarry edge may cause sliding of the overburden dump or may cause failure of the pit slope due to

excessive loading, thereby causing loss of life and property. Siltation of surface water may also cause run-off from overburden dump.

7.2.3 Machinery

Most of the accidents during transport by trucks, excavators and dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

7.2.4 Water Logging

Water logging in the mine site can be avoided by adopting following measures:

- Due care will be taken to provide retaining wall around the pits.
- Proper drainage will be maintained to eliminate inundation of working pits during rains from run-off water.
- There is no danger of flood or inundation as the ground level.
- Mining operations are not carried below the ground water table; therefore, there will be no disturbance to ground water quality due to mining activity.

Natural resource conservation

- A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be refilled in order to minimize the impact on environment.
- In any case the natural habitats of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation.
- Water conservation techniques will be employed.
- Time to time analysis of the soil, water resources etc will be done in order to analyze the negative impacts of mining activities on the environment.
- To prepare management plans for village landscapes. Villages to be seen as landscapes of diverse elements such as forests, scrub, grassland, streams/river, ponds etc.

7.2.5 Earthquake Management Plan

No landslide and inundation like disaster were come across in this area and nearby the area in past. The workings are proposed from top to bottom by forming proper benching. The proposed workings will be by opencast mining method. Underground mining is not proposed. Face height will maintain safe. No tailing dam is proposed.

Flood Management Plan

- The site is not close by to a water body so water bodies in the area will not be disturbed.

Natural resource conservation

- A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be spread over the backfilled mined out area in order to minimize the impact on environment.

- In any case the natural habitats of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation shall be utilized.
- Water conservation techniques will be employed.
- Time to time analysis of the soil, water resources etc. will be done in order to analyze the negative impacts of mining activities on the environment.
- To prepare management plans for village landscapes, villages to be seen as landscapes of diverse elements such as forests, scrub, grassland, streams/river, ponds etc. The dynamics of the village as an ecosystem to be assessed, corridors to be devised between major natural landscape elements, so as to facilitate movement of species.

7.2.6 Safety Measures

Measures to Prevent the Danger of Overburden

- To prevent the failure of overburden slopes, especially during the rainy season, proper garland drain & bund are constructed around the dump.

Measures to Prevent Accidents due to Trucks and Tippers

- All transportation within the main working area should be carried out under the direct supervision and control of the management.
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs should be provided at each and every turning point specially for the guidance of the drivers at night;
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks; and
- A statutory provision of the fence, constant education, training etc. will go a long way in reducing the incidence of such accidents.

7.3 DISASTER MANAGEMENT PLAN

7.3.1 Objectives of Disaster Management Plan

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation and restoration of production. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be given.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;

- Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area; and

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

Fire Fighting Facilities

Sufficient fire extinguishers will be installed at selected locations such as mine office, garage, stores etc.

Emergency Medical Facilities

An ambulance with driver availability in all the shifts, emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift first aid personnel would be available.

CHAPTER 8: PROJECT BENEFITS

8.1 IMPROVEMENT IN THE PHYSICAL INFRASTRUCTURE

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

8.2 IMPROVEMENT IN THE SOCIAL INFRASTRUCTURE

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.

In addition to above, due to increase in purchasing power of local habitants:

- There will be significant change in the socio-economic scenario of the area.
- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall the proposed project will change living standards of the people and improve the socio-economic conditions of the area.

8.3 EMPLOYMENT POTENTIAL

Future production planning does not indicate some change from present, in the employment. The number of unskilled labour may increase depending on the quantum of overburden removal and mineral excavation. The mine will provide employment to about 34 workers. The details of employment are given in Chapter-2.

The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. These will in-turn improves the socio-economic conditions of the area. The total manpower required for the proposed mining project under various categories is 34 persons and persons will be mainly sourced from local as well as other community in and around mining project and few technical persons will be employed during operational phase from local and also

from outside area. In addition to the above, contractual labour and indirect employment opportunities will also be getting benefited after installation of mining project.

8.4 POLICY AND ACTION PLAN ON CORPORATE ENVIRONMENTAL RESPONSIBILITY

Corporate Environmental Responsibility (CER)

Corporate Environmental Responsibility (CER) refers to responsibility of a company to ensure positive impact on environment, consumers, employees, communities, stakeholders and all other members of public sphere. The CER activities are increasingly being taken up by the project proponents not only as fulfilling of mandatory provisions but also for the formation and enhancement of brand image. Besides the above, CER is seen more as a responsibility towards society rather than a business promotion activity.

The year wise allocation of funds for the various activities proposed to be taken up under CER programme has been shown in **Table 8.1**.

The list of activities proposed to be taken up is indicated below:

a) Health Camps

b) Drinking Water Facilities

c) Maintenance of foot track

d) Donation for Temple Construction

e) Donation for cultural activities in the surrounding areas

Table 8.1: Year wise allocation of funds for the various activities proposed to be taken up under CER programme

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	12,000
2	Drinking Water Facilities	7,000
3	Maintenance of foot track	15,000
4	Donation for Temple Construction	5,000
5	Donation for cultural activities in the surrounding areas	5,000
Total		**44,000**

CHAPTER 9: ENVIRONMENT MANAGEMENT PLAN

9.1 INTRODUCTION

An EMP is prepared including all the administrative aspects of ensuring that mitigative measures are effectively monitored, after approval of the EIA. The final EIA/EMP of the proposed project will be submitted to SEIAA, Meghalaya, for obtaining environmental clearance for the project, in accordance with Environment Impact Assessment (EIA) Notification No. 1533 dt.14.09.2006. The approved Environment Management Plan will be implemented throughout the life of the project and half-yearly monitoring report showing the compliance status of conditions stipulated in Environmental Clearance letter will be submitted to MoEF&CC in every six months. An Environmental monitoring programme has been prepared for the proposed project for periodical assessment of effectiveness of implementation of Environment Management Planned to take corrective measures in case of any degradation in the surrounding environment.

To mitigate the adverse impact which will be caused due to the mining operation and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigative measures have been discussed in Chapter 4 of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

The aims of Environment Management Plan are:

- Overall conservation of environment.
- Minimization of waste generation and pollution.
- Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and longtime impacts.
- Ensure effective operation of all control measures.

9.2 IMPLEMENTATION OF EMP

As the major environment attributes will continue to be around the project area alone, implementation of the proposed control measures and monitoring thereof will be undertaken on a regional basis. The project proponent will ensure the implementation of the measures within the mine area and carryout efficient monitoring.

In order to implement the measures suggested for mitigating the adverse impacts on the environment, it is suggested to monitor the environmental parameters regularly.

9.3 ENVIRONMENTAL MONITORING

For assessing the prevailing quality of air, water, noise, soil etc., regular monitoring of parameters are necessary. The data assessed will be helpful in predicting the impact and planning suitable measures to improve/protect the environment. In the study area, the lessee will carry out monitoring studies for ambient air quality, fugitive dust, water quality, noise levels and soil quality as per the standard procedures and schedules. The monitoring system will include:

- Monitoring stations in the buffer zone remain the same as selected in this study for Air, water, Soil, Noise etc.,
- Implementation of the planned mitigating measures.
- Monitoring the programme of implementation.

The Environmental parameters will be monitored & samples will be analyzed as per the stipulations of Indian Bureau of Mines & Meghalaya State Pollution Control Board and as per MoEF&CC Guidelines. The above monitoring proposals shall be adhered to and the results shall be intimated to the appropriate authorities for their perusal and records.

9.4 ORGANIZATIONAL SETUP FOR ENVIRONMENT MONITORING

Major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining:

a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
b) Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.
c) Measurement of water level fluctuations in the nearby surface resources and bore wells.
d) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.
e) Monitoring Ground Vibrations: Ground vibrations studies or monitoring is not required as there is no proposal of drilling/blasting for scooping operations.

9.4.1 Environment Management Cell

No cell is proposed to form; the plan will be implemented through outsourcing suitable and accredited consultants and experts. Environmental Monitoring will be directly coordinated by the Supervisor/Owner.

Competent outsourced certified organization/lab personnel will conduct the monitoring operations. A full-fledged laboratory is not essential; part of the work will be given to competent consultants to undertake these jobs.
Regular semi-skilled manpower will be required for supervision, assistance in reclamation works followed by trained unskilled labourers to carry out other necessary operations.

9.4.1.1 Functions of the Cell

- Implementation of the mitigation measures.
- Maintain Records of the operation.
- Monitoring the programme of implementation.
- To estimate the efficiency of measures taken.
- To bring out any other unforeseen effect on environment not covered under the report.
- Inspection and regular maintenance of mining equipment and transport vehicles.

9.5 AIR QUALITY MANAGEMENT

The main pollutant in air is suspended particulate matter (SPM), which is generated during various activities of mining such as, removal of overburden, drilling, blasting and movement of transport vehicles. The ambient air quality with respect to the study zone of 10 km radius around the mine site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning and vehicular traffic. The prime objective of baseline air quality monitoring is to assess existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the mining operations.

9.5.1 Control of Fugitive Emissions

- Use of Personal Protection Equipment (PPE) like dust masks, ear plugs etc. by the mine workers.
- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.

9.5.2 Prevention and control of Gaseous Pollution

Open cast manual method will be adopted in this case and there is no provision for blasting. The main source of gaseous emissions would be transportation.
Only 300 tonnes of mineral will be produced per day and the transportation will be done with covered materials to prevent any spillage and also prevent fugitive dust emission due to wind. Any gaseous emission transportation will be negligible and will not impact the ambient air quality. Exhaust emission will be monitored for the trucks and to be kept below the permissible limit.

Proper maintenance of machines improves combustion process & makes reduction in the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

9.6 NOISE POLLUTION CONTROL

9.6.1 Noise Abatement and Control

- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads and mine area will be done to minimize the propagation of noise.
- Personal Protective Equipment's (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Periodical noise level monitoring will be done.

9.7 WATER QUALITY MANAGEMENT

Total water requirement is about 4.0 KLPD (Drinking & Dust Suppression + Greenbelt)

Measures for Minimizing Adverse Impacts

- The non-working pits will be used for rainwater harvesting and conservation. The pit after exhaustion of mineral will also be used for rainwater harvesting and conservation.
- Thus, by using the old pit and mineral, exhausted pit as water reservoir the water table will be recharged.
- The excavated pit is proposed as water reservoir at the end of the mine after securing the side walls.
- No toxic mineral substance is present in the area thus ground water quality will not be disturbed.

Surface Water

There is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along the soil. Monitoring of water will be carried out periodically. Water analysis will be carried out seasonally.

Ground Water Pollution

The domestic sewage from the canteen and toilets will be routed to septic tanks. Regular monitoring of water levels and quality in the existing water body in the vicinity will be carried

out. If found necessary, additional observation wells will be sunk for monitoring the water levels and quality around the mine representing both upstream and downstream conditions.

Impact on land use & reclamation of mined out areas

The land will be affected by excavation of mineral and dumping of waste. Land use planning is suggested for minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface with the help of plantation through proper and planned green belt development around the area and upper benches. The waste will be sold out and thus no impact will be anticipated by dumping of waste. The excavated land will be used as water reservoir and this reservoir will great helpful for future plantation, livestock and for irrigation of crops etc. The excavated land i.e. water reservoir will be properly fenced.

9.8 WASTE MANAGEMENT

The waste will be used in construction and maintenance of approach roads, construction of site services. The waste will also be lifted by local habitants for construction the walls along the agriculture field.

Some waste will be dumped outside the area in own land lessee. The waste dump will be stabilized by retaining walls of rubble stone. Parapet wall and drain will also be constructed towards lower altitude side to check the wash off during monsoon. The drains will be connected to the siltation to arrest the silt.

Top Soil Management

During mining operation, a great extent of gritty soil will be removed and would dumped at southern corner of the area with suitable precautions (such as cultivation of dwarf species of grass and construction of toe wall and garland drain) Some extent of it would be used for road dressing and plantation. After conceptual stage of working de-stoned area of mine will be reclaimed to the possible extent. As precautionary measure garland drain shall be cut at the lowest RL of the mine to collect the runoff water and this shall be connected to be used for plantation, water sprinkling on haul road and daily washing of machineries / transport vehicles.

9.9 GREENBELT AND PLANTATION

The main aim of plantation in the mined out areas is to stabilize the land to protect it from rain and wind erosion. 435 nos. of trees will be planted on 0.27 ha of land and plantation will be done on the periphery of the reclaimed area and van panchayat land. Precautionary measures will be taken for care of the forestation made by regular watering in the afforested area, to protect from grazing animals and proper manuring.

The following characteristics should be taken into consideration while selecting plant species for green belt development and tree plantation.

- They should be fast growing and tall trees.
- They should be perennial and evergreen.

- They should have thick canopy cover.
- Plantation should be done in appropriate alternate rows around the proposed site to prevent lateral pollution dispersion.
- The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species should be preferred.

9.10 BIOLOGICAL MANAGEMENT MEASURES

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the beauty of the core and the buffer zone. To achieve this, it is planned to increase plantation activities. The basic objectives of plantation are as follows:-

- Improvement of Soil quality.
- Quick vegetative cover to check soil erosion.
- Improvement in mining site stability.
- Conservation of biological diversity.
- As dust receptor which likely to produce during mining.

9.10.1 Greenbelt Development Plan

Green belt is plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belts have been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution. The greenbelt development plan aims to overall improvement in the environmental conditions of the region. The plan with a five-fold objective addresses issues such as providing sink for air pollutants likely to emitted from the project; enhancing the forest cover for increasing the biodiversity of the region; providing aesthetic value to the project area enhancing the ecological equilibrium of the area; and to a large proportion in combating soil erosion.

- Afforestation on degraded forest area, forest protection / conservation will be carried out every year by the mine owner.
- This activity will promote the emergence of the primary succession species; hence it will be a silvicultural operation, extremely important for maintaining ecology and environmental health of the area.
- This helps in regeneration & establishment of pioneer plant species saving expose land & land cutting.

These plantations will be carried out around mining zone and both sides of the mine road. About twice the area recommended for mining will be used for afforestation/greenbelt as per the “Forest (Conservation) Amendment Rule, 2004”.

The scheme of plantation around the project site is given as follows:

Afforestation will be put under a protective regulatory framework to ensure that it is not degraded or disturbed. No ecologically disruptive activity will be allowed in this zone.

The suggestive measures under EMP are given in **Table 9.1.**

Table 9.1: Key suggestive measures under EMP

Impact Predicted	Suggestive measure
Disturbance of free movement / living of wild fauna	• Awareness camps will be conducted for labours to make them aware about sensitivity/importance of forest life. • No tract or new road for movement of labours or vehicles be laid in reserve forest area, this will prevent forest fragmentation, encroachment and human – animal encounter. • Care will be taken that noise produced during vehicles movement for carrying ore materials are within the permissible noise level. Higher noise level in the forest area will lead to restless and failure in detection of calls of mates and young ones. • Care will be taken that no hunting of animals carried out by labours. • If wild animals are noticed crossing the core zone, it will not be disturbed at all. • Labours will not be allowed to discards food, plastic etc., which can attract animals near the core site. • Only low polluting vehicle will be allowed for carrying ore materials. All vehicles allowed in the project site area will have to provide pollution under control certificate at the end of three months. • No honk will be allowed in the forest area, noise level will be within permissible limit (silent zone-50dB during day time) as per noise pollution (regulation and control), rules, 2000, CPCB norms.
Harvesting of forest flora	• No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed. • No pilling of ore material should in the reserve forest area. • Collections of economically important plants will be fully restricted.

9.11 OCCUPATIONAL HAZARDS AND SAFETY

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health in proposed Mining Project are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.
To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.
- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a medical Officer
- First Aid facility is provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

9.12 ENVIRONMENTAL POLICY

The Owner of proposed Mine believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection, reclamation of the mined out land, preservation of biodiversity and proper disposal of waste following the best environmental practices during the process of mining.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company operations will implement operational and risk management practices that provide for maximum protection of people and the environment. To this end, the owner resolves that company will follow the below mentioned practices:

Operate in accordance with prescribed industry standards while complying with all applicable environmental, health and safety laws and regulations.

- Establish and maintain a well-defined environmental, health and safety management system to guide its operations.
- Ensure that all employees, officers and directors understand and adhere to its environmental, health and safety management program.
- Provide operations with the necessary resources, expertise and training to effectively carry out its EHS management programs.

- Engage employees at all levels in programs directed towards minimizing adverse effects on the environment resulting from mining activity.
- Work proactively with governments and the public in the development of cost effective and realistic regulations that promote enhanced environmental, health and safety protection.
- Promote environmental awareness among its employees, their families and the communities in which it operates.
- Require those who provide services and products to practice good environmental stewardship.
- Mitigate its environmental impacts through efficient use of resources, and the reduction of input materials and waste.
- Maintain a high degree of emergency preparedness.

9.13 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. The proposed yearly budget for EMP implementation including CSR has been shown in **Table 9.2.**

Table 9.2: Budget for Environmental Management Plan

S. No.	Measures	Annual recurring cost (In Lakh)
1.	Reclamation and Rehabilitation of excavated pits	0.30
2.	Soil dump Management	0.40
3.	Plantation & green belt development	0.28
4.	Air, Water and Noise Quality monitoring	0.60
5.	Water sprinkling	0.20
6.	CSR activity in nearby villages	1.10
Total		**2.88**

9.14 CORPORATE ENVIRONMENTAL RESPONSIBILITY (CER)

The cost towards Corporate Environmental Responsibility (CER) has been shown in **Table 9.3.**

Table 9.3: Budget for Corporate Environmental Responsibility (CER) (per year)

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	12,000
2	Drinking Water Facilities	7,000
3	Maintenance of foot track	15,000
4	Donation for Temple Construction	5,000
5	Donation for cultural activities in the surrounding areas	5,000
Total		**44,000**

9.15 CONCLUSION

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the proposed mine.

CHAPTER 10: SUMMARY AND CONCLUSIONS

10.0 INTRODUCTION

10.1 PURPOSE OF THE REPORT

The project is being proposed by Smt. Ailadmon Japang. The proponent has applied for environmental clearance for mining lease over an area of 2.40 ha at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The SEAC in its meeting dated 21st to 22nd July, 2020 examined the proposal. After through discussion and deliberation, it has been conveyed by SEAC that draft EIA/EMP report shall be prepared as per approved ToR and after public consultation through Meghalaya Environment Protection and Pollution Control Board the final EIA/EMP report shall be submitted after incorporating Public Hearing details to SEIAA, Meghalaya for Environmental Clearance.

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The proponent has applied for environmental clearance for mining lease over an area of 2.40 ha at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The maximum production rate is of 89,959 TPA of production.

The cost of the project is Rs. 22.0 lakhs.

10.2.2 Project Proponent

The project is being proposed by Smt. Ailadmon Japang. The address of the proponent is given below:

New Majai, Bholaganj, East Khasi Hills District, Meghalaya

The proponent has applied for environmental clearance for mining lease over an area of 2.40 ha at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

10.3 BRIEF DESCRIPTION OF PROJECT

10.3.1 Nature of the Project

The proposed mining is an opencast mining project where the entire activity will be done in a semi-mechanized way.

10.3.2 Size of the Project

The proponent has applied for environmental clearance for mining lease over an area of 2.40 ha at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya. The maximum production rate is of 89, 959TPA of production.

10.3.3 Anticipated Life of Project and Cost of the Project

The lease period is for 30 years. The cost of the project is about Rs. 22.0 lakhs.

10.3.4 Location of the Project

The proposed lease of limestone Mine is situated at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya.

10.4 PROJECT DESCRIPTION

10.4.1 Salient Features of Mine Lease

The salient features of mine lease are given in **Table 10.1** below:

Table 10.1: Salient Features of mine lease area

Sr. No.	Particular	Details
A.	**Nature of the Project**	**Limestone Mining Project.**
B.	Size of the Project	
1.	ML Area	2.40 Hectare (Non forest Land).
2.	Proposed Production Capacity	Total production in 5 years will be 4,48,085 MT and peak production will be 89,959 MT/annum.
3.	Lease Period of Mine	Lease was granted for a period of 30 Years.
C.	Method of Mining	
1.	Method	Open-Cast Manual Mining
2.	Blasting / Drilling	Blasting will be done by short holes with the permission of DGMS
D.	Project Location	
1.	Location	Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills, Meghalaya
2.	Toposheet No.	78O/12 (restricted)
3.	Lease Area Coordinates	

Boundary Pillar no.	Location (co-ordinates)	
	Latitude	Latitude
1	N25°10'45.60"	E91°44'35.10"
2	N25°10'48.00"	E91°44'35.60"
3	N25°10'49.30"	E91°44'34.50"
4	N25°10'48.40"	E91°44'32.60"
5	N25°10'49.60"	E91°44'32.40"
6	N25°10'50.80"	E91°44'34.20"
7	N25°10'52.10"	E91°44'37.90"
8	N25°10'51.60"	E91°44'39.40"
9	N25°10'46.20"	E91°44'39.00"
10	N25°10'45.60"	E91°44'37.10"

E.	Cost Details	
1.	Project Cost	Rs. 22.0 Lakhs
F.	Water Demand	
1.	Requirement	4 cum
2.	Source of water	Nearby water sources
G.	Man Power Requirement	34
H.	Environmental Setting	
1.	Nearest Village	Bholaganj, 1.8 km
2.	Nearest Town	Bholaganj, 1.8 km
3.	Nearest National / State Highway	NH 40, 23 Km
4.	Nearest Railway Station	Guwahati Railway Station nearly 187 Km
5.	Nearest Airport	LGB Airport of Guwahati is at a distance of about 206Km northeast of the block.
6.	Ecological Sensitive Areas (National Park, Wild Life Sanctuaries, Biosphere Reserve etc.) within 10 km radius	There is no national park /wild life sanctuary / Biosphere reserve / Biodiversity in the applied lease area and buffer zone (10 Km radius of applied area).
7.	Water bodies within 10 km radius of the mine site.	Thari river at 1.0 km from the project site
8.	Archaeological Important Place	None
9.	Seismic Zone	V

10.4.2 Mine Development and Production

The opencast method of mining with semi mechanization is proposed to excavate the mineral and waste and for other mining activities. Bench height and width are proposed 6 meters each considering semi mechanization.

Year wise Production details are given in **Table 10.2** below.

Table 10.2: Proposed Year-wise Production

Year	Mineral Lime Stone in tones
I	89,705
II	89,959
III	89,581
IV	89,456
V	89,384
Total	**4,48,085**

10.4.3 Method of Mining

The opencast method of mining with semi mechanization is proposed to excavate the mineral and waste and for other mining activities. Bench height and width are proposed 6 meters each considering semi mechanization. Approach roads will be provided up to the benches time to time. Blasting will be done by short holes with the permission of DGMS. The pneumatic breaker and hydraulic breakers will be used for excavation of mineral. The fencing around the pit/ excavation will be provided to check the inadvertent entry of human and livestock in the working zone. The soil if comes across during mining in small layer or cavity will be scraped and stacked separately to be used for plantation during each monsoon

10.5 IMPACT ON LAND USE, RECLAMATION OF MINED OUT AREAS AND AFFORESTATION PROGRAMME

Mining is essentially an excavation of mineral. The land environment is greatly affected by it. Specially, in case of mining which is being carried out by opencast method / semi- mechanized, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, Topography, Drainage pattern and geological features of the mine site as well as the study area.

Various components of land environment have been identified for study of impact of the mining operations. Details of the same are given below:

Impact on land use & land cover

There is no forest land or agriculture in the mine lease area. Land use pattern for preoperational, operational & conceptual stage of the mining as per mine plan for the proposed mine site is given below in Table 10.3:

Table 10.3: Land use pattern

Existing land Use pattern

Category	Area in Hectares
Excavated Land	**0.00**
Road	0.01
Total area in use	**0.01**
Balance unused area	2.39
Total Applied Lease Area	**2.40**

Land Use pattern after first five years plan period

Category	Area in Hectares
Excavated land including road	1.20
Green belt in Safety Barrier	0.27
Dump with Parapet Wall and Garland Drain	0.18
Total area in use	**1.65**
Balance unused area	0.35
Total Applied Lease Area	**2.40**

Land Use pattern after life of the mine

Category	Area in Hectares
Excavated land including road	1.88
Green belt (within Safety Barrier)	0.52
Total area in use	**2.40**
Balance unused area	0.00
Total Applied Lease Area	**2.40**

Source: Mine plan

The existing land use / land cover pattern within the study area (10 Km, Buffer including core Area) as studied through Site survey & satellite imagery is given as follows. Table 10.4

Table 10.4: Existing Land use of the 10 KM Study Area

Sr. No.	Particulars	Area (ha)	Percentage
1	Settlements	978.4	3.12
2	Water bodies	2345.7	7.47
3	Waste land	849.2	2.7
4	Crop land	9416.5	29.99
5	forest area	17810.2	56.72
	Total	**31400**	**100**

As per the mine plan reclamation will be done by mine rejects, spreading of topsoil and plantation will be done. It is also proposed to convert the pit into a water reservoir. The soil come across

during mining will be scraped and stacked separately in 0.01 ha area. The soil will be used for plantation in each monsoon.

10.6 LAND USE PATTERN

Presently (pre-mining), the land covered under the mine lease area is non-forest land.

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

Five soil samples were collected in and around the mine lease area to assess the present soil quality of the region. Soil pH plays an important role in the availability of nutrients Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly acidic (6.10 to 6.87). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 326 – 412 µmhos/cm.

10.7.2 Meteorology

Meteorological data at the site was monitored during 1st December 2019 to 29th February 2020 representing winter season.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at five locations during winter season from December, 2019 to February, 2020. The minimum and maximum level of PM10 recorded within the study area was in the range of 50.7 µg/m3 to 81.6 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3). The minimum and maximum level of PM2.5 recorded within the study area was in the range of 17.5 µg/m3 to 37.8 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3). The minimum and maximum concentration of SO2 recorded within the study area was 5.4 to 12.0 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3). The minimum and maximum level of NO2 recorded within the study area was in the range of was 9.6 µg/m3 to 19.5 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3). The minimum and maximum level of CO recorded within the study area was in the range of was 0.340 mg/m3 to 0.780 mg/m3. The minimum concentration was recorded at project site (AAQ1) and the maximum concentration was recorded at Mawmluh (AAQ3). The minimum and maximum level of free silica recorded within the study area was in the range of was 0.50 µg/m3 to 1.59 µg/m3. The minimum concentration was recorded at Sohbar (AAQ5) and the maximum concentration was recorded at Mawmluh (AAQ3).

The results thus obtained indicate that the concentrations of PM10, PM2.5, SO2 and NO2 in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.

10.7.4 Water Quality

To assess the physical and chemical properties of water in the region, water samples from 5 locations were collected from various water sources around the mine lease area. During the study period, in ground water the pH was varying from 7.52 to 8.27, the total dissolved solids varying from 161.06 mg/l to 184.35 mg/l, chloride level ranging from 19.7 mg/l to a maximum of 36.3 mg/l, the hardness is varying from 110.09 mg/l to 134.99 mg/l.

