

MINING PLAN

GHAGAR SAND GRAVEL & BOULDER MAHAL

District : Lakhimpur, Assam

Allotted Area : 5.0 Hectares

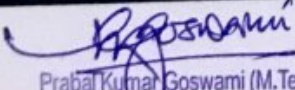
Approval from
THE DIRECTORATE OF GEOLOGY &
MINING, ASSAM.

Mining Plan is Approved
30-8-18
Director
Directorate of Geology &
Mining Assam, Guwahati-19

SUBMITTED
UNDER RULE -52(1) OF THE
ASSAM MINOR MINERAL CONCESSION RULES, 2013.

SUBMITTED BY :

*The Divisional Forest Officer
Lakhimpur Forest division.
Department of Environment and Forest
Government of Assam*


Prabal Kumar Goswami (M.Tech)
Regd. No. BCM/RQP/37/2018



GOVERNMENT OF ASSAM
OFFICE OF THE DIVISIONAL FOREST OFFICER : LAKHIMPUR DIVISION;
NORTH LAKHIMPUR.

Letter No. FLKT/B/Mining Zone/New (Genl)/2018/5763-64

Date: 27/08/2018

To,

The Director of Geology and Mining, Assam
Kahilapara, Guwahati-19.

Sub: Consent letter and declaration to be submitted by Divisional Forest Officers for preparation of Mining Plan.

Ref:- The PCCF & HoFF, Assam, Ghy.-37 letter No.FG.27/Nodal proposal (New)
Genl/Pt-III dtd.20-08-2018.

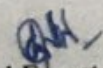
Sir,

With reference to the letter cited above, I am enclosing herewith filled up consent letter and declaration Form with a seal and signature as per direction of the Principal Chief Conservator of Forests and Head of Forest Force Assam, Panjabari, Guwahati-37 letter dtd.20-08-2018 as mentioned under reference.

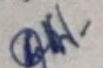
This is for favour of your kind information and necessary action.

Encl: As stated above.

Yours faithfully


Divisional Forest Officer
Lakhimpur Division
North Lakhimpur.

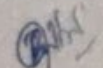
Copy to Sri Prabal Goswami, Registered Qualified Person, Regd. No.DGM/R.Q.P/37/2018, O/o the Director of Geology and Mining, Assam, Kahilapara, Guwahati-19 for information and necessary action.


Divisional Forest Officer
Lakhimpur Division
North Lakhimpur.

Memo No. FLKT/A/Mining Zone/New (Genl)/2018/1926-28

Date: 27/08/2018

1. Copy to the Principal Chief Conservator of Forests and Head of Forest Force Assam, Panjabari, Guwahati-37 for favour of his kind information and necessary action.
2. Copy to the Spl. Principal Chief Conservator of Forests(T), Upper Assam Zone, Kacharighat, Guwahati-1 for favour of his kind information.
3. Copy to the Conservator of Forests, Northern Assam Circle, Tezpur for favour of his kind information.

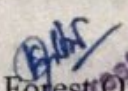

Divisional Forest Officer
Lakhimpur Division
North Lakhimpur.

DECLARATION BY THE APPLICANT

This Mining Plan is prepared under the provision of Rule 52(1) of the Assam Minor Mineral Concession Rules, 2013 in respect of the **"5.0 Ha Ghagar Sand, Gravel and Boulder Mahal Area"** measuring 5.0 Ha for 10 (ten) years located inside the Dullung Reserve Forest under North Lakhimpur Range, Lakhimpur Forest Division, Lakhimpur District, Assam for extraction and collection of Ghagar river bed deposits in the form of sand, gravels and boulders, is prepared in consultation with me. I understand its content and hereby agree to implement the extraction & collection work of the aforesaid minor minerals in accordance with the prevailing provisions of law. If any other permission is needed, I shall approach the appropriate authority, before commencement of the extraction work.

Date : 27/08/18

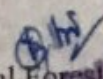
Place : Lakhimpur


Divisional Forest Officer,
Lakhimpur Forest Division,
North Lakhimpur.