The results indicate groundwater is generally in conformity with the drinking water standards (IS: 10500) and surface water is in conformity with IS-2296 standards.

10.7.5 Noise Levels

Ambient noise levels were measured at Five locations around the proposed mine site. The noise level in day time lies between 50.2 dB(A) to 60.7 dB(A) and in night time between 37.2 dB(A) to 41.6 dB(A). The status of noise quality within the 10 km zone of the study area is within the MoEF&CC standards.

10.7.6 Ecological Environment

Based on the field studies and review of published literature, the major trees species present in the study area are Amari, Ajhow, Jarul, Sida, Bonsum, Borpat, Bhelu and the major herbs area Water Willow, Prickly Chaff Flower, Sessile Joyweed, Prickly Amaranth, Java Pennywort.

The major avi fauna species present in the study area are Little cormorant, Eastern Grey Heron Little egret, Cattle Egret and major mammalian fauna are Rhesus monkey, House shrew, Indian fulvus fruit bat

10.7.7 Social Environment

According to the 2011 census of India, East Khasi Hills district has a population of 8,25,922. The total SC population in East Khasi Hills district is 5,642 which is 0.68% of the total population, while ST population is 6,61,158 which is 80.05% of the total population. The literate population in East Khasi Hills district is 5,78,030, out of which male & female are 2,87,270 and 2,90,760 respectively. The male literates represent 84.51 % while female represent 83.81% of the total population.

10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

10.8.1 Impact on Air Quality

The main pollutant in air is suspended particulate matter (SPM), which is generated during various activities of mining such as, removal of overburden, drilling, blasting and movement of transport vehicles. The ambient air quality with respect to the study zone of 10 km radius around the mine site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning and vehicular traffic. The prime objective of baseline air quality monitoring is to assess existing air quality of the area. This will also be useful in assessing the conformity to standards of the ambient air quality during the mining operations.

Air pollution sources in the operating mine was classified into two categories

i. Loading and unloading of mineral

ii. Transportation on the haul road

10.8.2 Impact on Water Resources

Surface Water Resources

The topography of the area will not be largely changed in view of the proposed concurrent reclamation. During the mining activity period, there is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along the soil dumps.

Groundwater Resources

The water table in hills is usually very deep and does not have any relevance with mining activities. However, concurrent restoration to original topography will not be disturbing the percolating water.

10.8.3 Impact on Water Quality

The impact on water quality will be confined to increased suspended solids during rain. The dumps will be secured with toe walls and rainy water will not carry significant suspended material.

10.8.4 Impact on Noise Levels and Ground Vibrations

With the mining operations, due to the deployment of machinery, operation for mine development, excavation and transportation of lime stone and men, it is imperative that noise levels would increase. The noise level in day time lies between 50.2 dB(A) to 60.7 dB(A) and in night time between 37.2 dB(A) to 41.6 dB(A). It is also observed that these incremental noise levels will not significantly affect the existing ambient noise levels.

10.8.5 Impact on Soil

The environmental impacts of the mining activities on topsoil are based on the quantity of removal of topsoil and its dumping. In the present project as it is proposed to temporarily store the topsoil and use it for plantation schemes, no impact of dozing of topsoil is envisaged.

The soil erosion from overburden dumps is not envisaged in the present project, as sufficient measures as detailed in the EMP would be undertaken.

10.8.6 Impact on Flora and Fauna

There is no forest area in the core zone area of the lease. As the mining activity is restricted to core zone, no significant impact on the flora of the buffer zone due to the proposed mining is anticipated.

The incremental dust generations due to the mining operations, at the boundary of the mine lease are insignificant and it is also expected that with the adoption of mitigatory measures as suggested in EMP, the impact due to operation of the mine will be minimal on the terrestrial ecosystem and also on the adjacent forest area.

The impact on the fauna of the buffer zone due to the mining activity will be marginal. The proposed progressive plantation over a period of time will reduce the impact, if any, on the fauna.

10.8.7 Impact on Land Use Pattern

The land will be affected by excavation of mineral and dumping of waste. Land use planning is suggested for minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface with the help of plantation through proper and planned green belt development around the area and upper benches.

10.8.8 Impact on Socio - Economic Aspects

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc. exist within the lease area or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. The proposed mine will be providing employment to local population and it will be give preference to the local people whenever there is requirement of man power.

10.9 ENVIRONMENTAL MANAGEMENT PLAN

The summary of environmental mitigation measures are given in **Table-10.5**.

Table-10.5: Proposed Environmental Mitigation Measures

Impact Predicted	Suggestive measure
Disturbance of free movement / living of wild fauna	• Awareness camps will be conducted for labours to make them aware about sensitivity/importance of forest life. • No tract or new road for movement of labours or vehicles be laid in reserve forest area, this will prevent forest fragmentation, encroachment and human – animal encounter. • Care will be taken that noise produced during vehicles movement for carrying ore materials are within the permissible noise level. Higher noise level in the forest area will lead to restless and failure in detection of calls of mates and young ones.

	• Care will be taken that no hunting of animals carried out by labours. • If wild animals are noticed crossing the core zone, it will not be disturbed at all. • Labours will not be allowed to discards food, plastic etc., which can attract animals near the core site. • Only low polluting vehicle will be allowed for carrying ore materials. All vehicles allowed in the project site area will have to provide pollution under control certificate at the end of three months. • No honk will be allowed in the forest area, noise level will be within permissible limit (silent zone-50dB during day time) as per noise pollution (regulation and control), rules, 2000, CPCB norms.
Harvesting of forest flora	• No tree cutting, chopping, lumbering, uprooting of shrubs and herbs should be allowed. • No pilling of ore material should in the reserve forest area. • Collections of economically important plants will be fully restricted.

10.10 ANALYSIS OF ALTERNATIVES

The lime stone has been identified based on the result of geological investigations and exploration carried out by the Geological Survey of India (GSI). The mining projects are site specific as such alternate sites were not considered.

The mine is operated by opencast semi-mechanized method of mining. No other alternative technologies can be used because of the hard nature of the ore. Proposed mine is using eco-friendly measures to minimize the impact of mining on the surrounding environment.

10.11 COST ESTIMATES

The proposed yearly budget for EMP implementation and the budget for Corporate Environmental Responsibility (CER) have been given in **Table 10.6**, **Table 10.7** respectively**.**

Table-10.6: Budget for Environmental Management Plan including CSR

S. No.	Measures	Annual recurring cost (In Lakh)
1.	Reclamation and Rehabilitation of excavated pits	0.30
2.	Soil dump Management	0.40
3.	Plantation & green belt development	0.28

4.	Air, Water and Noise Quality monitoring	0.60
5.	Water sprinkling	0.20
6.	CSR activity in nearby villages	1.10
Total		**2.88**

Table 10.7: Budget for Corporate Environmental Responsibility (CER) (per year)

S. No.	Activities	Allocation of Fund (Rs.)
1	Health Camps	12,000
2	Drinking Water Facilities	7,000
3	Maintenance of foot track	15,000
4	Donation for Temple Construction	5,000
5	Donation for cultural activities in the surrounding areas	5,000
Total		**44,000**

10.12 ADDITIONAL STUDIES

10.12.1 Risk Assessment and Disaster Management Plan

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding Mines Manager's Certificate of Competency. Moreover, mining staff will be sent to refresher courses from time to time to keep them updated.

10.12.2 Disaster Management Plan

Emergency preparedness is an important aspect in the planning of Disaster Management. Person would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

10.13 PUBLIC CONSULTATION

10.13.1 Public Hearing

In consonance with the EIA notification dated 14th September 2006, vide section 1 (a) related to Public Hearing, the draft EIA/EMP report shall be submitted to the Meghalaya State Pollution Control Board (MSPCB) for public hearing.

10.14 PROJECT BENEFITS

The impact on the civic amenities will be substantial after the commencement of mining activities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.
  The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region.

10.15 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Adoption of Best Available Technology and Best Management Practices with more environmental friendly process; and
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

Chapter 11: DISCLOSURE OF CONSULTANT ENGAGED

Declaration by Experts contributing to the EIA: Mining of lime stone from Lease Area (2.40 Ha.) at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, Meghalaya. I, Sanjeev Sharma hereby certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA coordinator

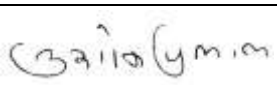
Name: Sanjeev Sharma

Signature and Date: 13-03-2020

Period of Involvement: December, 2019 to till date

Contact Information: sksv02@gmail.com

Functional area experts:

S. No.	Functional Areas	Name of the experts	Involvement (period and task)	Signature and date
1.	AP	Vijay Sharma	December, 2019 to Till date	
2.	WP	Anoop Kishore Mishra	December, 2019 to Till date	
3.	SHW	Sanjeev Sharma	December, 2019 to Till date	
4.	SE	Ashok Suyal	December, 2019 to Till date	
5.	EB	Kashmir Pal Singh	December, 2019 to Till date	
6.	HG	R.K. Mishra	December, 2019 to Till date	
7.	GEO	B. M. Sinha	December, 2019 to Till date	
8.	SC	Vijay Sharma	December, 2019 to Till date	
9.	AQ	Sanjeev Sharma	December, 2019 to Till	

			date	
10.	NV	Sanjeev Sharma	December, 2019 to Till date	
11.	LU	Ashok Bijalwan	December, 2019 to Till date	
12.	RH	Anoop Kishore Mishra	December, 2019 to Till date	
Functional Area Associate (FAA)				
1.	AP	Deepak Pandey	December, 2019 to Till date	

Declaration of association in the EIA

Declaration by the Head of the accredited consultant organization/ authorized person

I, ML Sharma hereby, confirm that the above-mentioned experts prepared the EIA of Mining of lime stone from Lease Area (2.40 Ha) at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, Meghalaya. I also confirm that the consultant organization shall be fully accountable for any mis-leading information mentioned in this statement.

Signature: 

Name: ML Sharma

Designation: Director

Name of the EIA consultant organization: Enviro Infra Solutions Pvt. Ltd.

NABET Certificate No. & Issue Date: NABET/EIA/1922/RA 0157 dated March 16 2020

ANNEXURE I: COPY OF APPROVED TERMS OF REFERENCE (TOR)

सत्यमेव जयते

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY
:: SEIAA : MEGHALAYA ::

'Silviculture Building' (Adjacent Sylvan House),
Lower Lachumiere, Shillong - 793 001
Email :ms.seiaamegh@gmail.com.

No. ML/SEIAA/MIN/EKH/P-59/2020/ 1508 **Dated, Shillong, the** 27th **Aug., 2020.**

From The Member Secretary,
State Environment Impact Assessment Authority
Meghalaya.

To Smt. Ailadmon Japang,
New Majai,Bholaganj, East Khasi Hills.

Subject : Grant of Term of Reference (TOR) to online application Proposal No.SIA/ML/MIN/54336/2020 for mining of Limestone with an area of 2.40 ha. at Ka Ri U Syiar,Lynti Dkhar Area, Sohbar, East Khasi Hills applied by Smt. Ailadmon Japang.

Sir,

This has a reference to your TOR online application proposal No.SIA/ML/MIN/54336/2020 for the proposed Limestone mining with a mining lease area of 2.40 ha. at Lynti Dkhar, Sohbar East Khasi Hills. The limestone will be used in kilns for manufacturing of lime to be used as building materials.

The project falls under Schedule l(a) of category B2 of EIA Notification2006, but as per the Cluster certificate letter No. DMl~/M M/36/2019/1780 dated, Shillong, the 24th January, 2020 issued by the Mining Engineer, O/o the Directorate of Mineral Resources, Government of Meghalaya, there is another limestone mine of different owner lying within 500 metres radius from the applied mining lease area and total area of the two mines is 5.775 hectares, i.e. more than 5ha., hence PP applied for Term of Reference (TOR) as required in the Ministry of Environment, Forest and Climate Change MoEF&CC vide O.M.No.L-11011/175/2018-IA-II (M) dated 12.12.2018, relating to compliance to Hon'ble National Green Tribunal

Order dated 13th September 2018 in O.A. No. 186 of 2016 (Satendra Pandey Vs Ministry of Environment, Forest & Climate Change & Anr.)

The applied area is a Non Forest Land, vide Divisional Forest Officer, East Khasi Hills & Ri Bhoi Territorial Division, Shillong *vide* letter No.KH/8/NOC /Limestone/ 41/Pt. lV /7605, dated Shillong, the 20th March 2019.

The proposed land measuring for 2.40 hectare is on lease for 12 years which was executed on 4thMarch 2019 and certified by Notary Public.

The mining lease area as per the documents viz, the approved Mining Plan, the Non Forest Land Certificate ,etc. including the Kml file duly examined by SEAC, Meghalaya falls under toposheet Survey of India No.7UO/ 12 within the following GPS Coordinates:

GPS Coordinates

Pillar No.	Latitude	Longitude
1	25° 10' 45.60"N	91 ° 44' 35.10"E
2	25° 10' 48.00"N	91 ° 44' 35.60"E
3	25° 10' 49.30"N	91 ° 44' 34.50"E
4	25° 10' 48.40"N	91 ° 44' 32.60"E
5	25° 10' 49.60"N	91° 44' 32.40-"E
6	25° 10' 50.80"N	91 ° 44' 34.20"E
7	25° 10' 52.10"N	91 ° 44' 37.90"E
8	25° 10' 51.60"N	91 ° 44' 39.40"E
9	25° 10' 46.20"N	91 ° 44' 39.00"E
10	25° 10' 45.60"N	91 ° 44' 37.10"E

The project proponent submitted the Mining Plan with Progressive Mine Closure Plan approved bythe Director of Mineral Resources, Government of Meghalaya, Shillong, *vide* letter No.DMR/MM/36/2019/127, dated Shillong, the 1st May 2019. The Mining Plan has been prepared to extract Lime stone at an average annual production of 89,959 TPA with a project cost of Rs.22.00 lakhs and the operations will be open cast, semi -mechanized method of mining.

As per the Mining Plan, the mineable reserves of the lime sto11e is 10,78,839 tonnes with an average production of 89,903 tonnes. The average annual production of Limestone may be different from the annual production of plan period of 5 years. Thus, 4,48,085 tonnes of total mineable reserve will be worked out in first 5

years and the balance mineable reserve i.e., 6,30,754 tonnes will be mined out in 7 years at the rate of 90,107 per year. Therefore, the life of the mine will be 12 years (5 years in plan period+ seven years in conceptual period)

As per Ministry of Environment, Forest andClimate Change Notification No.S.0. 3977(E) dated New Delhi, the 14th August 2018 in Appendix -XI, the project proponent needs to prepare Environment Management Plan.

The SEAC, Meghalaya in its meeting held on 21st& 22nd July, 2020 in which the Minutes was uploaded on 03/08/2020, as per Agenda 11, after due screening and examination of all the documents submitted by the Project Proponent and site cross checking and deliberation by using kml file through Google earth, SEAC unanimously recommended for a Standard Term of Reference as TOR to this project.

The State Environment Impact Assessment Authority, Meghalaya, in its meeting held on 10th August, 2020 noted the recommendation in the above said SEAC's Minutes relating to this project and accepted the recommendation of the SEAC. Then the SEIAA in the said Meeting, unanimously approved Standard Terms of Reference (sTOR) as recommended by the SEAC as a TOR to the project, as follows :-.

1. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w. r. t. the highest production achieved prior to 1994.
2. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
3. All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
4. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ Topo-sheet, Topographic sheet, Geomorphology and Geology of the area should be provided. Such an Imagery of the proposed area should clearly show the

land use and other ecological features of the study area (core and buffer zone).

5. Information should be provided in Survey of India Topo-sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.

6. Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

7. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large,may also be detailed in the EIA Report.

8. Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

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

10. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated.

Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

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

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

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

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

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

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

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

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

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

19. One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Sites pecific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and

location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the predominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

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

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

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

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

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

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

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

27. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

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

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

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

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

32. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in

detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

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

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

35. Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

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

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

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

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

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

41. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's circular No. J-11013/71/2016-IA. I (M) dated 25.10.2017 need to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

42. Compliance of the Ministry's Office Notification No. GSR-94(E) dated 25.01.2018 – mandatory implementation of Dust mitigation measures for construction and demolishing activities.

43. The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per Ministry's O.M. No.22-65/2017-IA.II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of the project included in the EIA/EMP Report.

44. Compliance of the Ministry's Office Memorandum No.F: 3-50/2017-IA.III (Pt), dated 30.05.2018 on the Judgement of Hon'ble Supreme Court, dated the 2nd August,2017 in Writ Petition (Civil) No.114 of 2014 in the matter of Common Cause versus Union of India needs to be submitted and included in the EIA/EMP Report.

45. Besides the above, the below mentioned general points are also to be followed:-

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

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

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

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

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

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

(vii) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of the SEIAA, Meghalaya with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

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

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

(x) The PP should submit the EIA/EMP report as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006, after incorporating the details of public hearing already conducted and covering the above mentioned issues, to take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under EIA Notification,2006.

The prescribed TOR shall be valid for a period of 4(four) years from the date of issue, for submission of the EIA/EMP reports, as per S.O. 751(E) dated 17.02.2020.

Member Secretary,
State Environment Impact Assessment Authority
Meghalaya, Shillong

Memo. No. ML/SEIAA/MIN/EKH/P-59/2020/ **Dated, Shillong, the Aug., 2020.**

Copy to :-

1) The Principal Chief Conservator of Forests and HoFF, Meghalaya, Shillong for information.
2) The Principal Secretary to the Govt. Meghalaya, Forests & Environment Department, Shillong for information.
3) The Jt. Secretary, IA Division, MoEF&CC, Paryavaran Bhavan, CGO Complex, Lodhi Road, New Delhi – 110 003 for information.

4) The Principal Chief Conservator of Forests, Territorial, Forests & Environment Department, Sylvan House, Lower Lachumier, Meghalaya, Shillong for information.
5) The Secretary to the Govt. of Meghalaya, Mining and Geology Department, Shillong, for information.
6) The Deputy Director General of Forests (C), Regional Office,N.E.Z, Ministry of Environment, Forests & Climate Change (Mo EF & CC), Law-u-sib, Lumbatngen, Sawlad, Near M.T.C. workshop, Shillong- 793 021, for information.
7) The Deputy Commission, East Khasi Hills District, Shillong, Meghalaya for information.
8) The Divisional Forest Officer, Territorial, East Khasi Hills and Ri Bhoi District (T) Division, Shillong for information.
9) The Member Secretary, State Experts Appraisal Committee, Meghalaya for information.
10) The Director, Mineral Resources, Govt. Meghalaya, Shillong for information.
11) The Member Secretary, Meghalaya Pollution Control Board, 'Arden', Lumpyngngad, Shillong – 793 014 for information.
12) Guard File.

Member Secretary,
SEIAA, Meghalaya

ANNEXURE II: COPY OF LETTER OF INTENT (LOI)

GOVERNMENT OF MEGHALAYA
THE DEPARTMENT OF FORESTS AND ENVIRONMENT
OFFICE OF
THE DIVISIONAL FOREST OFFICER:: EAST KHASI HILLS & RI-BHOI (T) DIVISION::
SHILLONG

No.KH/8/ML/Limestone/68/ 7650 Dated Shillong, the 22/03/2019.

To,

Smti. Ailadmon Japang
New Majai,
Bholaganj,
East Khasi Hills District.

Subj: *Letter Of Intent (LOI) for granting of mining lease under Meghalaya Minor Mineral Concession Rules, 2016 for Limestone at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District.*

Ref: Your application dated 20.03.2019.

APPROVED

Sir,

With reference to the above mentioned subject, I do hereby issue Letter of Intent (LOI) for granting mining lease under Meghalaya Minor Mineral Concession Rules 2016 for Limestone mining on area of 2.40 hectares at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District. On receipt of this Letter of Intent, you shall within a period of six months furnish the following documents for grant of mining lease :

1) Mining Plan duly approved by Director of Mineral Resources.
2) Environmental clearance under the Environmental (Protection) Act, 1986.
3) Consent to establish under the Water (Prevention & Control of Pollution) Act, 1974 and Air (Prevention & Control of Pollution)Act, 1981.
4) Clearance from Revenue and Disaster Management Department.
5) Clearance from Labour Department for occupational Health and Labour Laws including Child Labour.

This is for your information and necessary action.

Yours faithfully,

(Shri. T. Wanniang, I.F.S)
Divisional Forest Officer,
East Khasi Hills
&
Ri Bhoi (T) Division,
Shillong.

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Forest Management Building, Lower Lachumiere, Shillong-793001
Phone No. 0364-2226375 email- dfokhasihills@gmail.com

ANNEXURE III: NON FOREST LAND CERTIFICATE

GOVERNMENT OF MEGHALAYA
THE DEPARTMENT OF FORESTS AND ENVIRONMENT
OFFICE OF
THE DIVISIONAL FOREST OFFICER:: EAST KHASI HILLS & RI-BHOI (T) DIVISION::
SHILLONG

NO.KH/8/NOC/Limestone/41/Pt.IV/ 7605, Dated Shillong, the 20th/Mar/2019.

To,

Smti. Ailadmon Japang,
New Majai,
Bholaganj,
East khasi Hills District.

Subj: Non Forest land certificate for Limestone quarry at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District in respect of Smti. Ailadmon Japang.

Ref: Your letter No dated, 28.02.2019

Sir,

With reference to the above, I am to inform you that the land measuring 2.40 hectares at Ka Ri u Syiar Lynti Dkhar Area, Sohbar Sirdarship, East Khasi Hills District is not part of RF/PF under this office and it is not a Forest land as defined under the Meghalaya Forest Regulation (Ammendment) Act, 2012. Hence, this office issue Non- Forest land certificate for Limestone quarrying subject to the following conditions :-

1. That you shall obtain Mining lease / quarry permit under Meghalaya Minor Mineral Concession Rules, 2016.
2. That your Limestone Quarry is subjected to inspection by the staff/official of this office.
3. This Non Forest Land Certificate is liable for cancellation for violating any Act and Rules of the State Government and District Council.
4. The G.P.S Co-ordinates of Limestone Quarry is,

1.	N – 25° 10' 45.60"	E – 91° 44' 35.10"
2.	N – 25° 10' 48.00"	E – 91° 44' 35.60"
3.	N – 25° 10' 49.30"	E – 91° 44' 34.50"
4.	N – 25° 10' 48.40"	E – 91° 44' 32.60"
5.	N – 25° 10' 49.60"	E – 91° 44' 32.40"
6.	N – 25° 10' 50.80"	E – 91° 44' 34.20"
7.	N – 25° 10' 52.10"	E – 91° 44' 37.90"
8.	N – 25° 10' 51.60"	E – 91° 44' 39.40"
9.	N – 25° 10' 46.20"	E – 91° 44' 39.00"
10.	N – 25° 10' 45.60"	E – 91° 44' 37.10"

Yours faithfully,

(Shri. T. Wahniang, I.F.S)
Divisional Forest Officer
East Khasi Hills & Ri Bhoi (T) Division,
Shillong.

OFFICE OF THE DIVISIONAL FOREST OFFICER * INDIA * KHASI HILLS DIVISION, SHILLONG

Memo NO.KH/8/NOC/Limestone/41/Pt.IV/ Dated Shillong the _____/_____/2019.

Copy to :

1. The Conservator of Forests (T), Khasi and Jaintia Hills, Shillong Meghalaya for information.
2. The Member Secretary, State Environmental Impact Assessment Authority, Meghalaya for information.
3. The Member Secretary, Meghalaya State Pollution Control Board for information.
4. The Range Forest Officer i/c Southern Range, Shillong for information and necessary action. He is instructed to monitor/inspection for any violation of any Acts & Rules of the State Government and District Council.

Divisional Forest Officer,
East Khasi Hills & Ri Bhoi (T) Division,
Shillong

Forest Management Building, Lower Lachumiere, Shillong-793001
Phone No. 0364-2226375 email- dfokhasihil.s@gmail.com

ANNEXURE IV: APPROVED MINING PLAN

MINING PLAN WITH PROGRESSIVE MINE CLOSURE PLAN OF LIME STONE MINE

LOCATED AT – KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP, DISTRICT – EAST KHASI HILLS, MEGHALAYA.

PREPARED AS PER MMMCR 2016

APPLIED LEASE AREA: 2.40 Ha.

GOVERNMENT OF MEGHALAYA

APPROVED

APPLICANT

SMT. AILADMON JAPANG

VILLAGE- NEW MAJAI, BHOLAGANJ
DISTRICT-EAST KHASI HILLS,
MEGHALAYA

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Prepared By

ASHOK KUMAR SARKAR

RQP NO.-: RQP/KOL/377/2013/A

Flat No. 304, Block B-12, Airport Enclave Co-Operative Housing Society, Jessore Road, Kolkata - 700051, West Bengal.

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA.
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

CONSENT LETTER

The Mining Plan along with Progressive Mine Closure Plan in respect of Lynti Dkhar Limestone Mine over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State- Meghalaya has been prepared by Shri. Ashok Kumar Sarkar,

RQP No.-: RQP/KOL/377/2013/A

APPROVED

I request the Concerned Authority, Government of Meghalaya, to make further correspondence regarding modification etc. in Mining Plan along with Progressive Mine Closure Plan with the said recognized person on the following address:

ASHOK KUMAR SARKAR
Flat No-304, Block-12, Airport Enclave Co-operative
Housing Society, Jessore Road,
Kolkata- 700 051
West-Bengal
Registration No: RQP/KOL/377/2013/A

I hereby undertake that all the modification so made in the Mining Plan along with Progressive Mine Closure Plan by the recognized person be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respect.

For Lynti Dkhar Limestone Mine

A. Japang

Smt. Ailadmon Japang
(Applicant)

Place: - Lynti Dkhar
Date: - 28/03/2019

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA.
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

CERTIFICATE

APPROVED

The provision of Mines Act, Rules and Regulations made there under have been observed in the Mining Plan along with Progressive Mine Closure Plan in respect of Lynti Dkhar Limestone Mine over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State- Meghalaya belonging to Smt. Ailadmon Japang and wherever specific permission is required; the applicant will approach the DGMS.

Further, standards prescribed by DGMS in respect of Miners Health will be strictly implemented.

For Lynti Dkhar Limestone Mine

A. Japang

Smt. Ailadmon Japang
(Applicant)

Place: - Lynti Dkhar

Date: - 28/03/2019

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA.
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

CERTIFICATE

APPROVED

The progressive Mine closure plan of Lynti Dkhar Limestone Mine over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State- Meghalaya belonging to Smt. Ailadmon Japang complies all statutory rules, regulations, order made by the Central or State Govt. statutory organizations, court etc. has been taken into consideration and wherever specific permission is required the concerned authorities will be approached.

I also undertake to the effect that all measures proposed in this closure plan will be implemented in a time bound manner.

For Lynti Dkhar Limestone Mine

A. japang

Smt. Ailadmon Japang
(Applicant)

Place: - Lynti Dkhar

Date: - 28/03/2019

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA.
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

UNDERTAKING

APPROVED

I, Smt. Ailadmon Japang, applicant of Lynti Dkhar Limestone Mine over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State- Meghalaya do hereby undertake that the boundary pillars of the proposed grant area will be maintained properly.

For Lynti Dkhar Limestone Mine

A. Japang

Smt. Ailadmon Japang
(Applicant)

Place: - Lynti Dkhar

Date: - 28/03/2019

Mines Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA.
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

CERTIFICATE

APPROVED

Certified that the provisions of Mines Act, Rules and Regulations made there under have been observed in this Mining Plan and wherever specific permissions are required, the Applicant, Smt. Ailadmon Japang, will approach the concerned authorities of D.G.M.S. for granting permission.

The information furnished in this Mining Plan is true and correct to the best of my knowledge.

Place: Shillong
Date :28/03/2019

Ashok Kumar Sarkar
REG. No.- : RQP/KOL/377/2013/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA
APPLIED AREA – 2.40 HA

GOVERNMENT OF MEGHALAYA

APPROVED

INDEX - I

TEXT

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

LYNTI DKHAR LIMESTONE MINE

LOCATED AT KA RI U SYIAR, LYNTI DKHAR AREA, SOHBAR SIRDARSHIP,
DISTRICT- EAST KHASI HILLS, STATE- MEGHALAYA
APPLIED AREA – 2.40 HA

APPROVED

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Ashok Kumar Sarkar
RQP/KOL/377/2013/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

APPROVED

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Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

INTRODUCTION

1. Smt. Ailadmon Japang has applied for a mining lease for minor mineral (Limestone) mining over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State - Meghalaya.
2. Study revealed that the limestone of East Khasi Hills District, Meghalaya will be used in kilns for manufacturing of lime used as building materials.
3. The Government of Meghalaya has issued Letter of Intent for mining lease of limestone (minor mineral) mining in favour of Smt. Ailadmon Japang on dated Shillong 22rd March 2019 vide letter. No KH/8/ML/Limestone/68/7650.Mining lease will be granted only after obtaining EC from the concerned authority. (Photocopy of Letter of Intent is enclosed as an Annexure).
4. Mining plan including Progressive Mine Closure Plan in respect of Lynti Dkhar Limestone Mine is prepared under the provisions of MMMCR 2016.
5. While preparing the mining plan proper attention has been paid to ensure that the relevant provisions under MMDR Act-1957, MMR-1961, and Mines Act-1952, Mines Rules 1955, MMMCR 2016 are followed. All safety measures provided in the statutes will be complied with.
6. Required numbers of competent and qualified persons will be appointed for exercising control, direction and supervision of safe working.
7. For baseline data assistance has been taken from local authorities.

APPROVED

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

GOVERNMENT OF MEGHALAYA

CHAPTER – I
GENERAL

1.1 Name & Address of the Applicant:

Smt. Ailadmon Japang

At - New Majai, Bholaganj, District- East Khasi Hills, State- Meghalaya

1.2 Status of the Applicant:

The Applicant is a Private Individual.

1.3 Mineral occurring in the area which the applicant intends to mine:

Limestone

1.4 Name of the RQP preparing the Mining Plan:

Ashok Kumar Sarkar

Flat no-304, Block B-12,

Airport Enclave Co-operative Housing Society

Jessore Road, Kolkata.

Pin- 700051

Registration No: RQP/KOL/377/2013/A

APPROVED

1.5 Name of the Prospecting Agency:

A qualified surveyor has surveyed the area accompanied by a Geologist, assigned by the applicant. During the process, surface and scarp faces were studied to delineate the Limestone exposures by GPS within the lease hold area, followed by contouring by Total Station.

1.6 Details of the Area

Applied Area –2.40 Ha

Non- Forest Private Land.

1.7 Period of Mining Lease: - 12 years

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

CHAPTER – II
LOCATION & ACCESSIBILITY

2.1 Location & Accessibility:

The proposed mining block lies about 5Km south of Sohbar. The applied area is situated about 187km away from the Guwahati Railway Station. Nearest highway NH-6, is running near about 50km NE from the applied area. Nearest Airport is Guwahati Airport about 206 Km away from applied area.

2.2 Co-ordinates of the area

Boundary Pillar no.	Location (co-ordinates)	
	Latitude	Longitude
1	N25°10'45.60"	E91°44'35.10"
2	N25°10'48.00"	E91°44'35.60"
3	N25°10'49.30"	E91°44'34.50"
4	N25°10'48.40"	E91°44'32.60"
5	N25°10'49.60"	E91°44'32.40"
6	N25°10'50.80"	E91°44'34.20"
7	N25°10'52.10"	E91°44'37.90"
8	N25°10'51.60"	E91°44'39.40"
9	N25°10'46.20"	E91°44'39.00"
10	N25°10'45.60"	E91°44'37.10"

2.3 Availability of Water, Medical & Educational facilities:

The nearest Tharia River is flowing about 1 km away from the area. Primary health care facilities and educational facilities are available at Sohra which is situated near about 9km away from the site.

2.4 Google Map – The area has been marked on the image generated from Google Earth showing the vicinity of the area within a Radius of 500m (Plate No.1).

2.5 Co-ordinate Plan: - A Co-ordinate plan has been prepared on the basis of the co-ordinates of project boundary pillars to demarcate its location in the concerned area over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State – Meghalaya on a scale of 1:1500 (Plate no 2).

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

CHAPTER – III
GEOLOGY AND EXPLORATION & RESERVE

3.1 Physiography, River and Climate:

The proposed area around the block represents a rolling topography with gorges/scarp faces and with numerous streams. In the proposed block, elevation difference is noted from 120 metres to 146 metres. Karst topography is prevalent with spiky surface with lots of sink-holes and solution cavities. Streams are semi-dendritic and flow towards east before taking southern turn towards Bangladesh. Most of the small tributaries are straight following bedding planes or are semi-dendritic in pattern. Being at the southern slope of the Meghalaya Plateau overlooking vast plain of Bangladesh, the area experiences dominantly humid climate with moderate winter.The area experience severe rainfall between May and August with average annual rainfall of 11000 mm.

Regional Geology:

In a Regional Scale it is obvious that the topographic expression is very rugged with the high hills and the following stratigraphic sequence is noted in this part of East Khasi Hills District of Meghalaya.

Summarized Regional Geological set-up around the block.

Age	Group	Formation	Member	Rock types
Palaeocene to Eocene	Jaintia	Kopili Shella Langpar	 Sylhet L.St Sylhet S.St	Argillaceous sediments Dominantly limestone Ferruginous sandstone Coarse S.St,sandy L.St,Calc shale
Cretaceous Jurassic	Khasi Sylhet trap	Mahadek		Conglomerate with coarse,feldspathicS.St with purple,green clay bands Volcanic trap with vesicles of zeolite and agate
Proterozoic& Archaean(?)	Gneissic Complex			Migmatite,biotite schist and gneisswith quartz/pegmatite veins

Archaean Gneissic Complex of Proterozoic is exposed in the SW and north-central part of the country and is represented dominantly by migmatite,,biotite gneiss and biotite schist It is intruded by basaltic rock which is equivalent to the Sylhet Trap of Jurassic age that attains a thickness of about 600 m.The Sylhet trap is hard,compact, massive, fine-grained and greenish in colour with vesicles at the top. The upper and lower part of the trap rock is basaltic whereas the middle part is alkali basalt with rhyolite and tuff.

Sedimentary sequence of Cretaceous age represented by the Mahadek Formation overlies the Proterozoic rocks with a bed of basal conglomerate and is represented by

very coarse, feldspathic and glauconitic sandstone that is interbanded with purple to green coloured clay.

Except the aforesaid rock types, the entire part of the region is covered by sediments of the Tertiary age with age ranging from Palaeocene to Eocene. Langpar(=Therria) Formation is represented by sandy limestone with calcareous shale and sandstone.and conformably overlies the Mahadek Formation. Limestone occurring at the base is grey in colour, siliceous containing rare shells of ostrea, gryphea and lamellibranchs. Sylhet Sandstone Member is coarse grained, feldspathic and the overlying Limestone Member that covers the whole southern fringe is of argillaceous limestone with fossils of foraminifera. The Kopili Formation that is dominantly argillaceous with sporadic phospathic nodules overlies the Sylhet Formations. All these above Formations trend along ENE-WSW to WNW-ESE direction with southerly dip. Minor faults are recorded within the Sylhet Trap and E-W and N-S trending vertical joints are common in the Langpar Formation

3.2 Local Geology:

The proposed mining area is small and exposes only the limestone of the Sylhet limestone Formation. Table provides a glimpse of the Geology that is seen in the area

Local Geological set-up in the block

Geological age	Group	Formation	Summarized rock types
Recent	Newer alluvium	Unclassified	Unconsolidated soil, scree material
Eocene	Jaintia	Sylhet (=Shella)	Top part with grey/white limestone Bottom part with dark /steel grey limestone.

The block exposes a monotonous litho-package of marly limestone. Limestone is greyish in colour, hard and compact. Atplaces the limestone is steel grey in colour. Fossil content is minimum with nummulites, discocyclina and with occasional crystals of calcite.It is difficult to trace bedding plane as the surface is covered with thick calcareous deposition. Extensive weathering results in formation of 'karst topography' on the surface resulting in spiked surface along slopes. Solution cavities, caverns, stylolites with variable magnitude and wave length are some of the other features seen on the limestone.

Overburden constitutes of unconsolidated fragments, boulders, angular pebbles overlain by brownish soil horizon that rarely exceeds one meter in thickness.

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

3.3 Method of Estimation of Reserves:

Standard Cross Sectional Area method.

a) Sections have been drawn from boundary to boundary across the applied area considering the litho units in the area. The sectional area has been estimated on the basis of the cross sections.

b) Length of influence have been measured by taking half of the section interval distance on both side of each section.

c) Bulk density has been taken as 2.7.

3.4 Resource & Reserve:

Resources have been divided into two categories, such as Proved Reserve & Probable Reserve.

Up to an average depth of 34 meters (from ground level) has been taken as Proved Reserve category on the basis of Limestone exposed in the mining face of the nearby mines & also from the exposure on hill top and slope as well as from the nala cutting section around the applied area and further up to a depth of 5 meters has been taken as Probable Reserve category.

Mineable reserve is based on the mineable part of the reserve. Mineable mineral (Limestone) reserve has been calculated from the geological reserve in the area considering the stone which is to be left out and maintained as Safety Barrier of 7.5 meters within ML boundary and in consideration of ultimate pit limit as calculated from the Geological Plan & Section.

Measured Mineral Resources

SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	STONE (TONNES)
A-A'	8667	50	433350	2.7	1170045
B-B'	5142	40	205680	2.7	555336
C-C'	3677	40	147080	2.7	397116
D-D'	3207	50	160350	2.7	432945
TOTAL					**2555442**

Indicated Mineral Resources

SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	STONE (TONNES)
A-A'	1017	50	50850	2.7	137295
B-B'	654	40	26160	2.7	70632
C-C'	550	40	22000	2.7	59400
D-D'	577	50	28850	2.7	77895
TOTAL					**345222**

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Blocked Measured Mineral Resources in Safety Barrier & UPL

SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	STONE (TONNES)
A-A'	6117	50	305850	2.7	825795
B-B'	2374	40	94960	2.7	256392
C-C'	1920	40	76800	2.7	207360
D-D'	1516	50	75800	2.7	204660
TOTAL					**1494207**

Blocked Indicated Mineral Resources in Safety Barrier & UPL

SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	STONE (TONNES)
A-A'	1017	50	50850	2.7	137295
B-B'	536	40	21440	2.7	57888
C-C'	505	40	20200	2.7	54540
D-D'	577	50	28850	2.7	77895
TOTAL					**327618**

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Category of Resource	Mineable Reserves in Tonnes	Non Mineable in Tonnes	
Proved	1061235	Feasibility Mineral Resources	1494207
Probable	17604	Pre-Feasibility Mineral Resources	327618
TOTAL	**1078839**		**1821825**

SUMMARY OF TOTAL MINEABLE RESERVE:

Category of Reserve	Total Reserve in Tonnes
Mineable Proved Reserve	1061235
Mineable Probable Reserve	17604
Total	**1078839**

Anticipated life of the mine:

The mineable reserve would be **1078839** tonnes with an average annual production of **89903** (**1078839**/12=**89903)** Tonnes.The average annual production of limestone may be different from annual production of five years plan period.Thus 448085 tonnes of the total mineable reserve will be worked out in first 5 years and the balance mineable reserve i.e 630754 Tonnes will be mined out in further 7 years@90107 tonnes per year. Therefore, the life of the mine will be 12 years (five years in plan period + seven years in conceptual period).

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CHAPTER – IV
MINING

4.1 The entire area is highly potential area and working will be started from north-western part of the applied area and gradually continue to attain depth. This total quantity of mineable reserves of Limestone will be mined out in 12 years (five years in plan period + seven years in conceptual period). The benching system 6mx6m will be practiced in the area, in order to comply with the provisions of Metalliferous Mines Regulations, 1961. Details of advancement and formation of benches are shown in Development Plan & Sections 5, 5A, 6, 6A, 7, 7A 8, 8A,9, 9A) on a scale **1:1500.**

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4.2 Mining Strategy:

The deposit in this area is massive and compact in nature. It is proposed to carry out Open Cast Semi-Mechanized mining in this area during the plan period i.e. five years. Jack hammer drill machine will be deployed for drilling of shot holes ranging from 39 to 34mm diameter and breaking of limestone at the required size will also be done manually. For blasting of holes with burden and spacing of 1.6 m x 2 m in a staggered grid pattern would be adopted. Muffle blasting will be adopted as precautionary measure to contain fly rocks.

4.3 Production Targets:

Year wise Production of limestone from the area has been calculated by cross sectional method. The cross sectional area has been multiplied by the advancement to be worked in each bench as length of influence to get the bulk volume. Thus the value obtained has been multiplied by tonnage factor (T.F.) to get the actual production of Limestone in each bench. Year wise calculation has been made separately and the details of year wise development of the Mine is given below:

Production :

Year	Production of Limestone in Tonnes	Removal of Gritty Soil in Tonnes
1st	89705	10985
2nd	89959	6900
3rd	89581	00
4th	89456	00
5th	89384	4725
6th	90107	1950
7th	90107	1685
8th	90108	850
9th	90108	00
10th	90108	00
11th	90108	00
12th	90108	00
Total	**1078839**	**27095**

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4.4 **Bench Design and Formation:**

Since the mine will be worked in semi-mechanized method during this proposed plan period of 5 years, bench height will be restricted to the statutory 6mx6m due to compactness of the hard Limestone and as per the DGMS norms. Bench slope angle for stabilization of the benches will be maintained at 45°.

4.5 **Bench Development over the plan period:**

Working will be started from north-western side of the area and advanced towards southern side, attaining further depth. Details of advancement and formation of benches are shown in Development Plans & Sections (**Plates: 5, 5A 6, 6A 7, 7A 8, 8A, 9 & 9A**) in the scale of 1:1500.

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1st year: Working will be started from top hilly portion of the area with two benches of 6m X 6m in dimension with RL up to 132m. During mining operation gritty soil will be removed and dumped in the southern side of the area with suitable precautions. For haulage of the stone ramp will be maintained at the working face. Details of calculations are given below:

LIMESTONE PRODUCTION 1ST YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME (m3)	T.F	LIMESTONE (TONNES)
144-138	A-A'	226	50	11300	2.7	30510
138-132	A-A'	756	29	21924	2.7	59195
TOTAL						89705

SOIL PRODUCTION 1ST YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME (m3)	T.F	SOIL (TONNES)
144-138	A-A'	96	50	4800	1.5	7200
138-132	A-A'	87	29	2523	1.5	3785
TOTAL				7323		10985

2nd year: - During 2nd year working will be continued in the same mine with two benches and further depth of 6m X 6m in dimension with up to 126m RL. During mining operation some quantity of gritty soil will be removed and would be dumped in the southern side beside previous dump with suitable precautions. For haulage of the stone ramp will be maintained at the working face. Details of calculations are given below:

LIMESTONE PRODUCTION 2ND YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	LIMESTONE (TONNES)
138-132	B-B'	256	43	11008	2.7	29722
132-126	A-A'	970	23	22310	2.7	60237
TOTAL						89959

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SOIL PRODUCTION 2ND YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	SOIL (TONNES)
138-132	B-B'	115	40	4600	1.5	6900
TOTAL				4600		6900

3rd year: - During this year working will be continued in the same mine with one bench of 6m X 6m in dimension up to the RL 126m. During this year no gritty soil will be generated. For haulage of the stone ramp will be maintained at the working face. Details of calculations are given below:

LIMESTONE PRODUCTION 3RD YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	LIMESTONE (TONNES)
132-126	B-B'	626	53	33178	2.7	89581
TOTAL						89581

4th year: - During this year working will be continued in the same mine in further depth with two benches of 6m X 6m in dimension up to the RL 114m. For haulage of the stone ramp will be maintained at the working face. Details of calculations are given below:

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LIMESTONE PRODUCTION 4TH YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	LIMESTONE (TONNES)
126-120	A-A'	600	21	12600	2.7	34020
126-120	B-B'	516	22	11352	2.7	30650
120-114	B-B'	180	51	9180	2.7	24786
TOTAL						89456

5th year: During this year working will be continued in the same mine with three benches of 6m X 6m in dimension up to the RL 102m. For haulage of the stone ramp will be maintained at the working face. Details of calculations are given below:

LIMESTONE PRODUCTION 5TH YEAR						
BENCH RL(m)	SECTION	SECTIONAL AREA(m2)	LENGTH OF INFLUENCE(m)	VOLUME(m3)	T.F	LIMESTONE (TONNES)
120-114	B-B'	275	51	14025	2.7	37868
114-108	B-B'	375	39	14625	2.7	39488
108-102	B-B-	165	27	4455	2.7	12029
TOTAL						89384

4.6 Notes on Conceptual Plan for the Lease Period:

Mining will be carried out with the help of machinery and manual manpower for digging, excavation and removal of limestone in conjunction with shot hole drilling by jack hammer drill. Mining operation shall be carried out in compliance with the provisions of the MMR, 1961.

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During the 5 years plan period the area will be worked out maintaining a 7.5m Safety Barrier. The voids created by mining will be reclaimed after the conceptual period of mining.

Land Use Pattern:

Existing Land Use pattern

Category	Area in Hectares
Excavated land	**0.00**
Road	0.01
Total area in use	**0.01**
Balance unused area	2.39
Total Applied Lease Area	**2.40**

Land Use pattern after first five years plan period

Category	Area in Hectares
Excavated land including road	1.20
Green belt in Safety Barrier	0.27
Dump with Parapet Wall and Garland Drain	0.18
Total area in use	**1.65**
Balance unused area	0.35
Total Applied Lease Area	**2.40**

Land Use pattern after life of the mine

Category	Area in Hectares
Excavated land including Reclamation	1.88
Green Belt (within Safety Barrier)	0.52
Total area in use	**2.40**
Balance unused area	0.00
Total Applied Lease Area	**2.40**

4.7 Level of Mechanization:

The deposit in this area is massive and compact in nature. It is proposed to carry out opencast Semi-Mechanized mining in this area during the plan period i.e. five years. Jack hammer drill machine will be deployed for drilling of shot holes of 39 to 34mm diameter and breaking of limestone at the required size will be done manually. For blasting of holes with burden and spacing of 1.6 m x 2 m in a staggered grid pattern will be followed. Muffle blasting will be adopted as precautionary measure to contain fly rocks.

4.8 Machinery Deployment:

EXCAVATORS: (Loading Equipment)

For Material Production:

Production of Limestone	:	89959 MT/annum
Production of Soil (gritty)	:	10985
No. of working days	:	300
Production of limestone per day	:	$\frac{89959}{300}$ = 299.86 MT say 300
Production of Soil (gritty) per day	:	$\frac{10985}{300}$= 36.62 MT say 37MT

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Material required to be handled per day	:	(300 + 37)MT = 337MT
Bucket fill factor	:	80%
Bucket Capacity	:	0.6 cu.m. i.e. 0.48 cum @ 80%
Bulk density loose	:	1.85
Material handled by each bucket	:	0.48 x 1.85 = 0.888 MT
Cycle time (including pastime) for each bucket	:	30 sec
Utilization (Job efficiency) and	:	70%
Tonnage handled/hr	:	$\frac{0.888 \times 0.7 \times 60 \times 60}{30}$ = 72.4092 MT Say 75 MT/hr
Tonnage handled per shift (6hrs shift) for one shift working	:	6 x1x 75= 450 MT
Number of excavators required	:	337/ 450 = 0.75
Considering 80% availability the requirement of excavator is 0.75/0.8 = 0.94 say 1 no. Therefore one excavator would be sufficient to meet the production target.		

Specification of Excavator:

Type	Nos.	Bucket capacity In cu m	Motive power	H.P
Hydraulic Excavator	1	0.6	Diesel	115

Haulage and Transport Equipment:
No. of Tippers required for Limestone Transportation:

1. Lead distance	=	0.3 km
2. Uphill at 20 kmph speed	=	(60/20)x0.3 = 0.9 min say 1 minute
3. Downhill at 25 kmph speed	=	(60/25)x0.3 = 0.72 min say 1 minute
4. Loading time	=	3 minutes
5. Spotting time	=	1 minute
6. Unloading	=	1 minute
7. Total time requited per trip	=	7 minutes
8. No. of trips per hour	=	60/7= 8.57
9. With 80% efficiency	=	8.57 x 0.80 = 6.86 trips per hour
10. Hourly output per tipper	=	6.86 x 10 = 68.6 MT
11.Production of limestone per day	=	$\frac{89959}{300}$ = 299.86 MT say 300
12.Production of Soil (gritty) per day	=	$\frac{10985}{300}$= 36.62 MT say 37MT
13.Material required to be handled per day	=	(300 + 37)MT = 337MT
14. Considering one shift per day, 6 hrs per shift so output of 1 tipper per day	=	68.6 x 6=411.6MT
15. No. of Tippers required	=	337/411.6 = 0.82
Considering 80% availability, number of tippers required is 0.82/0.8 = 1.025 no. say 1. For emergency purpose one more tipper is suggestible. Therefore two tippers would be enough to meet the requirement of transport.		

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Details of Tippers:

Description	Nos.	Size/ Capacity	Motive power	H.P
Tippers for limestone transportation	2	10 MT	Diesel	98.5

Machinery Deployed

Salient features of the Proposed Mining Machinery are as under:

S. No	Type of machine	No	Dia of hole In mm	Size/ capacity	Motive power	H.P
1	Excavators	1	-	0.6 cu. m	Diesel	115
2	Compressor	2	----	300 cfm	Diesel operated	1
3	Jackhammer Drill	3	--	--	--	--
4	Tippers	2	-	10 MT	Diesel	98.5
5	Rock Breaker	1	--	--	--	--
6	Water tanker	1	--	--	--	--

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CHAPTER – V
BLASTING

5.1. Blasting:

Equipment for compressed air drilling

5.1.1 Air Compressor

Diesel-operated, compressors with 250cum. capacity. - 2 Nos.

5.1.2 Jack Hammer Drill

Air operated with 1800 to 2000 RPM – 3 Nos.

Drilling of 3.3m (including 10% sub-grade) depth hole will be performed in four stages of drilling i.e. 1st, 2nd, 3rd and 4th which are as follows:

1st stage with drill rod of 800mm long X 39mm Diameter

2nd stage with drill rod of 1600mm long X 38mm Diameter

3rd stage with drill rod of 2400mm long X 36mm Diameter

4th stage with drill rod of 3300mm long X 34mm Diameter

Two 3m thick layered of limestone will be blasted to maintain the 6m bench height and ultimately to achieve the production target. Sufficient numbers of drill rod with required length will be kept stored for emergency purpose and also to avoid delay in mining work.

5.2 Blasting

In this mine, shallow – hole drilling would be in practice. Holes would be drilled in hard formation by jackhammer drill having diameter from 39mm to 34mm. The holes are generally made up to 3.3m (including 10% sub-grade) depth. Burden and spacing would be maintained as 1.6m and 2m depending upon the compactness of formation. On this basis each hole will yield 1.6mx2mx3mx2.7= 25.92 tonnes.

The shot hole blasting will be carried out manually. The shots will be fired electrically using exploder approved by DGMS. In case of non-availability of electric detonators provision will be kept for ordinary fuse blasting.

5.3 The blasting parameters adopted would be as under:

Average depth of hole	:	3.3m
Burden	:	1.6m
Spacing	:	2m
Yield per hole	:	1.6mX2mX3mx2.7= 25.92 tonnes
Average daily production	:	300 Tonnes
No. of hole required /day	:	300/25.92 = 11.57 Nos. say 12
Size of Cartridge	:	25mmx200mm
Weight of Cartridge	:	125gm
No of Cartridges per hole	:	2 Cartridges
Charge per hole	:	250gm

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Explosive consumption / day : 12X250 =3 Kg

Thus to extract 300 Tonnes of limestone per day drilling and blasting will be required. Therefore 12 holes are required to be drilled per day, which can be performed by 2 drilling crew consisting of four persons.

Delay Blasting will be practiced in the area for 12 holes.

Types of Explosive

Blasting will be carried out by using gel explosives (such as Powergel 901 is a water resistant packaged explosive designed to deliver high energy. It can be used in both priming applications and as a high density column explosive. Powergel 901 cartridges are packaged in film, which readily splits during tamping to maximize coupling and bulk strength within a blast hole.) and safety fuse of 5m length.

Storage of Explosive:

An agreement will be made with the blasting agency by the applicant before starting the mining operations.

5.4 SAFE PRACTICES DURING SHOT FIRING

Required precautionary measures would be taken to avoid Kinking during firing.

Drilling and charging of holes shall not be carried out in the same area simultaneously.

A detailed record of the hole positions, type of explosives, quantity of explosives, hole depth, charge column and stemming would be maintained in a Register for locating/ finding out the depth of the charge in case of a chance misfire.

Before firing of shots in a cycle of blasting all persons shall be withdrawn from the blasting site to a safe place, i.e. more than 300m away from the spot/site of blasting.

Blasting time will be fixed in consultation with the neighboring mines and preferably after the end of working shift taking all required precautions, like marking the danger zone of 300m with red flags/ posting of sentries waving red flags, use of warning signals/blowing sirens and providing blasting shelters etc. Controlled blasting will be done to minimize blast vibration impacts and contain fly rocks.

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CHAPTER – VI
MINE DRAINAGE

6.0. Mine Drainage:

South flowing Tharia river is the nearest river at a distance of about 1km from the block.

The area is highly sloping and workings will be kept restricted above ground water table.

There exists no surface water body in the vicinity of the proposed area of mining. The proposed area with its surroundings is gently sloping. The proposed mining operation being semi-mechanized would not affect environment adversely.

However, adequate control measures will be taken to prevent water pollution/contamination like toe wall will be constructed with weep - holes & garland drains will also be provided as precautionary measures.

As stated above, the Mine excavation shall not intervene the water table. However, there is chance of accumulation of water during monsoon. For this, a sump shall be made at the bottom RL of pit to collects this water, which shall be pumped out by diesel driven pump.

Pumped out pit water shall be used for road sprinkling & plantation irrigation (green belt development) etc. As such, there is no impact on water regime due to mining activities.