CONSENT LETTER FROM THE APPLICANT

This Mining Plan in respect of the “5.0 Ha Ghagar Sand, Gravel and Boulder Mahal Area”, mining permit/lease/contract for sand gravel & boulders located in the Ghagar River Bed, under North Lakhimpur Range, Lakhimpur Forest Division, Lakhimpur District of Assam for extraction and collection of aforesaid minor minerals to facilitate various construction work within the state of Assam is being prepared by Sri Prabal Kumar Goswami (M.Tech.), resident of H/no. 17, Ganga Path, Anandapur, P.O. & P.S. Dispur, Guwahati-781006, and a RQP with Registration No.DGM/RQP/37/2018 from the Directorate of Geology and Mining, Govt.Of Assam, Guwahati with validity up to the midnight of 20/02/2028, on behalf of me.

I hereby undertake that the Mining Plan so prepared by the said RQP has been made with my knowledge and consent and shall be acceptable and binding of me in all respect.


Divisional Forest Officer,
Lakhimpur Forest Division,
North Lakhimpur.



: CERTIFICATE :

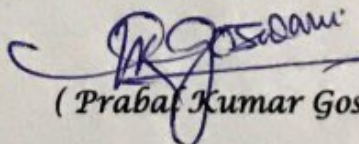
This is to certify that the Mining Plan of the 'GHAGAR RIVER BED SAND GRAVEL AND BOULDER MINING AREA, measuring 5.0 Ha located at Ghagar river bed of Dullung RF, for river bed deposits of sand gravel & boulder under Lakhimpur Forest division, District Lakhimpur, Assam for collection of above mentioned minor minerals from the river bed measuring 5.0 Hectares has been prepared in favour of the applicant The Divisional Forest Officer, Lakhimpur Forest Division, under the relevant provisions of the Assam Minor Minerals Concession Rules, 2013.

The applicant will approach concerned authorities for any other permission, if required, during the process of Mining Operation.

It is further certify that the information furnished in the Mining plan is true and correct to the best of my knowledge.

Place : Guwahati

Date :16/8/18.....


(Prabal Kumar Goswami)

Regd. No. DGM/RQP/37/2018

Directorate of Geology and Mining

Govt. Of Assam

Valid upto : 20/02/2028

Address : H/no. 17, Ganga Path, Anandapur,

Hengrabari, Ganeshguri, Guwahati 781006

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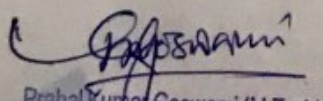
INTRODUCTION

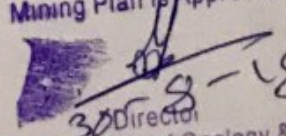
Lakhimpur district of Assam is located between $26^{\circ}48'00''$ and $27^{\circ}53'00''$ North Latitude and $93^{\circ}42'00''$ and $94^{\circ}20'00''$ East Longitude. The district is bounded on the north by Siang and Papumpare District of Arunachal Pradesh and on the east by Dhemaji District and Subansiri River. Majuli Sub Division of Jorhat District stands on the southern side and Gohpur sub division of Sonitpur District is on the West. (Fig.1).

The district is divided into two sub divisions viz. North Lakhimpur and Dhakuakhana and seven revenue circles, nine civil blocks and 81 Gaon Panchayats. There are 1184 villages in the district.

The Divisional Forest Officer, Lakhimpur Forest Division, With their office at Lakhimpur, intends to operate an sand gravel and boulder mining Contract in the Ghagar River Bed with area measuring 5.0 Hectare located at Dullung Reserve Forest Area under Lakhimpur Forest Division, Lakhimpur, Assam. This Mining plan is being prepared for extraction and collection of river bed deposits in the form of sand gravels and boulder and will be used in various construction works as well as filling purposes in Lakhimpur and adjoining districts, as recommended by the Department of Environment and Forest, Government Of Assam.

The Proposed land lying on the Ghagar River Bed and the proposed mine for extraction of aforesaid minor minerals will certainly accomplish the requirement for various construction works in and around Lakhimpur District.


Prabal Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

Mining Plan is Approved

30-8-18
Director
Directorate of Geology &
Mining Assam, Guwahati-19



This Mine plan is prepared for the Divisional Forest Officer, Lakhimpur Forest Division under the supervision of Principal Chief Conservator of Forest and HOFF, Department of Environment and Forest, Govt. Assam. (See 5(1),AMMCR,2013).