Water quality monitoring will be done as per CPCB norms & MSPCB guidelines.

CHAPTER – VII
STACKING OF MINERAL REJECT AND DISPOSAL OF WASTE

7.0. Nature of Waste:

The entire produce of Limestone will be used as building material and according to its end use as discussed in the next chapter (Use of Minerals).

7.1. Nature of soil & selection of dump site:

During Plan period some quantity of gritty soil will removed and will be dumped at southern portion of the applied area with suitable precautions. Some extent of the generated gritty soil would also be used for road maintenance and plantation program. After conceptual period exhausted area will be reclaimed to the extent possible. To prevent dump failure/soil erosion, toe-wall with weep-holes and garland drains will be provided towards lower side of the dumps to check the wash off during the rainy season.

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CHAPTER – VIII
USE OF MINERALS

8.1. USE OF MINERALS:

Limestone of the area will be used in kilns for manufacturing of lime used as building materials.

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CHAPTER – IX
MAN POWER

9.1. Manpower Deployment:

There would be 300 working days in a year. Taking into account 5 years of plan period, the requirement of management & supervisory personnel has been considered as under Reg. 34 (2) (C) of MMR, 1961 & would be as follows:

Employment Potential:

The following employment will be generated due to mining operation in the area.

Employees	Future
Manager	1
Supervisor	1
Junior Supervisor	1
Blaster	1
Blaster Helper	1
Storekeeper	1
Attendance Clerk – cum Register Keeper	1
Excavator Operator	1
Compressor Operator	2
Jackhammer Drill Operator	4
Tipper Driver	1
Rock Breaker Operator	1
Water Tanker Driver	1
Semi-skilled Miners (inclusive of absentees & leave)	12
Unskilled	5
Total	**34**

9.2 LABOUR SOURCE: Labours will be employed from nearby villages.

9.3 SITE SERVICES

The services provided outside the working site are:

1) Rest Shelter

2) Pit Office

3) First Aid Arrangement and

4) Drinking Water.

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CHAPTER – X
MINERAL PROCESSING

10.1 Mineral Processing:

The beneficiation/processing of limestone are not required as the entire limestone will be used in kilns for manufacturing of lime used as building materials.

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CHAPTER – XI
ENVIRONMENT MANAGEMENT PLAN

Environment is normally affected due to mining particularly when the methodology adopted is open casting. For environmental protection of the area an Environmental Management Plan has been prepared. The present scenario of environmental attributes and activities are shown in **Plate – 11**.

11.1 Base Line Data,

11.1.1 Existing Land Use Pattern

Category	Area in Hectares
Exacavated Land	**0.00**
Road	0.01
Total area in use	**0.01**
Balance unused area	2.39
Total Applied Lease Area	**2.40**

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11.1.2 Water

South flowing Tharia river is the nearest river at a distance of about 1km towards from the block. The area is much above HFL and there is no record of flooding of the area. Natural drainage pattern of the area will not be altered due to mining activity, mining operation will be conducted above ground water table.

11.1.3 Terrestrial Ecology

The study of Terrestrial Ecology involves the identification of animals, birds including nomadic and migratory, reptiles and amphibian fauna.

11.1.3.1 Fauna:

In and around the project area Insects, Lizards, Dogs etc. are rarely noticed.

11.1.3.2 Flora:

Different types of Creepers, Bushes, Shrubs and small plants etc. are commonly found in the applied area and in its surroundings.

11.1.4 Quality of Air

At present time air is clean and clear and free from the pollutants as no mining activity in existence. The mining operation will be carried out by open cast semi- mechanized method. So after the commencement of mining operation, following measures shall be undertaken:

- Regular water spraying on haul roads, waste dumps and maintaining approach roads to suppress the dust as per practice.
- Transporting equipment shall be maintained regularly.
- Adequate plantation shall be done along lease boundary and transport road.
- Wet drilling shall be practiced.
- Maintenance of nearby local roads through which transportation of minerals shall be carried out by the project proponent.

Monitoring of ambient air quality shall be done and report of such monitoring shall be submitted to Competent authority.

11.1.5 Climate

The area experiences dominantly humid climate with moderate winter. The area experiences severe rainfall between May and August with average annual rainfall of 11000 mm.

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11.1.6 Social and Demographic Profile

Local people of the region are mainly dependent on farming and mining will help them providing additional sources of job opportunity and would prevent migration. Local people are fully dependent on daily -rated jobs, forest products, agriculture and employment in mines. Area within 500m radius is shown in Plate – 1

11.1.7 Public buildings, places of worship and monuments:

There is no public building, places of worship or monument of historical importance within the proposed applied area.

11.1.8 Whether the area falls under the Water (Prevention & Control of Pollution) Act 1974:

Yes.

11.2.1 Relief and Landscape Alteration:

With the gradual extraction/mining of the limestone deposit stretching from surface to below ground the profile of the virgin area will change and the topography of the area will also get altered. Thus the altered topographic scenario will have a different visual effect.

11.2.2 Impact on the Water Table:

Limestone mining operation would not require much water except for water sprinkling at points/source of dust generation. No chemical beneficiation would be necessary for ROM limestone mined. As the Mining operations would be carried out above Water Table there is no likelihood of impact on ground water table.

11.2.3 <u>Water Contamination</u>

In the project area very thin soil cover is there & less possibilities of rain water causing soil erosion. As precautionary measure garland drain shall be cut surrounding the mine to collect the runoff water and this shall be connected to the settling tank which will collect the solid particles of silt and clay and allow clear sump water to flow to the storage tank from where it will be used for plantation, water sprinkling and daily washing of machineries / transport vehicles.

11.2.4 <u>Air and Noise Pollution</u>

There will be impact on air up to a certain limit due to dust generation during loading operation, transportation of gritty soil/limestone and drilling & blasting. Similarly, due to mining operation noise pollution will be there, due to drilling, blasting and movement

of transportation vehicles. However effective measures shall be taken to maintain the pollution limit within prescribed CPCB norms and MSPCB guidelines **(For precautionary measures please refer Para 11.3.1 ,11.3.2 & 11.3.5)**.

11.2.5 Impact on Climate:

No impact on climate is anticipated due to proposed level of working.

11.2.6 Impact on Human Environment:

There will be a beneficial impact on human environment due to generation and growth of employment with commencement of mining operation.

11.3 Environment Management Plan:

Necessary action will be taken to monitor Air Quality, Water Quality, Noise Level from time to time as indicated earlier **(Please refer Para 11.3.1, 11.3.2, 11.3.3, 11.3.5).**

11.3.1 Dust Suppression:

During Mining operation, fugitive dust will be the principal air pollutant. Following measures will be provided to reduce the air pollution-

- Water spraying will be there in haul road and operational area.
- Wet drilling will be preferred.
- Sharp drill bits will be used to reduce dust generation.
- Dust extractor will be used to reduce dust generation wherever necessary.
- Proper monitoring of air quality data has to be maintained and in case it exceeds the permissible limit, adequate measures have to be taken.
- Avenue plantation in and around the mine, dump site is to be made.
- The 7.5m Safety Barrier shall be maintained for green belt development at 2.5 m spacing left all around and shall be used for plantation of trees with deep and thick vegetation so that air pollution due to dispersal of dust from the mine can be arrested. Pollution from dust, smoke & due to blasting shall be kept minimized by adoption of muffling system.
- Details of year wise greenbelt development along with number of plants and required area. (Taking 435 plants on 0.27 ha area or 2.5mX2.5m grid pattern)

Year	Area for greenbelt in m^2	No of plants
1st	540	87
2nd	540	87
3rd	540	87
4th	540	87
5th	540	87
Total	**2700**	**435**

- The species of plants having fast growth and are sustainable with high survival rate and as supported by the local prevailing environmental conditions would be chosen.

The plantation shall be done in the safety zone area.

GOVERNMENT OF MEGHALAYA

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Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

- Green belt plantation will be protected properly and will be maintained by daily watering and regular nursing. Necessary precaution and care will be taken to protect the saplings and to maintain the optimal rate of survival.

11.3.2 Precaution against Air Pollution:

There shall be some air pollution from use of explosives for blasting & also from operation of wagon drill, compressor, jack hammer drills in the process of mining. Efforts will be made to reduce and keep the level of pollution within permissible limits by sprinkling water on haul roads and mining operational area. PPE such as masks; goggles shall be provided to the workers.

11.3.3 Water Pollution Control Measures:

During rainy season the rain water falling on the mine with silt and clay, wash off particles of the surrounding area will be flown through the garland drain to the settling tank into which the transported suspended particles will be precipitated and allow clear sump water to overflow to the storage tank from where it will be used for plantation, water sprinkling on haul road and daily washing of machineries / transport vehicles.

11.3.4 Storage of Top Soil/Rejects:

At the stage of mining operation some extent of gritty soil will be removed and would be dumped at southern corner of the area with suitable precautions. Some quantity of the generated gritty soil would also be used for road dressing and plantation. After conceptual period exhausted mine area will be reclaimed to the extent possible.

During rainy season to prevent dump failure/soil erosion, toe-wall with weep-holes and garland drain will be constructed around the dump and would be connected with main garland drain and thus the constructed garland drain will collect the seepage water from the dump and the water will be drained to the settling tank connected with the main garland drain surrounding the mine area. And also dwarf species of plant would be cultivated on the heap of the dump to check the collapsing.

11.3.5 Noise Pollution Control Measures

The main source of noise in the mining area is the operation of Heavy Earth Moving Machines like Excavators, Tippers. Besides drilling & blasting are also a potential source of noise pollution. In order to minimize the noise pollution following measure will be adopted:

- Regular, proper and timely maintenance of machinery.
- Plantation along the periphery of mining lease area.
- Providing ear plugs to the workers.

11.3.6 Land Reclamation

After the full extraction of minable limestone deposit and completion of mining operation the excavated vacant area will be reclaimed to the extent possible.

CHAPTER – XII
PROGRESSIVE MINE CLOSURE PLAN

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12.1. Introduction:

Smt. Ailadmon Japang has applied for a mining lease for limestone over an area of 2.40 Ha located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State - Meghalaya.

12.1(a) Name & Address of the Applicant:

Smt. Ailadmon Japang

At - New Majai, Bholaganj, District- East Khasi Hills, State- Meghalaya

12.1(b) The Extent of the Area:

Details of the Area:

Applied Area: 2.40 Ha

Status of the Applicant:

The Applicant is a Private Individual.

Name & Address of the RQP Preparing the Mining Plan:

Ashok Kumar Sarkar

Flat no-304, Block B-12,

Airport Enclave Co-operative Housing Society

Jessore Road, Kolkata.

Pin- 700051

Registration No: RQP/KOL/377/2013/A

12.1.(c). Method of Mining:

Please refer Chapter – IV.

Mining Engineer
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12.1.(d). Mineral Processing:

Please refer Chapter – X.

12.1.1. Reasons for Closure:

i) **Quality Deterioration of Mineral:** If the mineral is found to be bad in quality in the proposed mining area at any stage of operation then the mine may have to be closed.

ii) **Government Departmental Objection for Violation:** During mining operation if any violation/deviation from the approved mining plan is observed/pointed out by the State Government Department officials concerned they may direct to close the mine.

iii) **Exhaustion of Reserves in the mine:** As per the Letter of Intent the applicant has to close the mine when the workings would reach up to the ultimate pit limit depth because of exhaustion of the estimated mineable reserve.

iv) **Stay order from the Court:** If any stay order comes from a Court of Law the mine will have to be stopped forthwith.

Ashok Kumar Sarkar
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12.1.2. Statutory Obligations:

The applicant will comply with all the statutory obligations.

12.1.3. Closure Plan Preparation:

The name and address of the applicant and the recognized qualified person who prepared the Mine Closure Plan and the name of the executing agency is furnished in para 12.1.(a) & 12.1(b).

12.2. Mine Description:

12.2.1. Geology:

Please refer Chapter - III of the mining plan.

12.2.2. Reserves:

Please refer Chapter - III of the mining plan.

12.2.4. Mining Method:

Please refer Chapter–IV.

12.2.5. Mineral Beneficiation:

Please refer Chapter – X.

12.2.6. Review of Implementation of Mining Plan / Scheme of Mining including Five Years Progressive Closure Plan up to the Final Closure of Mine:

This is a fresh applied lease; at this stage it is not required.

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12.3. Closure Plan:

12.3.1. Mined-Out Land:

As a result of mining operation, the original ground profile will get altered. The de-stoned mine will be reclaimed after conceptual plan period. Details of year wise production land use pattern have been mentioned in the mining chapter (Chapter No-IV).

12.3.2. Environment:

The green belt development not only functions as a foreground and background landscape feature resulting in harmonizing and amalgamating the physical structures of the mines with surrounding environment, but also acts as a pollution sink as indicated above. Thus, implementation of afforestation program is of paramount importance. In addition to augmenting existing vegetation, it will also check soil erosion, make the ecosystem more compatible and functionally more stable and make the climate more conducive.

The choice of species of plants shall be such as would be supported by the environmental conditions prevailing in the area for fast and sustained growth. The plantations shall be done in the safety zone area.

- The phase-wise reclamation & afforestation has to be started simultaneously in the production year.

Ashok Kumar Sarkar
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Directorate of Mineral Resources
Meghalaya, Shillong

- The 7.5m Safety Barrier shall be used for green belt development at 2.5m spacing left all around and shall be used for plantation of trees with deep vegetation so that air pollution from the mine can be arrested. Pollution from dust, smoke & due to blasting shall also be minimized by adoption of muffling system at stipulated interval of time.
- Details of year wise greenbelt development along with number of plants and required area. (Taking 435 plants on 0.27 ha area or 2.5mX2.5m grid pattern)

Year	Area for greenbelt in m^2	No of plants
1st	540	87
2nd	540	87
3rd	540	87
4th	540	87
5th	540	87
Total	**2700**	**435**

- Green belt plantation will be made and protected properly and will be maintained by daily watering and nursing. Suitable precautions will be taken to protect the saplings and to maintain the optimal rate of survival.
- Road side plantation will also be done during the conceptual plan period.

12.3.3. Ground Vibration due to Blasting:

Please refer Chapter – V.

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12.3.4. Water Regime:

The water comes across in the working during monsoon. The water will fill in the working pits. Some water will flow by joints and cracks and rest water has dewatered through nearby garland drain during and after the monsoon.

The monsoon water which directly precipitates over the working will fill in the pit and rest water which precipitates outside the pit will flow down towards the lower RL side by slope of the area. The water accumulate in the working pit is being dewatered by diesel operated pumps.

Impact on the Water Table:

As mining operations do not need much water and no chemical beneficiation will be necessary, there is no likelihood of impact on ground water table.

Water Contamination:

The nearest river is flowing approx. 1km away from the proposed area; therefore, chances of the river water getting contaminated by mining operation are remote.

Water Pollution Control Measures:

During rainy season the rain water falling on the mine with silt and clay, wash off particles of the surrounding area will be flown through the garland drain to the settling tank into which the transported suspended particles will be precipitated and allow clear

sump water to overflow to the storage tank from where it will be used for plantation, water sprinkling on haul road and daily washing of machineries / transport vehicles.

12.3.5. Air Quality Management:

Air and Noise Pollution:

There will be impact on Air Quality to a certain limit because of dust generation due to transport operation, waste dumping and drilling/ blasting. Similarly, due to mining operations also there will be noise pollution to some extent.

Air and Noise Pollution Control Measures:

The air pollution will also result due to drilling and blasting, movement of vehicles and mining operation by semi-mechanized method.

Vigorous efforts shall be made to minimize air pollution by keeping the machineries in well maintained condition and proper drilling and blasting. The greenbelt development would also minimize air pollution.

The air quality would be maintained as per the norms of CPCB & MSPCB guidelines wherever necessary.

The main source of noise pollution in the mining area is the operation of Heavy Earth Moving Machinery like Tippers, Excavators. Besides, drilling & blasting operations are also potential sources of noise pollution. In order to minimize the noise pollution the following measures will be adopted:

- Regular water spraying on haul roads, waste dumps and maintaining approach roads to suppress the dust as per practice.
- Transporting equipment shall be maintained regularly.
- Adequate plantation shall be done along lease boundary and transport road.
- Wet drilling shall be practiced.
- Maintenance of nearby local roads through which transportation of minerals shall be carried out by the project proponent.

Monitoring of ambient air quality shall be done and report of such monitoring shall be submitted to Competent authority.

12.3.6. Waste Management:

The entire produced Limestone will be used as building material and according to its end use.

12.3.7 Top Soil Management:

During mining operation, a great extent of gritty soil will be removed and would dumped at southern corner of the area with suitable precautions (such as cultivation of dwarf species of grass and construction of toe wall and garland drain). Some extent of it would be used for road dressing and plantation. After conceptual stage of working de-stoned area of mine will be reclaimed to the possible extent.

As precautionary measure a garland drain shall be cut at the lowest RL of the mine to collect the runoff water and this shall be connected to the settling tank which will collect the solid particles of silt and clay and allow clear sump water to flow to the storage tank from where it will be used for plantation, water sprinkling on haul road and daily washing of machineries / transport vehicles.

12.3.8. Tailing Dam Management:

As there will be no beneficiation activity in the area, no tailing dam management would be necessary.

12.3.9. Infrastructure:

The Applicant will construct the pit office cum attendance room and first aid center, work shop as per the site selection after grant of mining lease. A rest shelter will be provided near mining area. Provision of potable water will be made from well/tube well which, in generally, is used by the villagers.

At the final closure stage the infrastructure so constructed will be dismantled after the completion of mining activity.

12.3.10. Disposal of Mining Machinery:

The mining machineries will be engaged on hire basis. After the abandonment of mines all the machineries will be returned to the owner.

12.3.11. Safety & Security:

The size of the working benches will be maintained as per Reg. 106 of MMR, 1961. Personal Protective Equipment (PPE) like industrial safety helmets, gloves, safety spectacles, goggles, visors, high-visibility clothing, safety boots, shoes with protective toecaps, safety harness, earplugs, earmuffs, etc. will be provided to the workers .Respiratory Protective Equipment (RPE) like nose masks etc. will be provided to the workers keeping in mind of their comfort ability and friendly fittings and beside these the project proponent would provide Health insurance/Accidental insurance, Hours of work and over time payment, meal and tea breaks, leaves applicable/sick leave, first-aid and medical treatment.

At the time of final closure of the mines, the abandoned pits shall be fenced properly and signboards will be set up indicating the safety cautions at prominent places.

12.3.12. Disaster Management & Risk Assessment:

The applied lease area is small and the mining operation will be in semi-mechanized method. No heavy seismic activities are recorded in this area during the last 50 years as per the village officials. The mining operation will not go to the much deeper side, hence chances of land slide or subsidence are rare. The proposed project site falls in zone- V as per IS 1893 (Part-I): 2002. Hence, seismically it is an active zone.

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Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

12.3.13. Care & Maintenance during Temporary Discontinuance:

Proper care and maintenance during temporary discontinuance will be taken. Proper safety and security for the machineries as well as for staffs will be taken.

12.3.14. Economic Repercussions of Closure of Mine & Manpower Retrenchments:

Taking into account of the plan period of five years the requirement of management & supervisory personnel has been considered as under Reg. 34 (2) (C) of MMR, 1961. Since a handful of workmen would be employed for mining activity, no major repercussion is expected after closure of mine.

12.3.15. Number of Local Residents Employed in the Mine, Status of the Continuation Family Occupation & Scope of Joining the Occupation Back:

The mine would provide employment to local workers mostly from the nearby villages outside the applied area. The main occupation of their family is farming. All the statutory facilities under the mines rules will be extended to the workers. In case of final closure, they can revert back to their family occupation along with the statutory monetary benefits given by the management.

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12.3.16 Time Scheduling for Abandonment:

Time schedule of all abandonment operations as proposed is given below in self-explanatory bar chart.

Activities	Tentative time frame for completion of jobs for mine closure operation (In months) from date of cessation.											
	1	2	3	4	5	6	7	8	9	10	11	12
Reclamation & Rehabilitation of mined out land	The excavated area will be reclaimed, after complete extraction of mineable reserve, to the extent possible.											
Waste management	Not Applicable											
Decommissioning of infrastructure											→	
Safety & Security	Safety and security will be provided and ensured by the mine proponent.											
Monitoring of air & water	→											
Disposal of mining m/c.	The machinery deployed in the mine on hiring basis would be returned to the owner after the expiry of life of mine.											

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12.3.17 Expenditure during the five years plan period: -

Description	Quantum of work to be done	Approx. total cost of process (in Rs)
Reclamation and Rehabilitation of excavated pits	Mine will be reclaimed after extraction of total mineable reserve.	-----
Soil dump Management	Top gritty soil will be dumped in southern portion of the applied area.	40,000/-
Plantation & green belt development	0.27 Ha area within the safety barrier will be used for greenbelt development about 435 plants.	87,000/-
Air Noise and water Quality monitoring	Monitoring will be done yearly for five years (Air, Water, and Noise).	75,000/-
Settling tank & Garland drain	Construction of garland drain & Settling tank.	40,000
Settling tank cleaning	Silt and clay remove from settling tank.	60,000
Tentative cost of abandonment		**3,02,000/-**

12.3.18 Financial Assurance :Computation of financial assurance:

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Total Applied Lease Area - 2.40 Ha say 3 Ha

Rates. – Rs. 10000/-per Hectare.

Amount of financial assurance – 3 Ha X 10000/ - = Rs. 30,000/-

The amount of financial assurance as may be specified by the State Govt. will be submitted in the form of Bank Guarantee by the applicant to the concerned authority of the State Govt, Meghalaya before execution of the lease deed.

12.3.19 Certificate:

The above certificates are enclosed at the beginning of the mining plan.

12.3.20 Plans, sections etc:

Progressive Mine Closure Plan is enclosed as plate No 13 with this plan.

****

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Ashok Kumar Sarkar
RQP/KOL/377/2013/A

SMT. AILADMON JAPANG

VILLAGE- NEW MAJAI, BHOLAGANJ, , DISTRICT- EAST KHASI HILLS, MEGHALAYA

GOVERNMENT OF MEGHALAYA

UNDERTAKING

APPROVED

I would hereby like to declare that the Limestone Mined out from my quarry located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship,, East Khasi Hills District, will be used in kilns for manufacturing of lime used as building materials.

A japang

(Smt. Ailadmon Japang)

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

भारत सरकार /GOVERNMENT OF INDIA
खान मंत्रालय /MINISTRY OF MINES
भारतीय खान ब्यूरो /INDIAN BUREAU OF MINES

Ashok Kumar Sarkar

अर्हताप्राप्त व्यक्ति के रुप में मान्यता प्रमाण पत्र

APPROVED

(खनिज रियायत निमावली, 1960 के नियम 22सी के तहत)

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON

(Under Rule 22C of Mineral Concession Rules, 1960)

श्री अशोक कुमार सरकार पुत्र स्व. श्री चित्तरंजन सरकार, निवासी फ्लेट सं. 304, ब्लॉक बी –12, एयरपोर्ट एनक्लेव कॉपरेटिव हाउसिंग सोसायटी, जेसोर रोड, कोलकाता – 700 051, जिनका फोटो और हस्ताक्षर उपर दिया हुआ है, तथा जिन्होने अपनी अर्हता और अनुभव का संतोषजनक साक्ष्य दिया है, को खनन् योजना तैयार करने हेतु खनिज रियायत निमावली, 1960 के नियम 22सी के तहत् अर्हता प्राप्त व्यक्ति के रुप में मान्यता प्रदान की जाती है ।

Shri Ashok Kumar Sarkar, S/O Late Shri Chittaranjan Sarkar, resident of Flat No. 304, Block B-12, Airport Enclave Co-operative Housing Society, Jessore Road, Kolkata – 700 051, whose Photograph and signature is affixed herein above, having given satisfactory evidence of his qualifications and experience is hereby **RECOGNISED** under Rule 22(C) of the Mineral Concession Rule, 1960 as a Qualified Person to prepare Mining Plans.

उनकी पंजीयन संख्या है
His registration number is **RQP/KOL/377/2013/A**

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

यह मान्यता 10(दस) वर्षों की अवधि के लिए मान्य है जो दिनांक 21.02.2023 को समाप्त होगी । This recognition is valid for a period of 10(ten)years ending on 21.02.2023.

उनके द्वारा प्रस्तुत खनन् योजना में गलत जानकारी/दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा/निरस्त किया जाएगा ।

This certificate is liable to be withdrawn/cancelled in the event of furnishing the wrong information/documents in the Mining Plan submitted by him.

22/2/2013

स्थान /Place : Kolkata
दिनांक /Date : 22.02.2013

क्षेत्रीय खान नियंत्रक/Regional Controller of Mines
भारतीय खान ब्यूरो/Indian Bureau of Mines
कोलकाता क्षेत्र/Kolkata Region

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- BOUNDARY PILLARS
- 500M RADIUS BOUNDARY
- APPROACH ROAD

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate No- 01

Google Map

Lynti Dkhar Limestone Mine

Applicant
Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syur,
Lynti Dkhar Area, Sohbar Siedarship,
District- East Khasi Hills, State - Meghalaya.

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORRECT

SIGNATURE:-

RQP- ASHOK KUMAR SARKAR
Reg No- RQP/KOL/377/2013/A

Coordinate of Pillars

Pillar No	Coordinates	
1	N25°10'45.60"	E91°44'35.1
2	N25°10'48.00"	E91°44'35.6
3	N25°10'49.30"	E91°44'34.5
4	N25°10'48.40"	E91°44'32.6
5	N25°10'49.60"	E91°44'32.4
6	N25°10'50.80"	E91°44'34.2
7	N25°10'52.10"	E91°44'37.6
8	N25°10'51.60"	E91°44'39.
9	N25°10'46.20"	E91°44'39.
10	N25°10'45.60"	E91°44'37.

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APPLIED LEASE BOUNDARY

BOUNDARY PILLARS

GRID LINES

APPROACH RO

BOUNDARY DI

Plate No

Coordinate Plan

Lynti Dkhar Limestone Min

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghala

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Sy
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghala

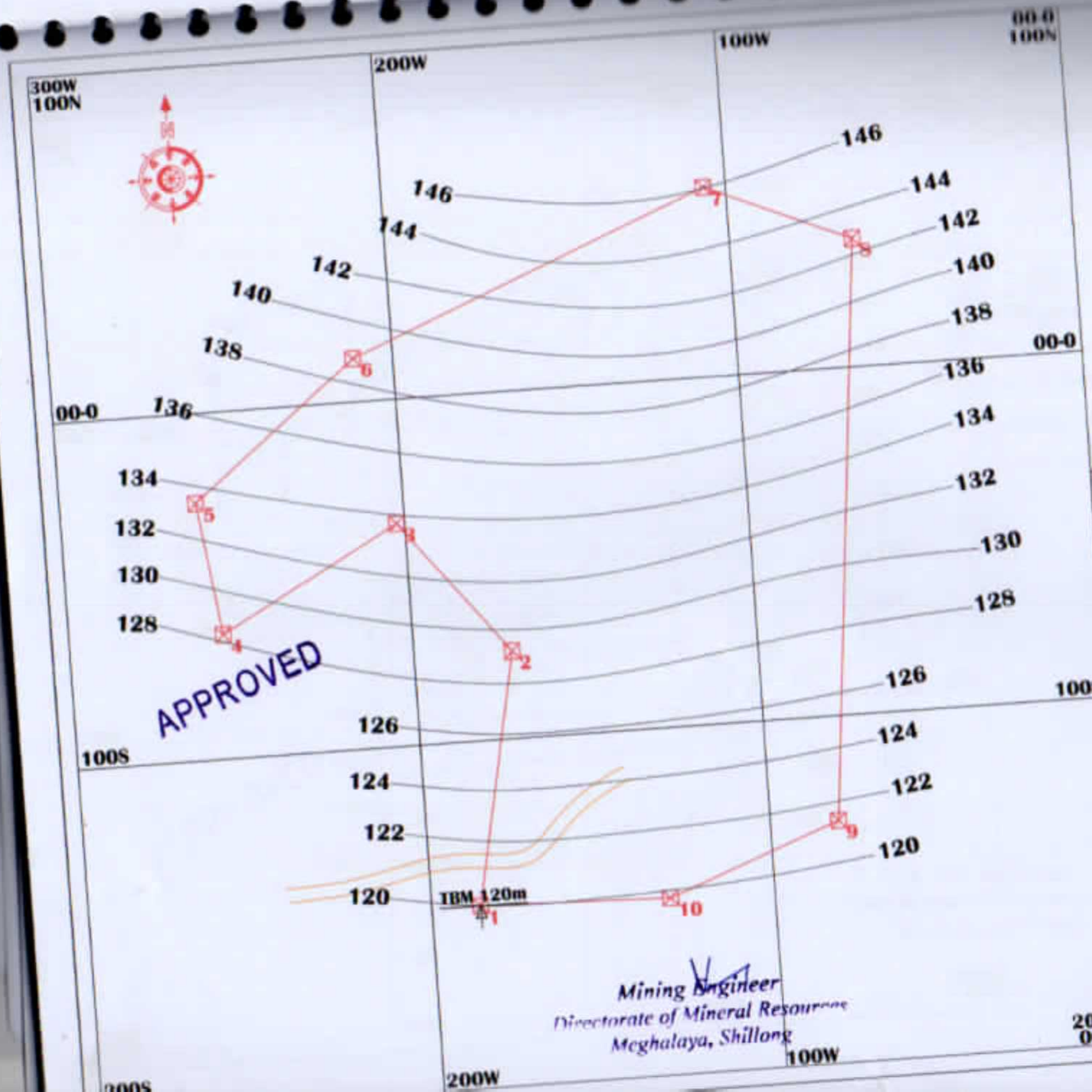
Scale 1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS C

SIGNATURE-

RQP- ASHOK KUMAR
Reg No- RQP/KOL/37



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- IBM 120m TEMPORARY BENCH MARK
- APPROACH ROAD

Plate No- 0

Surface Plan

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORR

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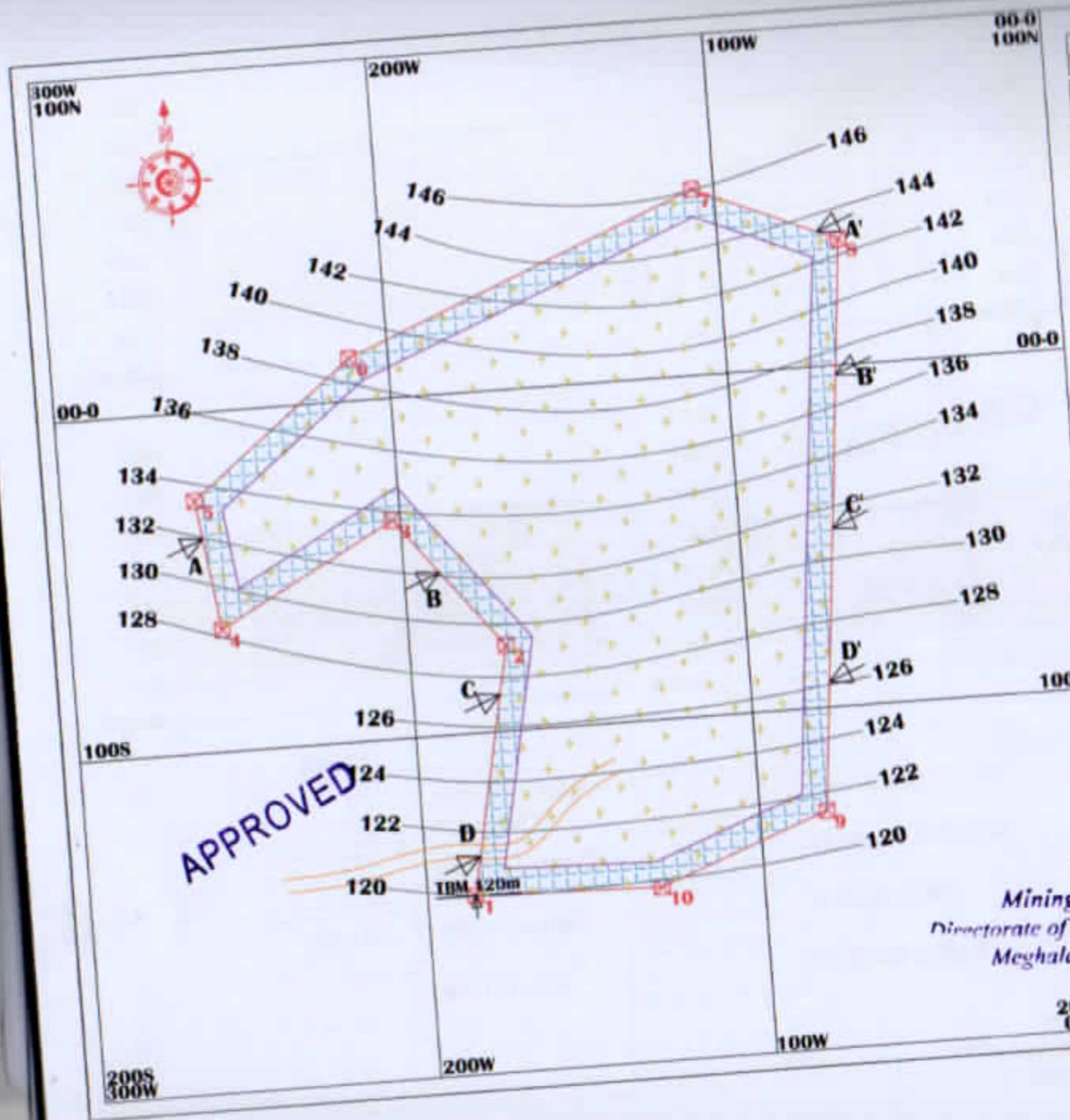
Reg No- RQP/KOL/377/201



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- GRITTY SOIL
- ULTIMATE PIT LIMIT

GOVERNMENT OF MEGHALAYA

Plate No-

Geological Plan

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

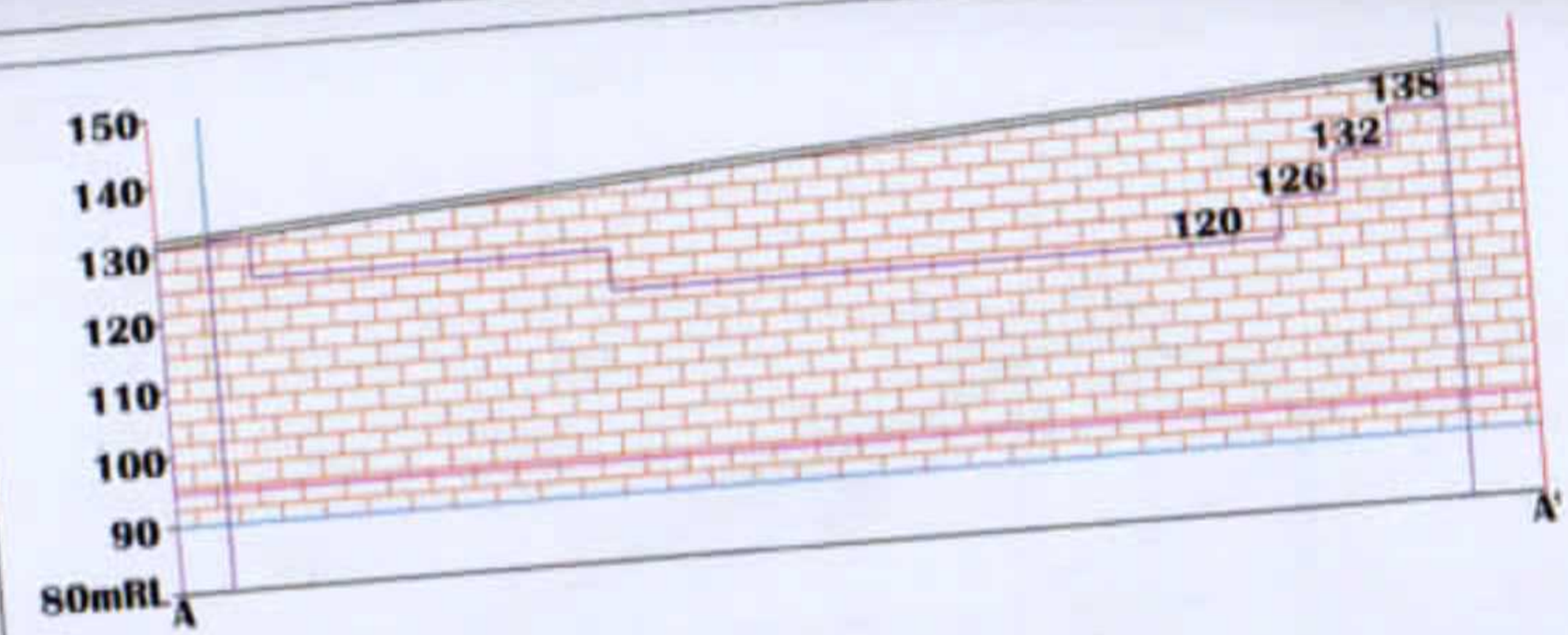
Lease applied for 12 Years

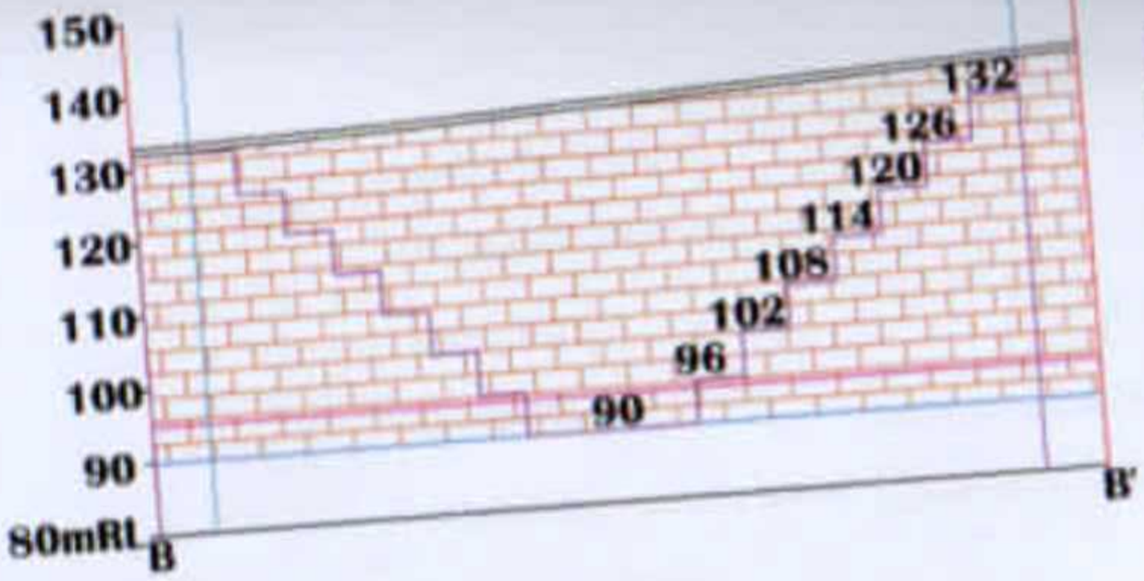
CERTIFIED THAT THE ABOVE PLAN IS COR

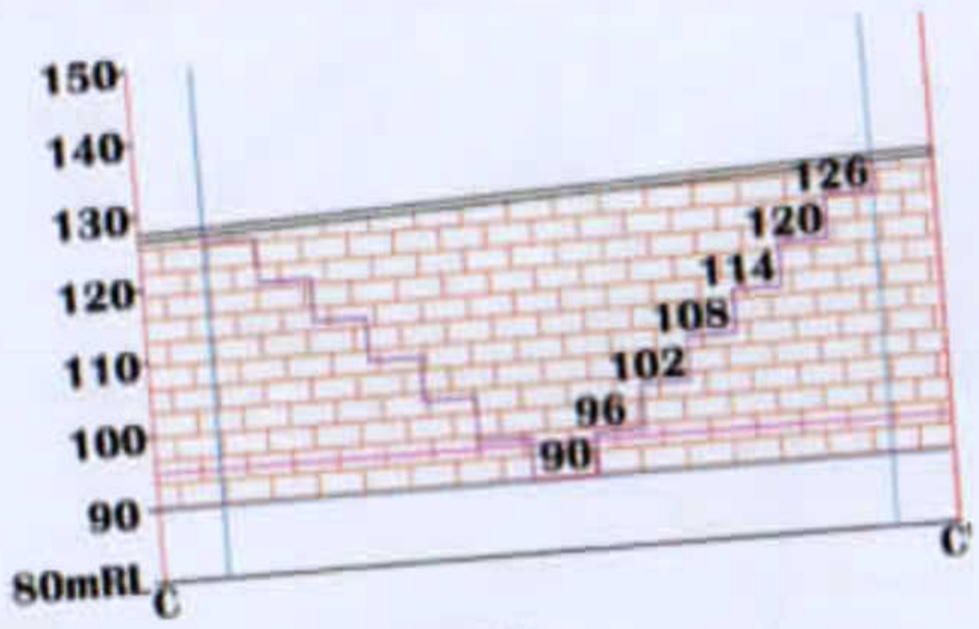
SIGNATURE-

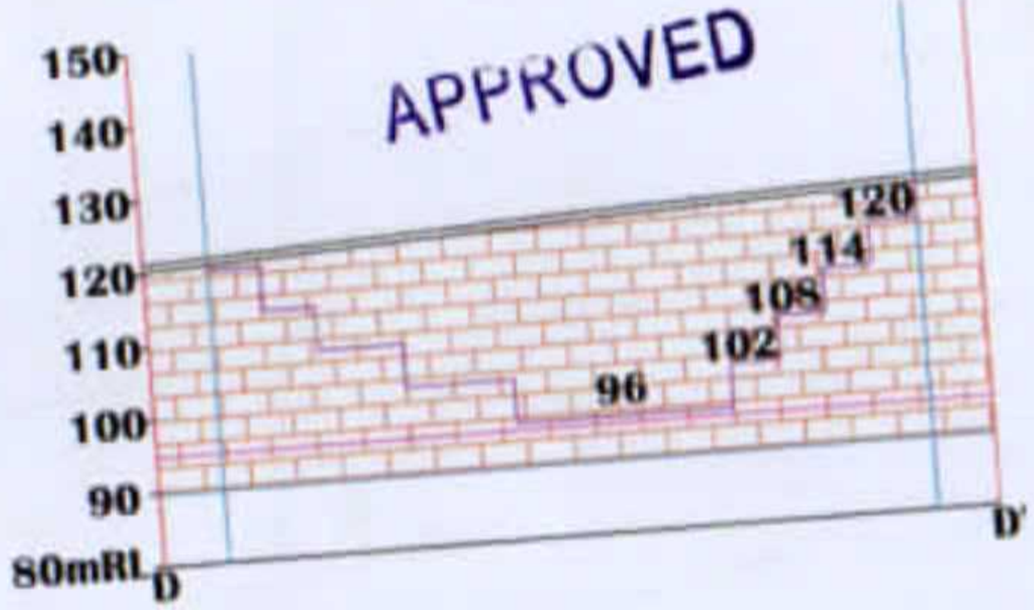
RQP- ASHOK KUMAR SA
Reg No- RQP/KOL/377/2

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong









APPROVED

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- PROBABLE ZONE

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

Plate No- 4

Geological Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

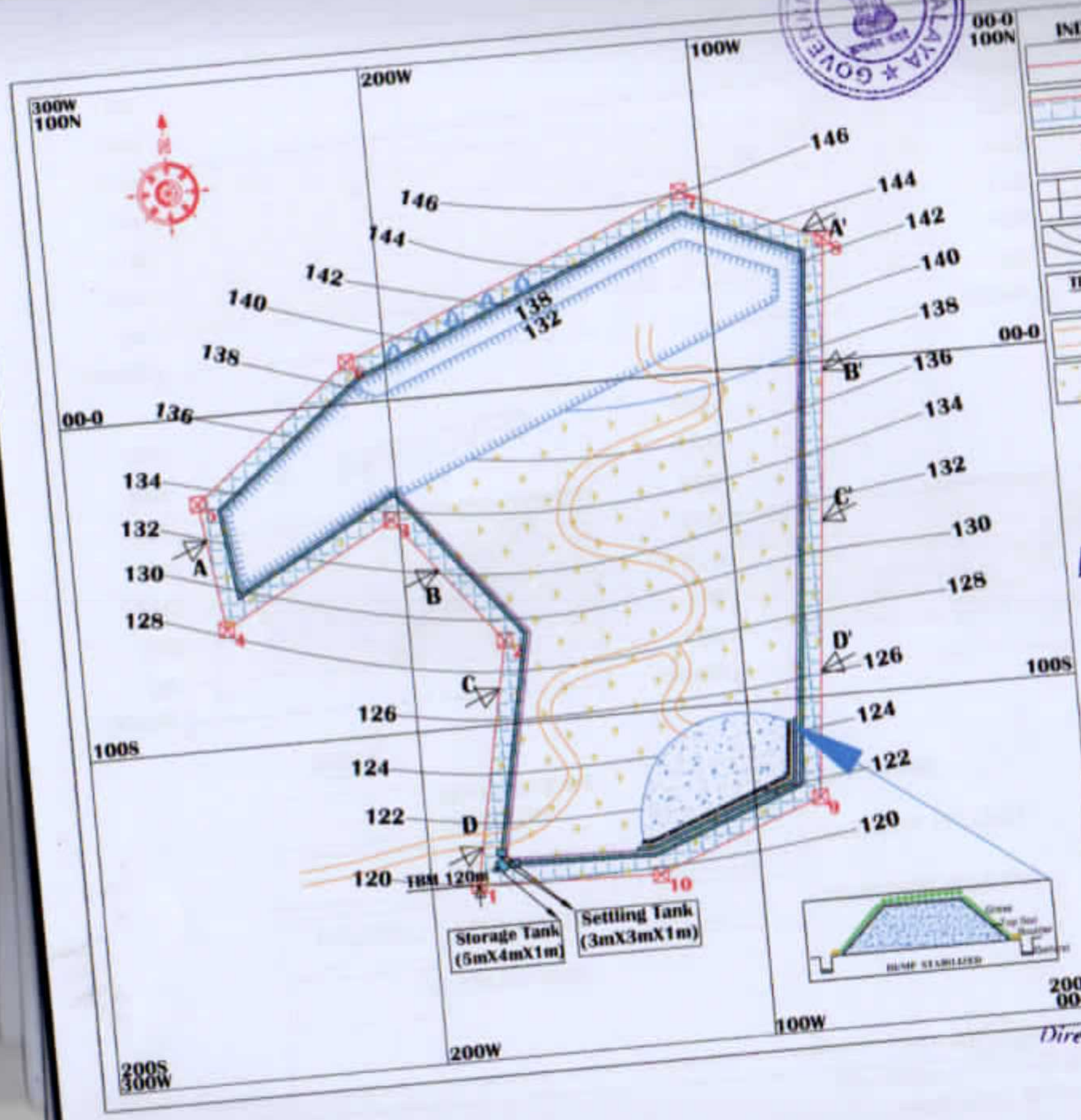
Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS COR

SIGNATURE-

RQP- ASHOK KUMAR SA
Reg No- RQP/KOL/377/20



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- BOUNDARY PILLARS
- GRID LINES
- CONTOUR LINE
- TEMPORARY BENCH MARK
- APPROACH ROAD
- GRITTY SOIL
- ULTIMATE PIT LIMIT
- PROPOSED WORKING
- PROPOSED PLANTATION
- PROPOSED DUMPING
- PROPOSED GARLAND D
- PROPOSED PARAPET W

APPROVED

Plate No

Development Plan 1st Ye

Lynti Dkhar Limestone Mi

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghala

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U S
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghala

Scale 1:1500

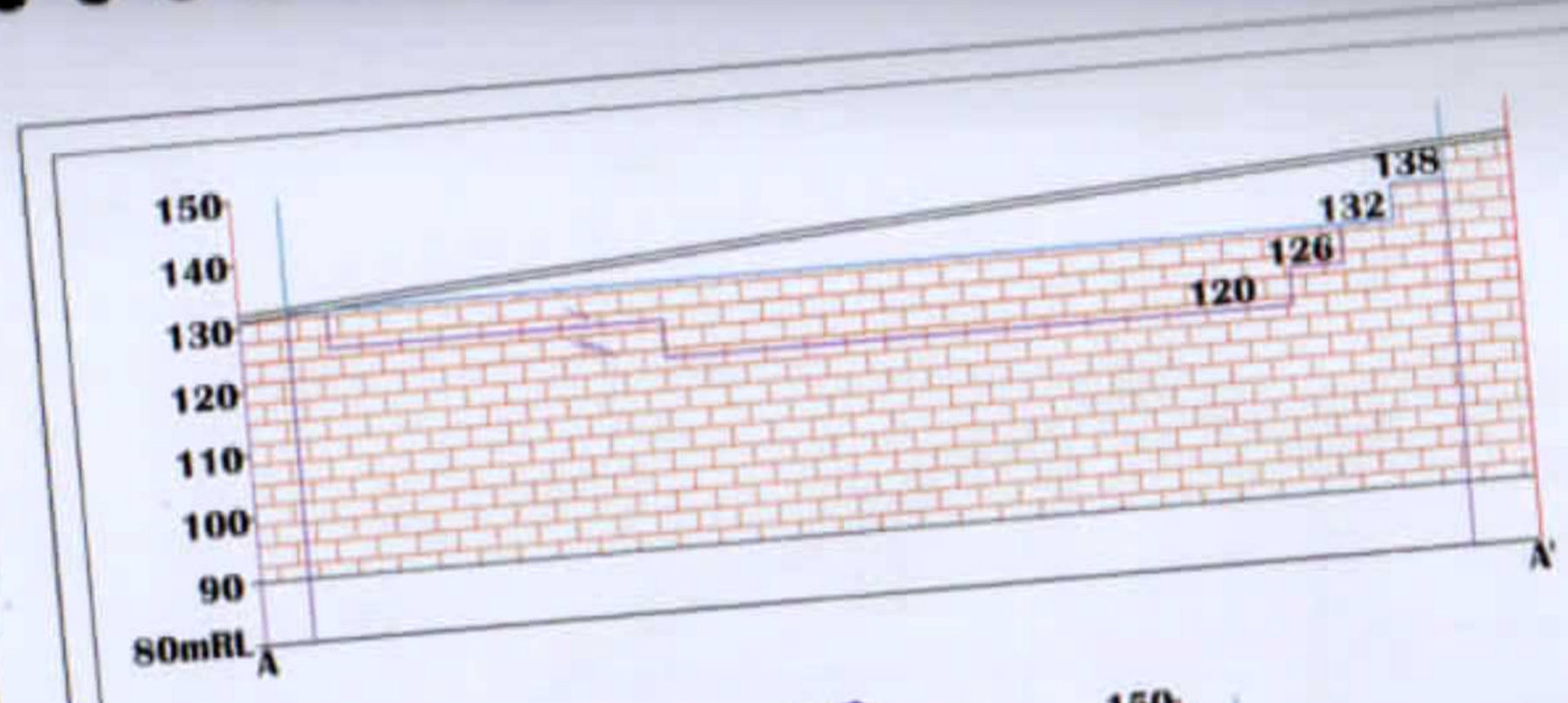
Lease applied for 12 Years

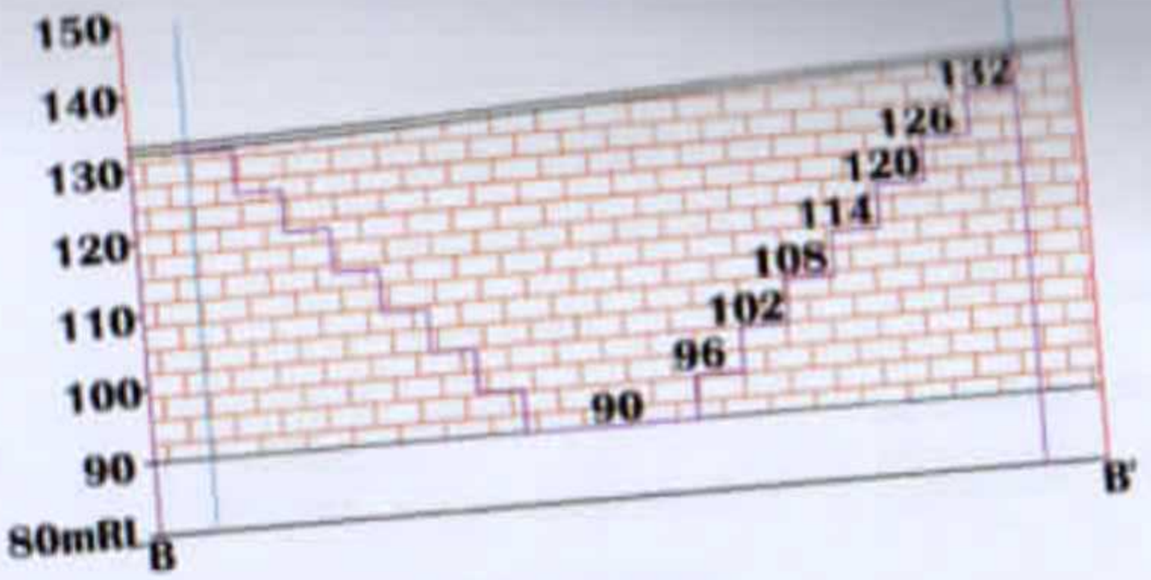
CERTIFIED THAT THE ABOVE PLAN IS C

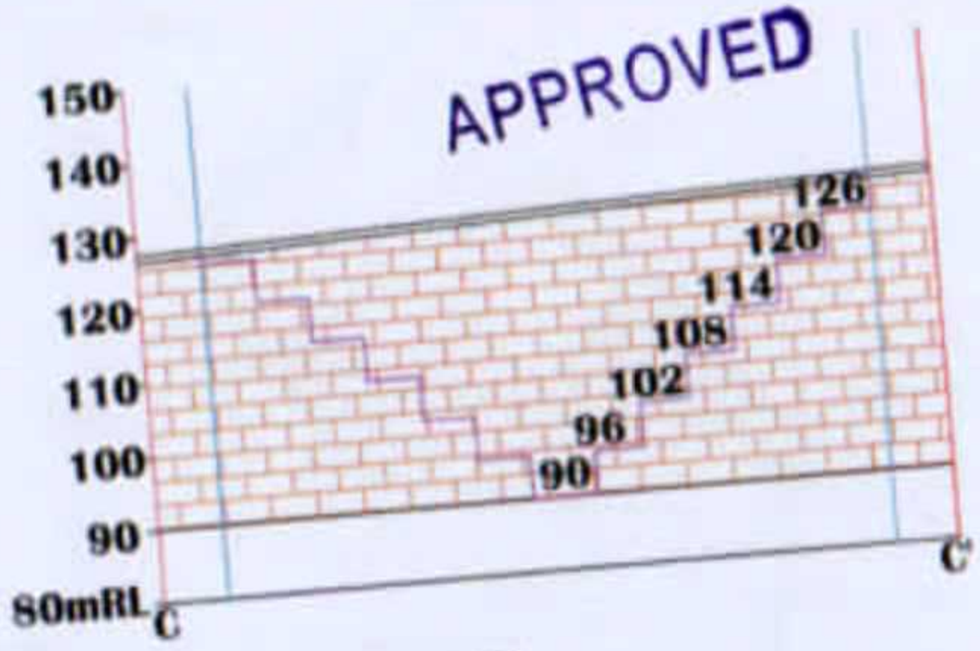
SIGNATURE-

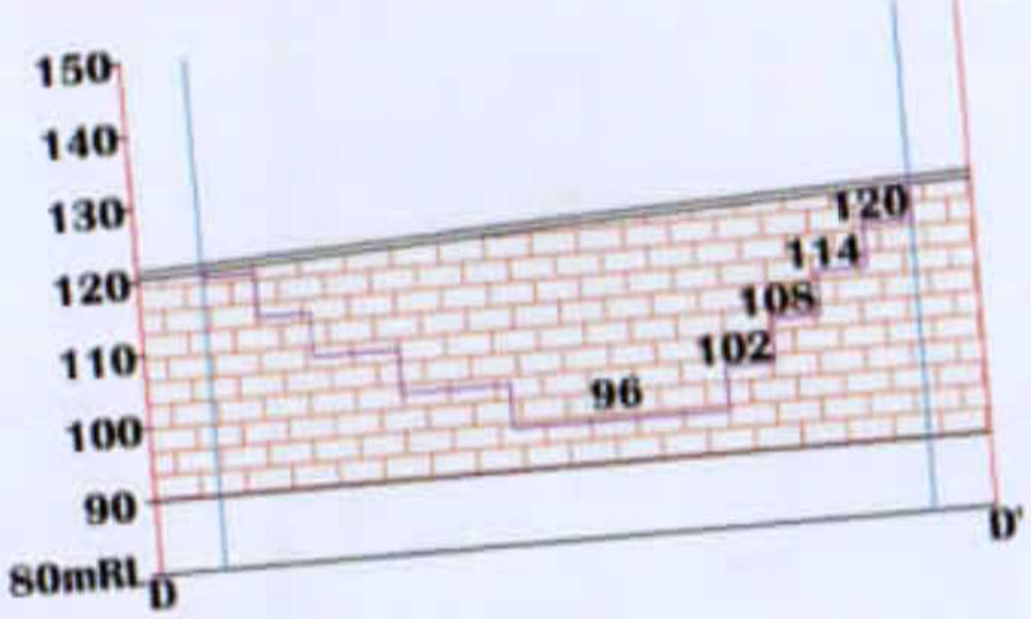
RQP- ASHOK KUMAR
Reg No- RQP/KOL/

Engineer
Directorate of Mineral Resources
Meghalaya, Shillong









APPROVED

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- PROPOSED WORKING

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

Plate No-

First Year Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syia
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

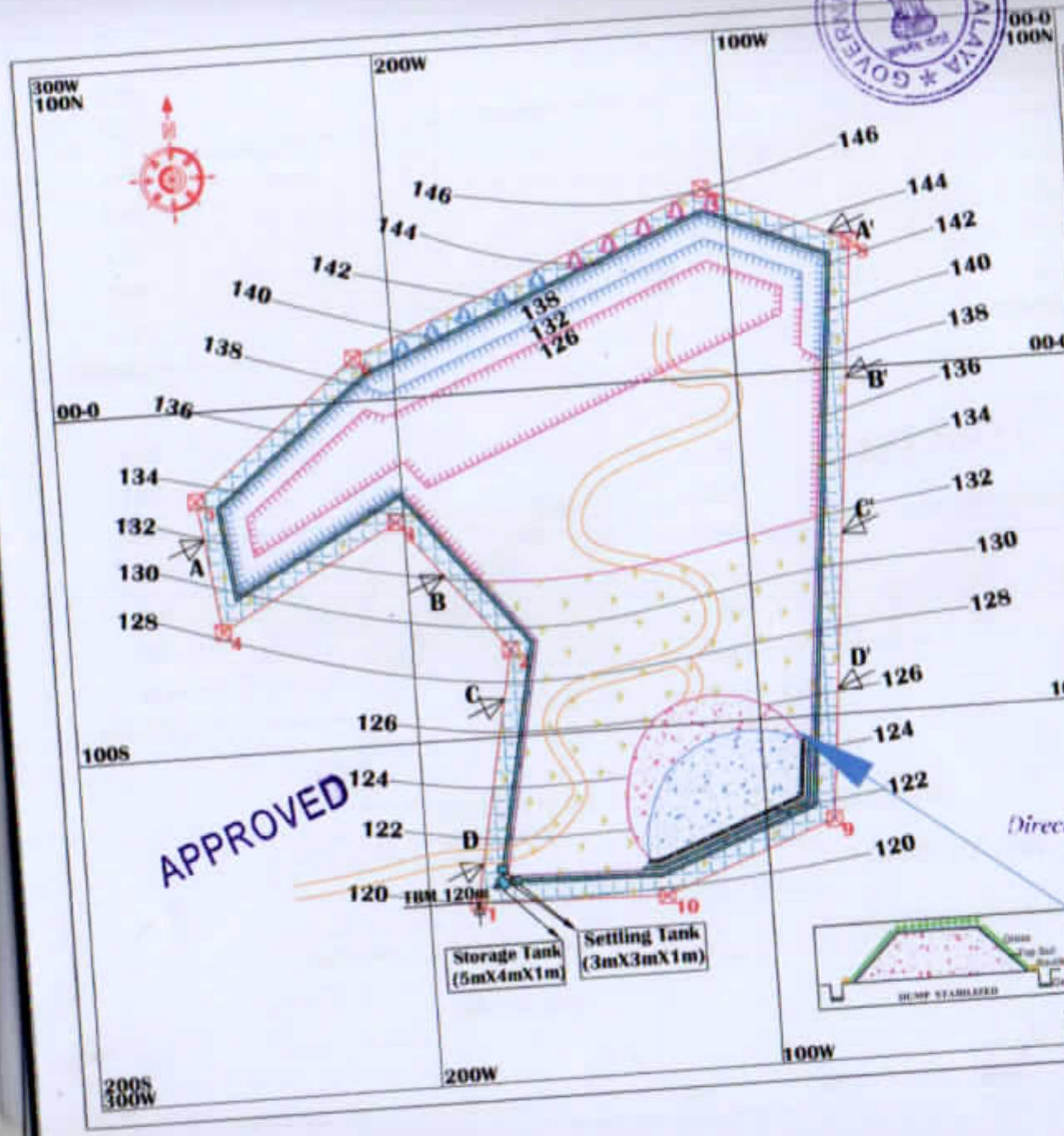
Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CO

SIGNATURE-

RQP- ASHOK KUMAR S
Reg No- RQP/KOL/377/



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- GRITTY SOIL
- ULTIMATE PIT LIMIT
- PROPOSED WORKING
- PROPOSED PLANTATION
- PROPOSED DUMPING
- PROPOSED GARLAND DRA
- PROPOSED PARAPET WAL

Plate No-

Development Plan 2nd Year

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

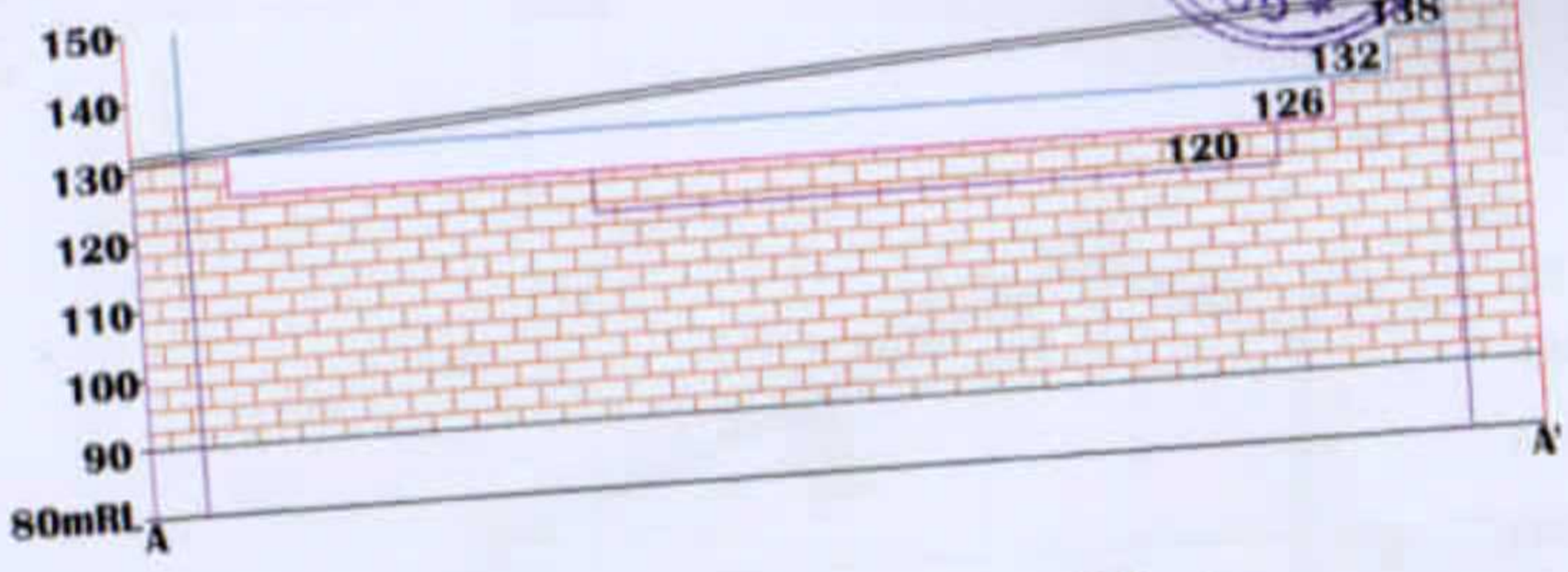
Scale	1:1500

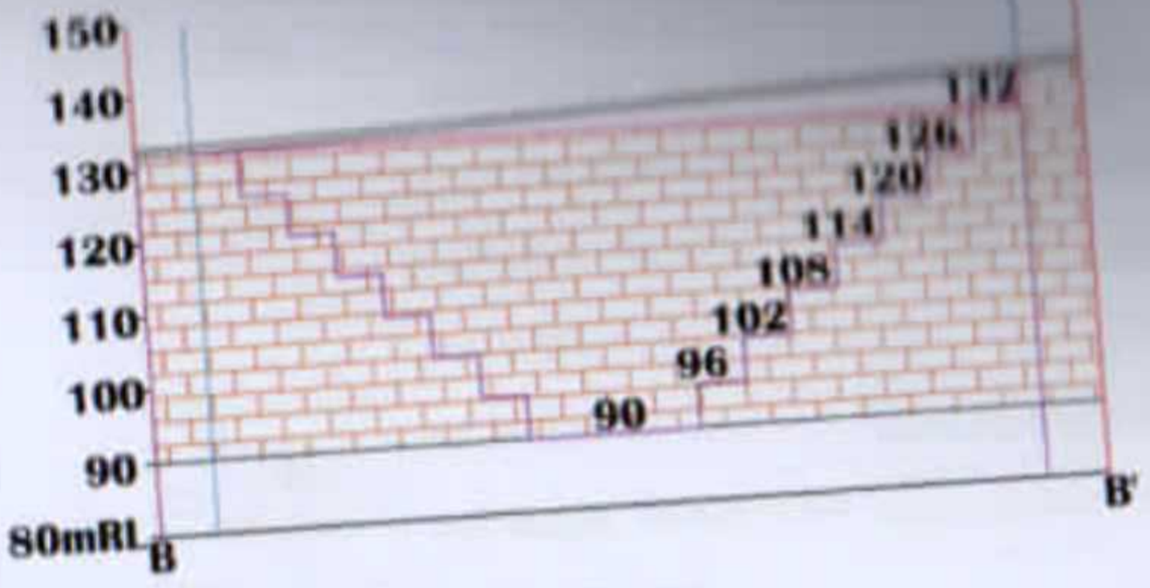
Lease applied for 12 Years

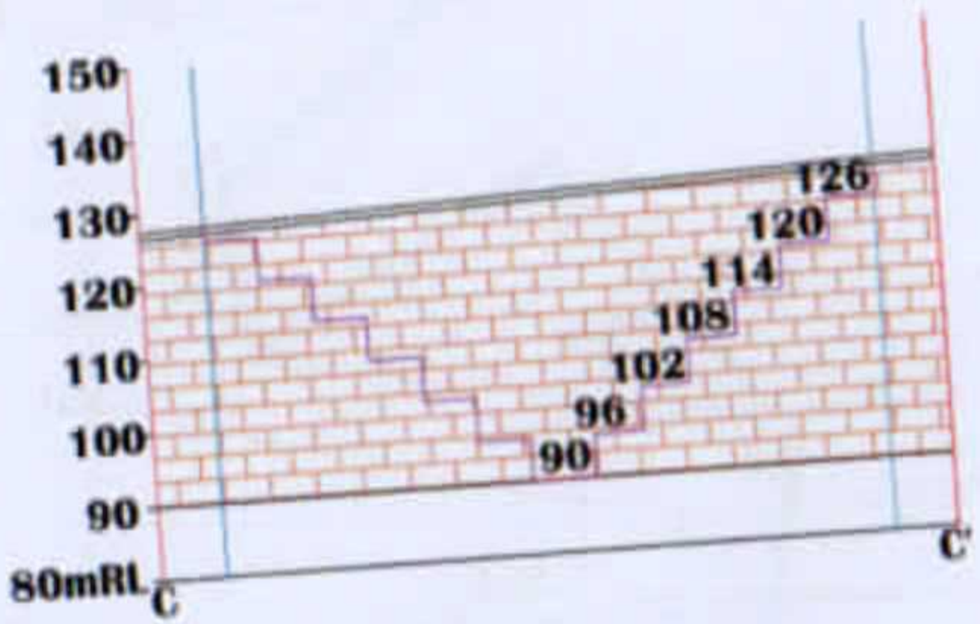
CERTIFIED THAT THE ABOVE PLAN IS COR

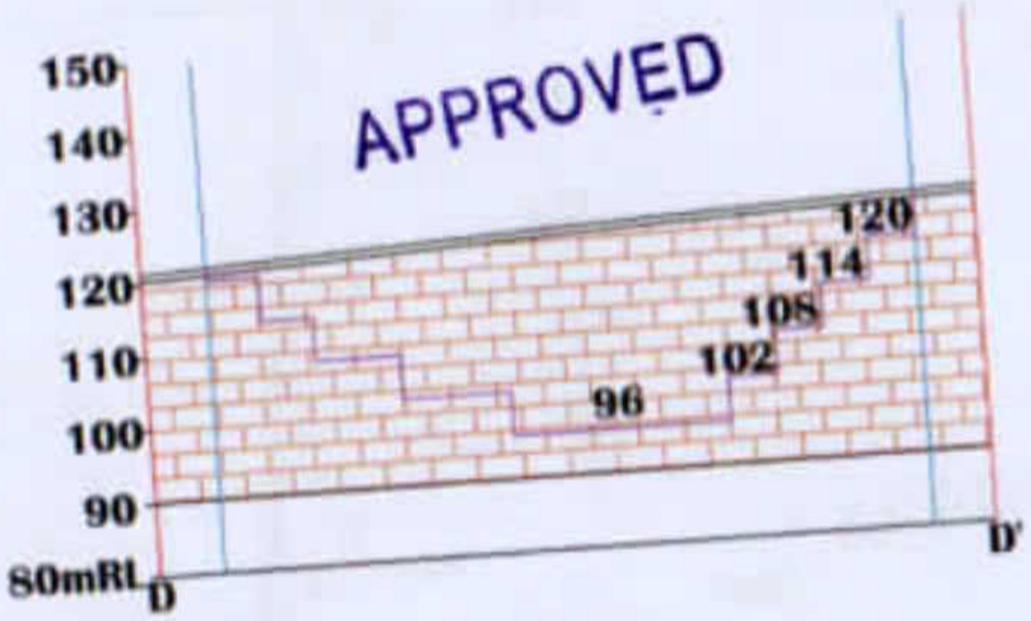
SIGNATURE-

RQP- ASHOK KUMAR SA
Reg No- RQP/KOL/377/20









APPROVED

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- LIMESTONE
- ULTIMATE PIT LIMIT
- PROPOSED WORKING

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate No-

Second Year Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

Lease applied for 12 Years

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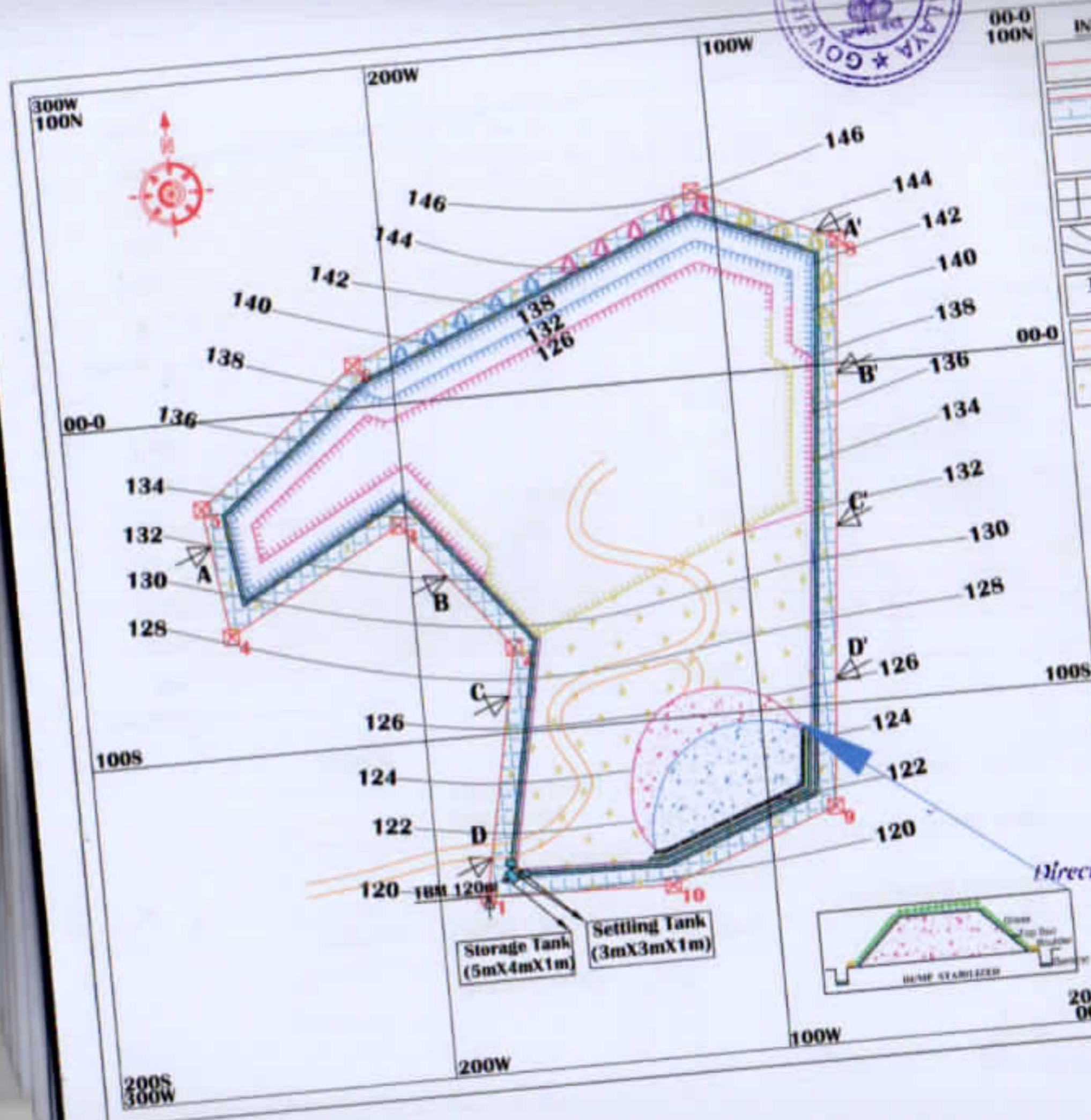
Reg No- RQP/KOL/377/2



APPROVED

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate No-

Development Plan 3rd Year

Lynti Dkhar Limestone Mine

Applicant
Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syia
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

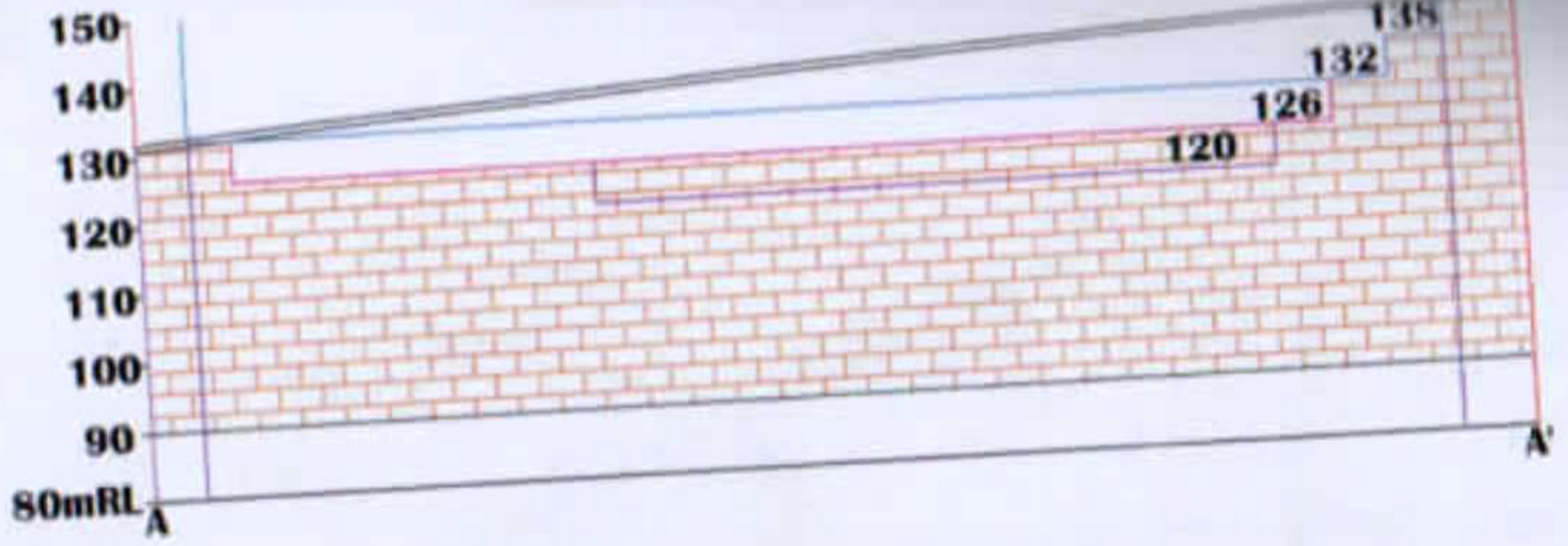
Scale	1:1500

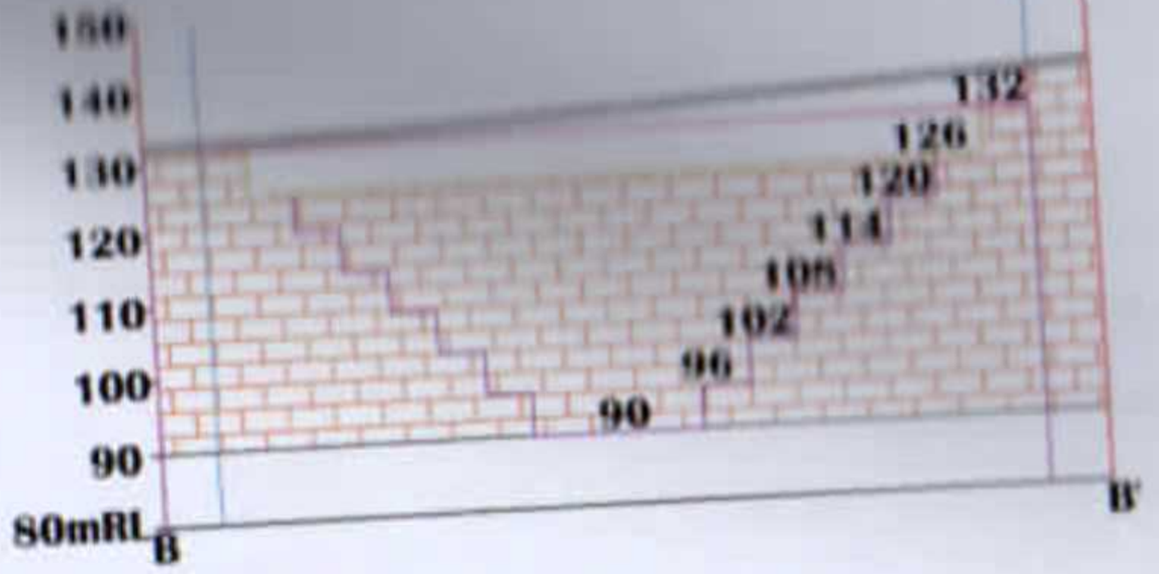
Lease applied for 12 Years

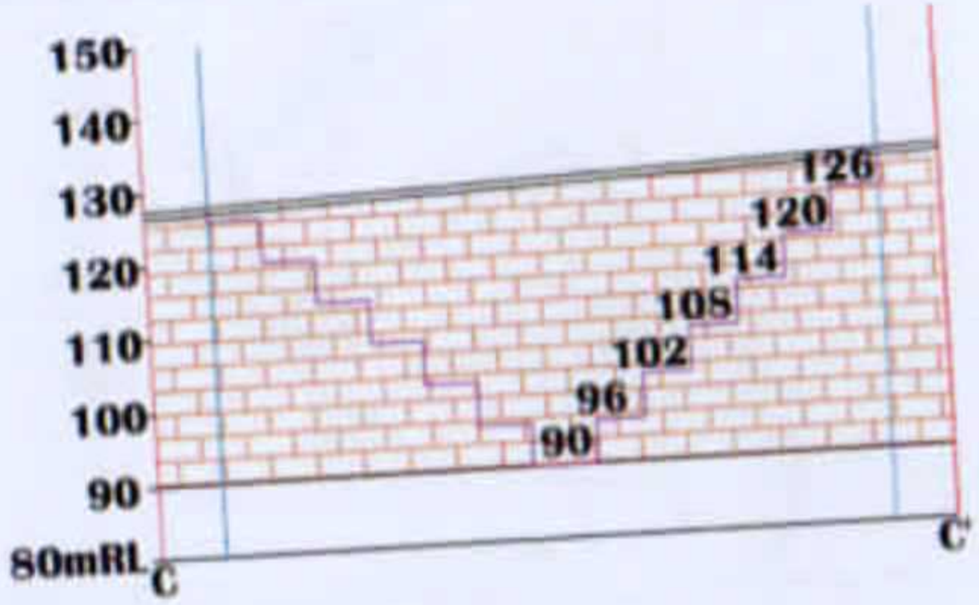
CERTIFIED THAT THE ABOVE PLAN IS CO

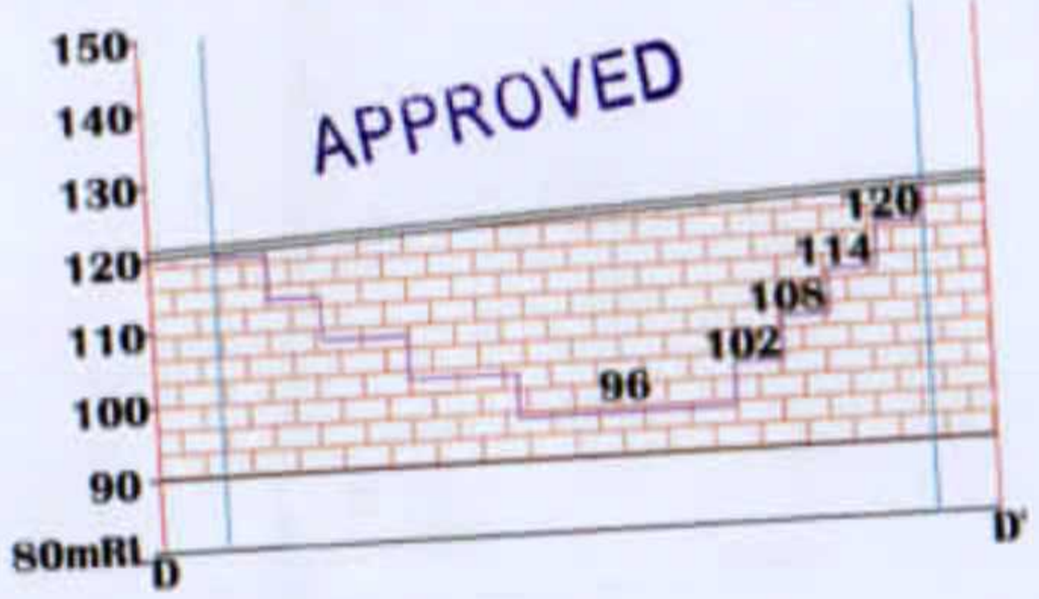
SIGNATURE-

RQP- ASHOK KUMAR S
Reg No- RQP/KOL/377/









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- GRITTY SOIL
- LIMESTONE
- ULTIMATE PIT LIMIT
- PROPOSED WORKING

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

Plate No- 7A

Third Year Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

Lease applied for 12 Years

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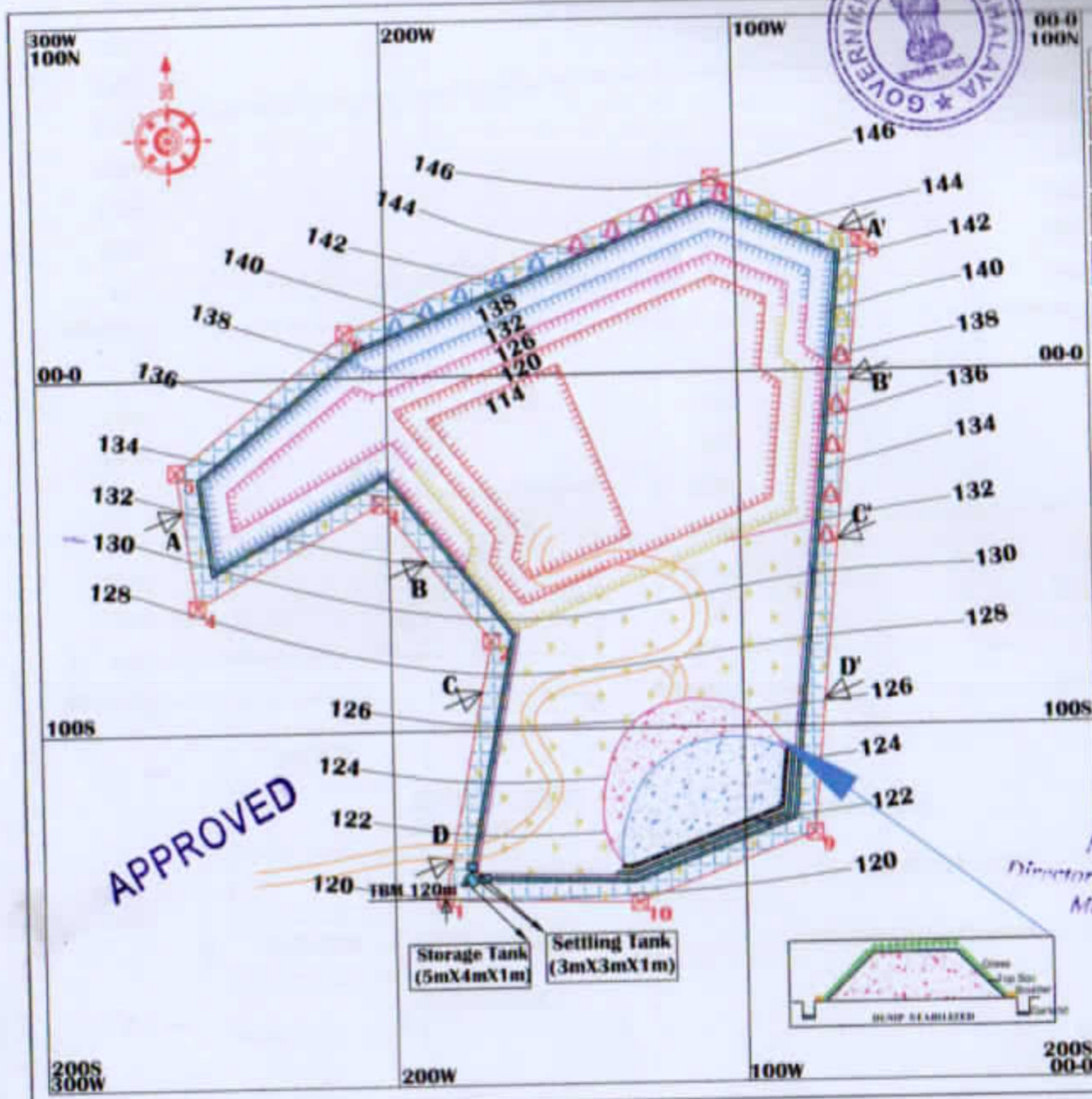
Reg No- RQP/KOL/377/2013/



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- ULTIMATE PIT LIMIT
- PROPOSED WORKING
- PROPOSED PLANTATION
- PREVIOUS DUMPING
- PROPOSED GARLAND DRA
- PROPOSED PARAPET WAL

Mining Engineer
Directorate of Mineral Resour...
Meghalaya, Shillong

Plate No- 6

Development Plan 4th Year

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORRE

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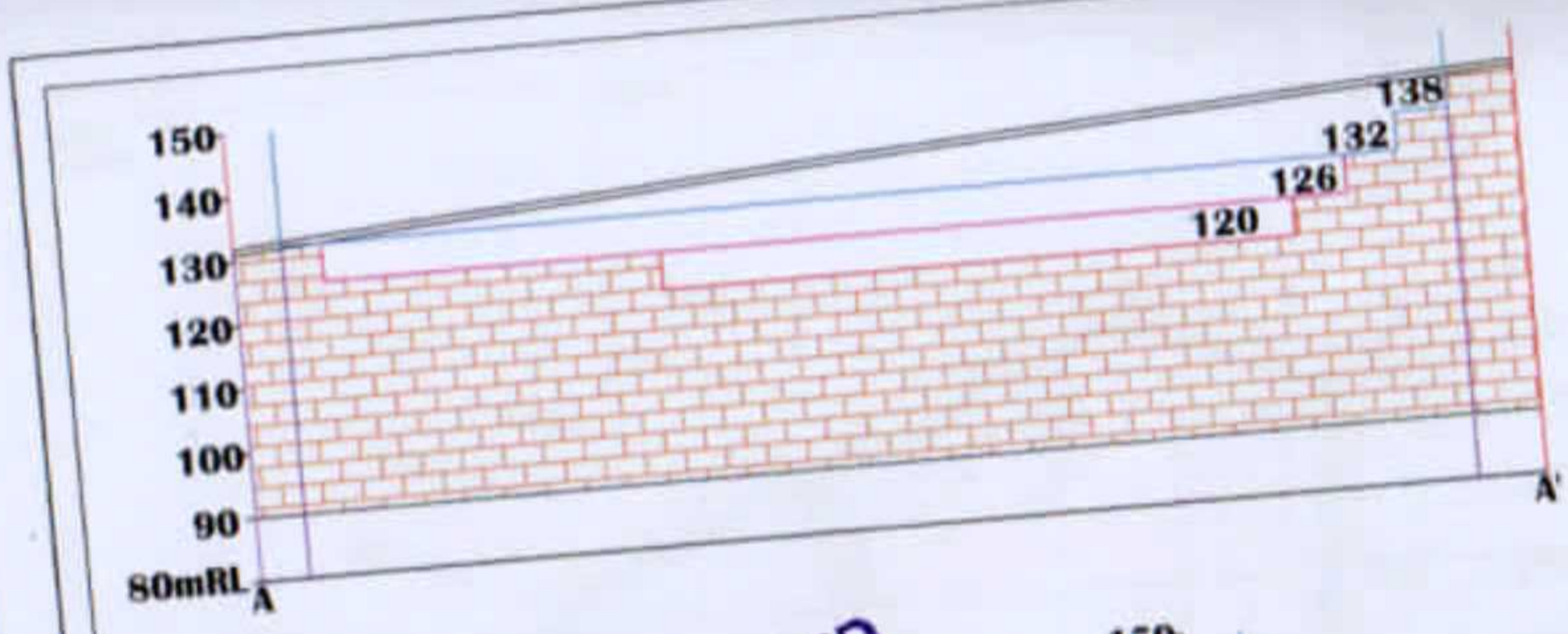
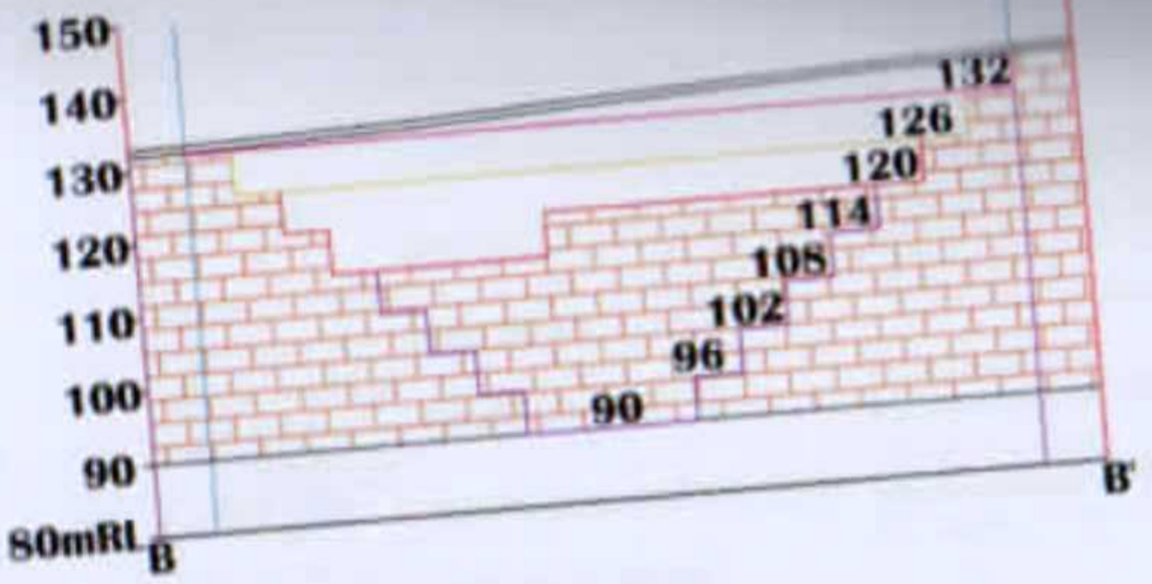
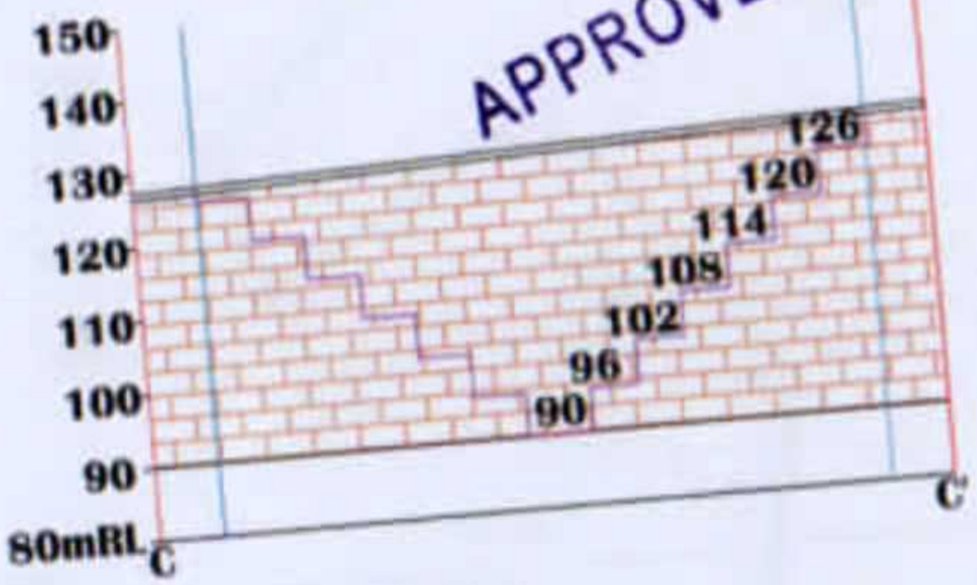
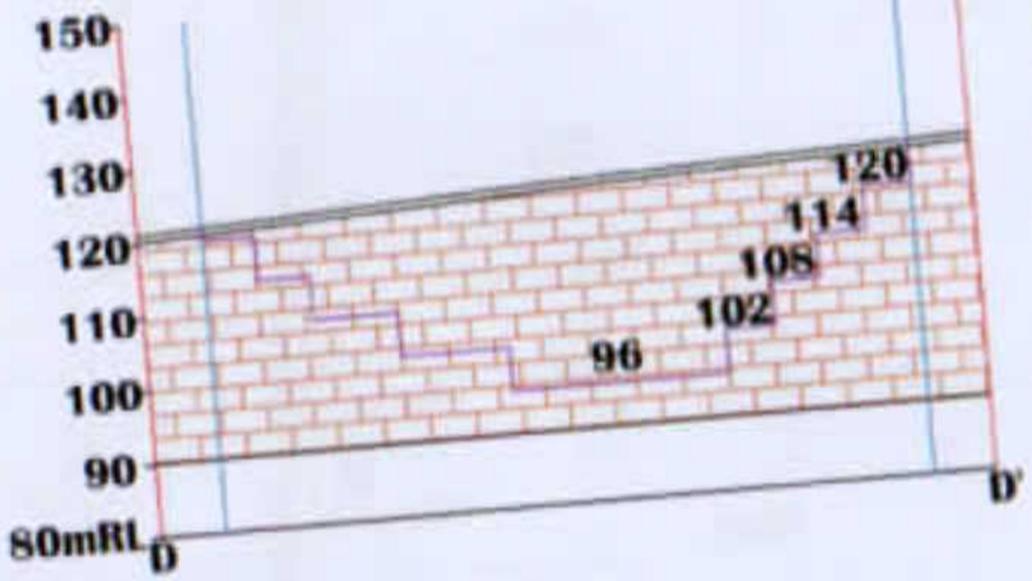
Reg No- RQP/KOL/377/2013/









APPROVED

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- SAFETY BARRIER
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- GRITTY SOIL
- LIMESTONE
- ULTIMATE PIT LIMIT
- PROPOSED WORKING

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

Plate No- 8

Fourth Year Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

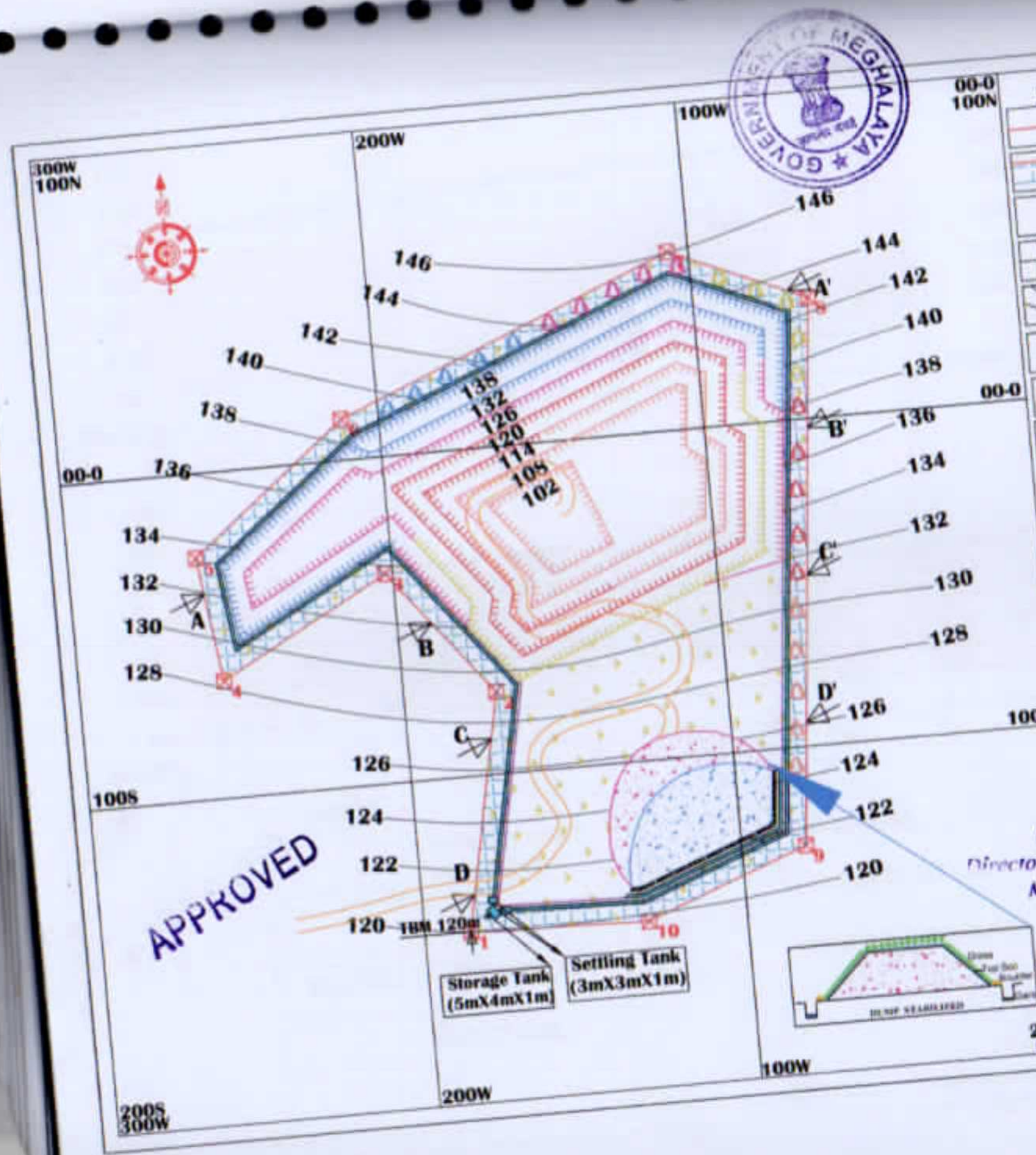
Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORR

SIGNATURE-

RQP- ASHOK KUMAR SA
Reg No- RQP/KOL/377/20



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- GRID LINES
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- TEMPORARY BENCH MARK (TBM 120m)
- APPROACH ROAD
- GRITTY SOIL
- ULTIMATE PIT LIMIT
- PROPOSED WORKING
- PROPOSED PLANTATION
- PREVIOUS DUMPING
- PROPOSED GARLAND DR
- PROPOSED PARAPET WA

Plate No

Development Plan 5th Yea

Lynti Dkhar Limestone Min

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalay

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Sy
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalay

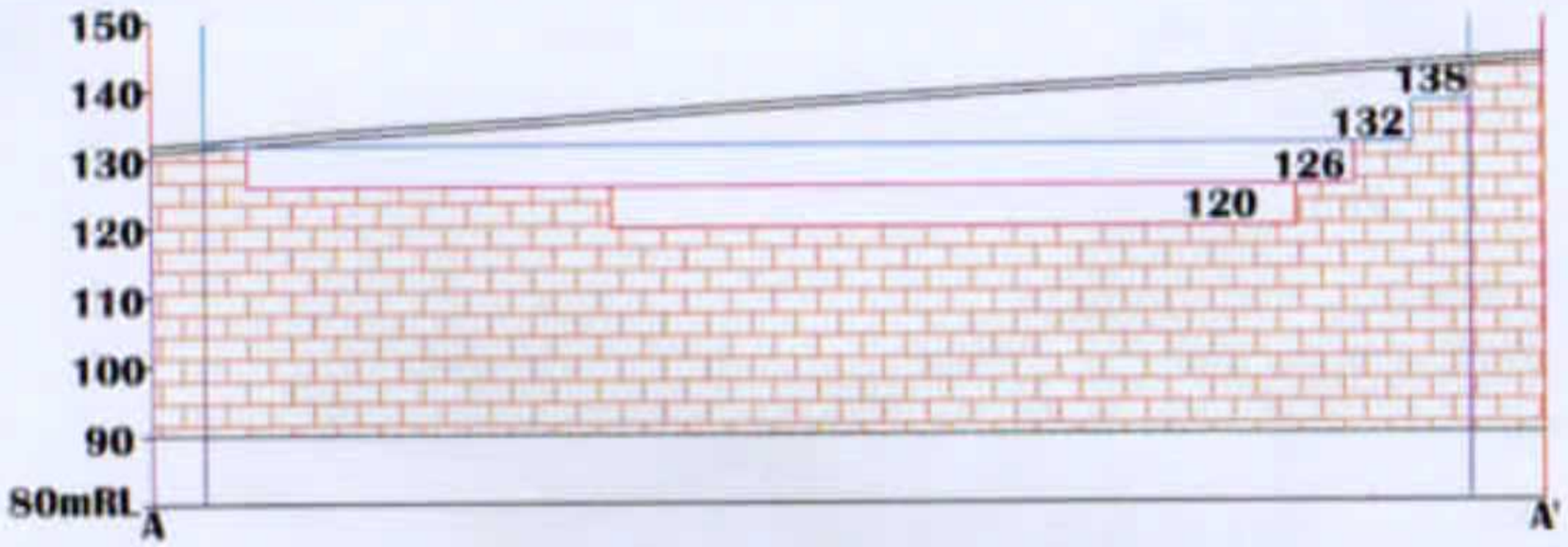
Scale 1:1500

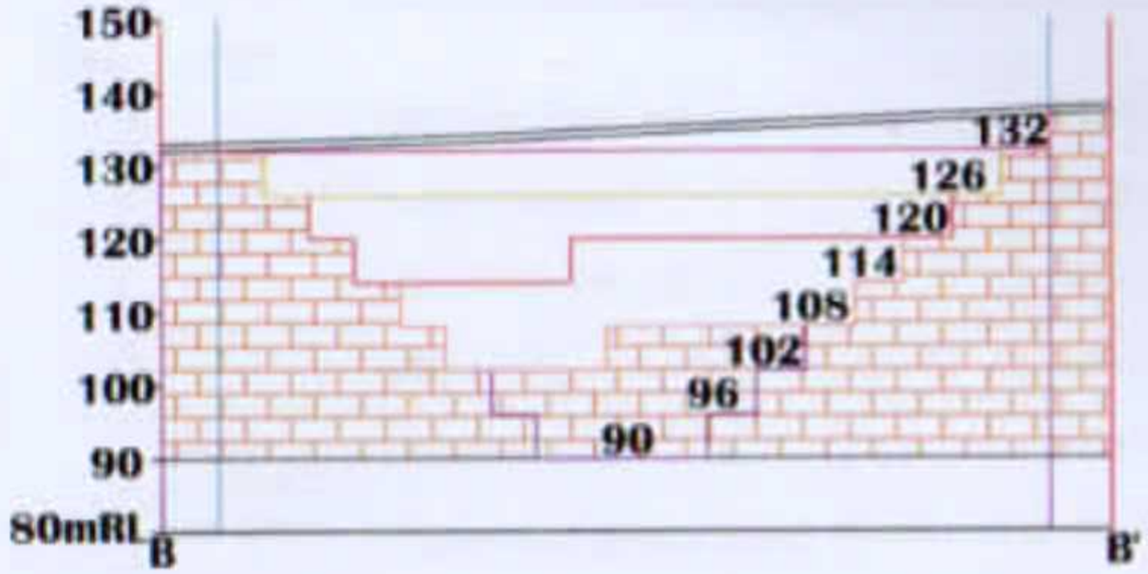
Lease applied for 12 Years

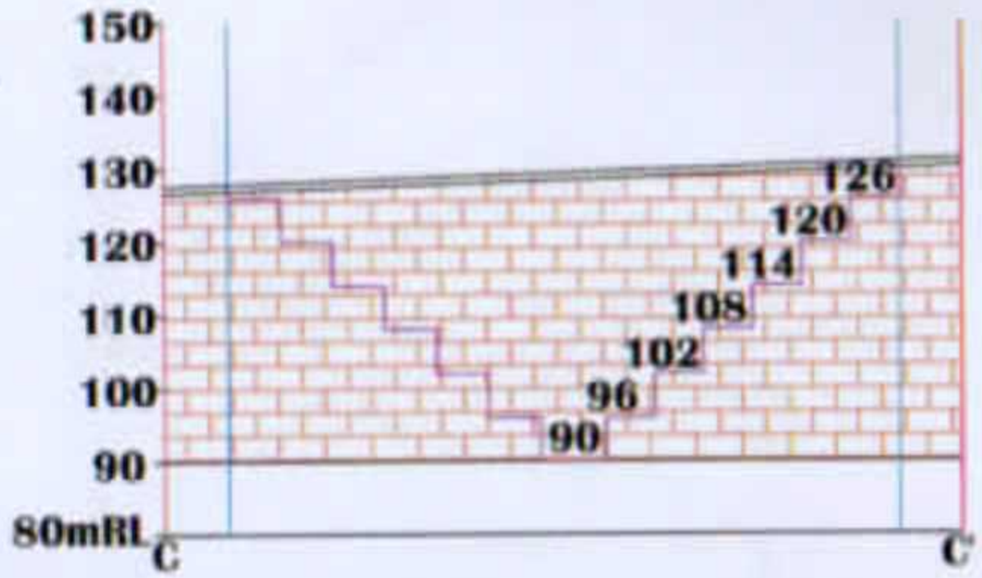
CERTIFIED THAT THE ABOVE PLAN IS C

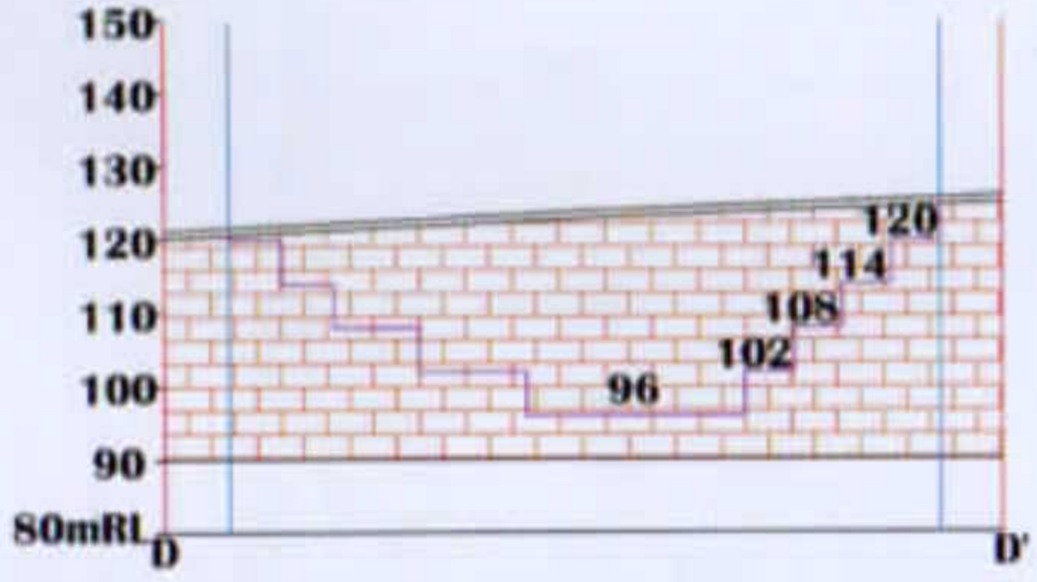
SIGNATURE-

RQP- ASHOK KUMAR
Reg No- RQP/KOL/37









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APPROVED

APPLIED LEASE BOUNDARY	LIMESTONE
SAFETY BARRIER	ULTIMATE PIT LIMIT
102,108... SPOT LEVELS	PROPOSED WORKING
GRITTY SOIL	

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate No- 9A

Fifth Year Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORRECT

SIGNATURE-

RQP- ASHOK KUMAR SARKAR
Reg No- RQP/KOL/377/2013/A

GOVERNMENT OF MEGHALAYA

300W
100N

200W

100W

00-0
100N

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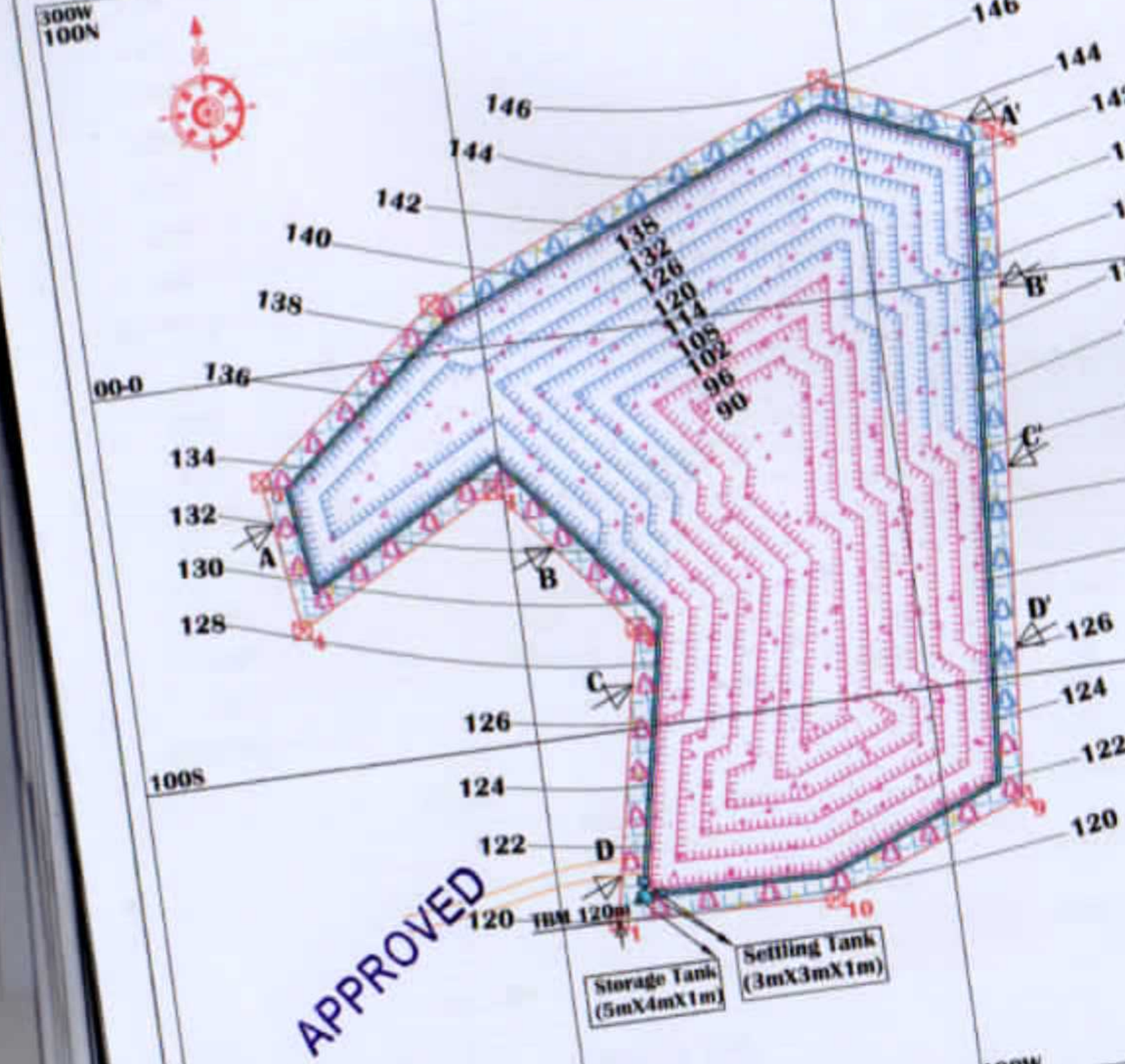
- APPROACH ROAD
- GRITTY SOIL
- PLAN PERIOD WORKING
- CONCEPTUAL WORKING
- PLAN PERIOD PLANTATION
- CONCEPTUAL PLANTATION
- CONCEPTUAL RECLAMATIO
- PLAN PERIOD GARLAND



APPROVED

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate

Coneptual Plan

Lynti Dkhar Limestone M

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj.
District:- East Khasi Hills, Meg

Applied Lease Area - 2.40 H

Applied Lease Area located at - Ka R
Lynti Dkhar Area, Sohbar Sirdar
District- East Khasi Hills, State - Me

Scale	1:
Lease applied for 12 Yea	

CERTIFIED THAT THE ABOVE PLA

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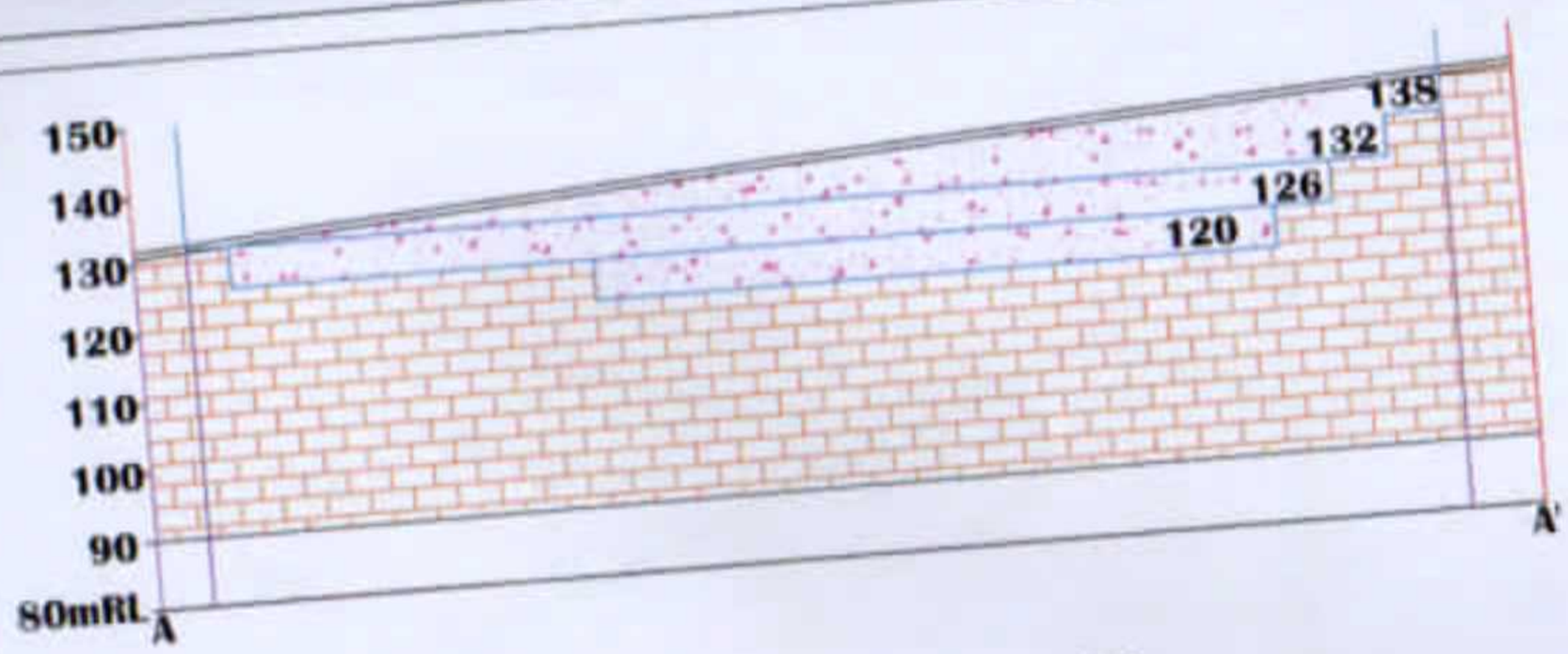
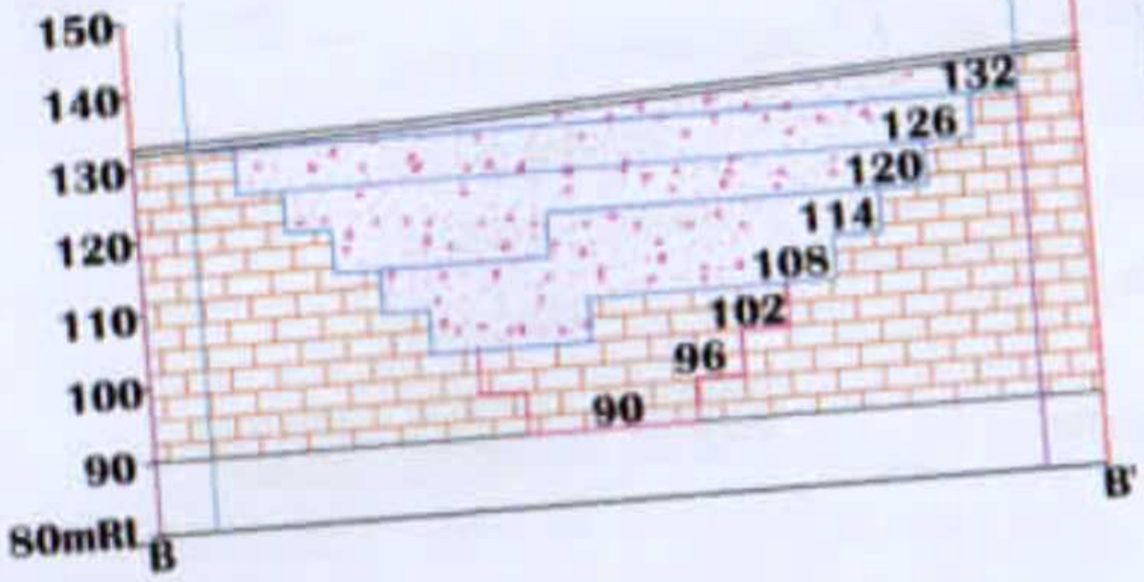
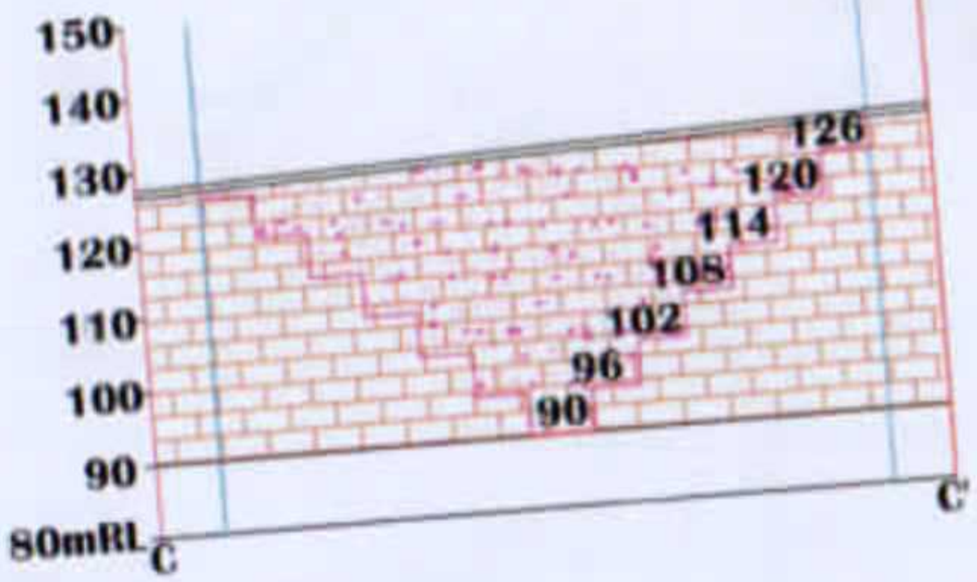
RQP- ASHOK K
Reg No- RQP/K







APPROVED

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- APPLIED LEASE BOUNDARY
- SAFETY BARRIER
- 102,108... SPOT LEVELS
- GRITTY SOIL
- LIMESTONE
- PLAN PERIOD WORKING
- CONCEPTUAL WORKING
- CONCEPTUAL RECLAMATION

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

Plate No- 10A

Conceptual Section

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

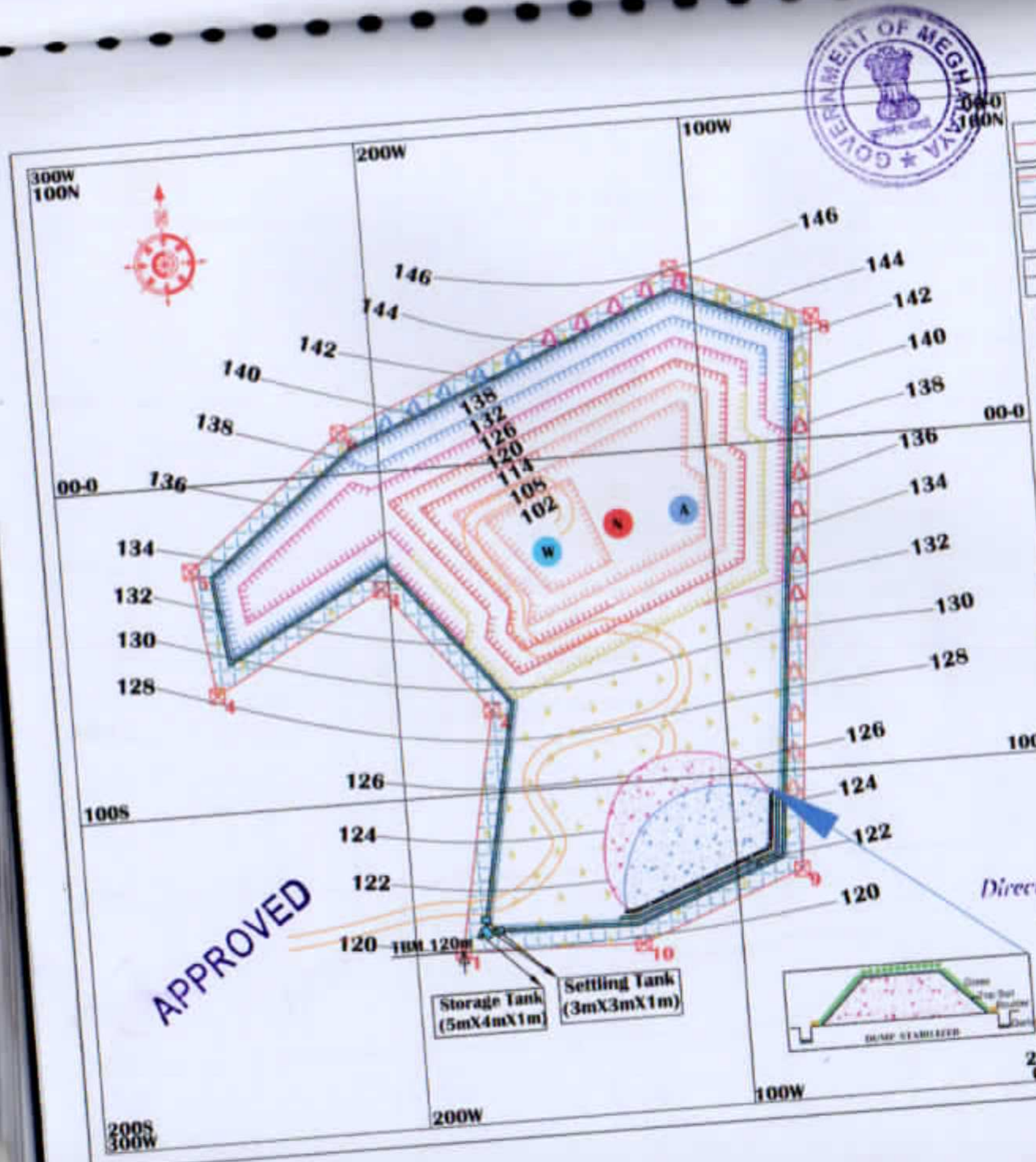
Scale	1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORREC

SIGNATURE-

RQP- ASHOK KUMAR SARKA
Reg No- RQP/KOL/377/2013/A



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- GRID LINES
- 132 / 134 CONTOUR LINE
- IBM 120m TEMPORARY BENCH MARK
- APPROACH ROAD
- GRITTY SOIL

PROPOSED WORKING	PROPOSED PLANTATION	PROPOSED DUMPING	
			1ST YEAR
			2ND YEAR
		NA	3RD YEAR
		NA	4TH YEAR
		NA	5TH YEAR

MONITORING STATION

- A AIR
- W WATER
- N NOISE

Plate No

Environment Management Pl

Lynti Dkhar Limestone Min

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalay

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syi
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalay

Scale 1:1500

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CO

SIGNATURE-

RQP- ASHOK KUMAR S
Reg No- RQP/KOL/377

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

GOVERNMENT OF MEGHALAYA

LEGEND

	APPLIED LEASE BOUNDAR
	7.5M SAFETY BARRIER
	BUSHES & SHRUB
	BOUNDARY LINE
	BOUNDARY LINE
	ROAD (Not in Scale)
	CONTOUR
	HABITATION
W	WATER MONITORING STATION
A	AIR MONITORING STATION
N	NOISE MONITORING STATION

Plate No-

Environment Plan

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha

Applied Lease Area located at - Ka Ri U Syiar,
Lynti Dkhar Area, Sohbar Sirdarship,
District- East Khasi Hills, State - Meghalaya.

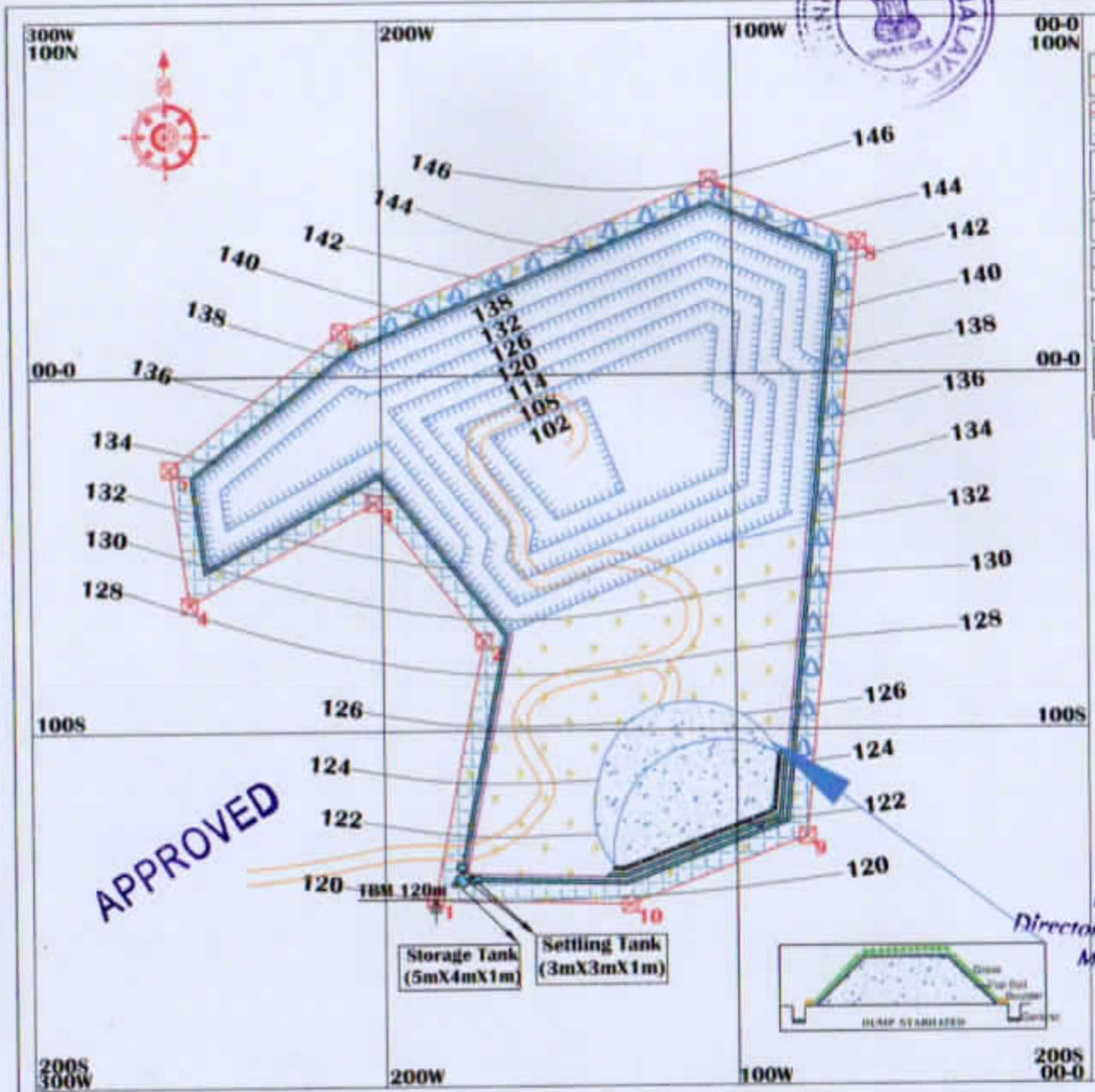
Scale	1:5000

Lease applied for 12 Years

CERTIFIED THAT THE ABOVE PLAN IS CORRE

SIGNATURE-

RQP- ASHOK KUMAR SARK
Reg No- RQP/KOL/377/2013



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- TBM 120m TEMPORARY BENCH MARK
- APPROACH ROAD
- GRITTY SOIL
- ULTIMATE PIT LIMIT
- PROPOSED WORKING
- PROPOSED PLANTATION
- PROPOSED DUMPING
- PROPOSED GARLAND D
- PROPOSED PARAPET W

Mining Engineer
Directorate of Mineral Resources
Meghalaya, Shillong

Plate No-

Progressive Mine Closure Plan

Lynti Dkhar Limestone Mine

Applicant

Smt. Ailadmon Japang
New Majai, Bholaganj,
District:- East Khasi Hills, Meghalaya.

Applied Lease Area - 2.40 Ha	
Applied Lease Area located at - Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, State - Meghalaya.	
Scale	1:1500
Lease applied for 12 Years	

CERTIFIED THAT THE ABOVE PLAN IS CORRE

SIGNATURE-

RQP- ASHOK KUMAR SARK
Reg No- RQP/KOL/377/2013

ANNEXURE V: CLUSTER CERTIFICATE

GOVERNMENT OF MEGHALAYA
DIRECTORATE OF MINERAL RESOURCES
SHILLONG

No. DMR/MM/36/2019/ 07 **Dated Shillong, the 24 January 2020**

TO WHOM IT MAY CONCERN

It is hereby certified that as on date, the approved mining plans indicated below are located within a distance of 500 meters from the periphery of the approved mining plan on Lime stone over an area 2.40 hectare located at Ka Ri U Syiar, Lynti Dkhar Area, Sohbar Sirdarship, District- East Khasi Hills, Meghalaya, of Smt Ailadmon Japang r/o New Majai village, Bholaganj, District- East Khasi Hills, State- Meghalaya:

S. No.	Approved mining plan	Area (hectares)	Mineral	Distance from the approved mining plan of Smt. Ailadamon Japang (metres)
1	Smt Nondini Syiemlieh	3.3750	Limestone	433

Yours faithfully,

(P. Clk Marak)
Mining Engineer,
Directorate of Mineral Resources
Meghalaya:::Shillong