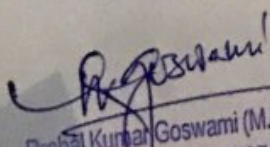
The location of the Ghagar mining zone, as has been recommended by the Department of Environment and Forest, Government of Assam. The location of the proposed mining zone is within the Dullung Reserve Forest, and, one motorable road is already exists which is passing by the Ghagar river. One approach road/ haul road has to be prepared from this road to the proposed mining zone to fulfill total connectivity. Through this road, the National Highway is just within 1.0 Km away.

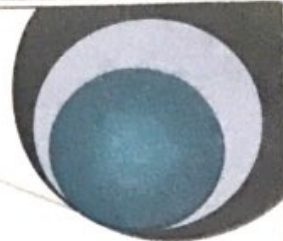
The proposed Mining area is located under the jurisdiction of Lakhimpur Range of Lakhimpur Forest Division, North Lakhimpur, Assam. The proposed site is not within any protected area under Archaeological, Religious, Cultural heritage or Defence Establishments. By opening a time bound sand gravel and boulder mahal as proposed, this area will benefitted by both direct and indirect generation of employment opportunities to the local people and thereby growth of economic activities.

Mining Plan is Approved

30-8-18
Director
Directorate of Geology &
Mining Assam, Guwahati-19

2


Prabali Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018



GENERAL INFORMATION.

The Applicant .

1.	Name	:	The Divisional Forest Officer Lakhimpur Forest Division
2.	Office Address	:	O/o Divisional Forest Officer Lakhimpur division PS. Lakhimpur
3.	Site Address	:	Ghagar Sand gravel & boulder Mahal Mining Contract Area Village : Ghagar RF District :Lakhimpur (Assam).
4.	Status of Applicant	:	Government Officer, Ministry of Environment & Forest, Govt. of Assam.
5.	Mineral Occurring in the area and its use	:	River bed deposits to be used for filling, levelling & other construction work
6.	Name of the Quarry	:	Ghagar Sand gravel & boulder Mahal Mining Area
7.	Quantity recommended for extraction	:	22,192 CuM per year for Sand gravel & boulder (Max.)
8.	Period allowed for Mining	:	5 (five) years
9.	Forest Range & Division	:	Dullung Range, Lakhimpur Forest Division, Lakhimpur District: Lakhimpur, Assam

Prabhat Kumar Goswami
Prabhat Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

Mining Plan is Approved

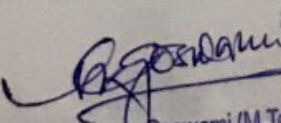


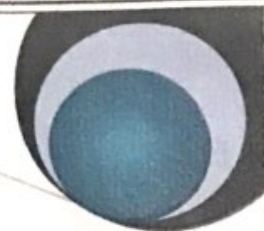
Director
Directorate of Geology &
Mining Assam, Guwahati-781005



10.	Survey of India Toposheet No. involved	:	83I/3 of zone 46
11.	Latitude /Longitude	:	1. 27°27'25.631"N- 94°13'12.536"E 2. 27°27'33.711"N- 94°13'07.103"E 3. 27°27'40.519"N- 94°13'03.193"E 4. 27°27'47.325"N- 94°13'02.349"E 5. 27°27'47.599"N- 94°13'04.733"E 6. 27°27'40.820"N- 94°13'04.735"E 7. 27°27'34.808"N- 94°13'08.695"E 8. 27°27'26.017"N- 94°13'14.403"E
12.	Nearest Railway Station	:	Lakhimpur
13.	Nearest Airport	:	Lilabari, Lakhimpur
14.	Nearest Highway	:	NH-31

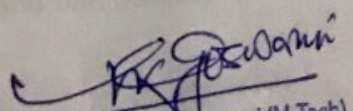
Mining Plan is Approved

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Director
Directorate of Geology &
Mining Assam, Guwahati-19
Prabal Kumar Goswami (M.Tech)
Regd. No. DCM/RQP/37/2018

**PARTICULARS OF THE RQP PREPARING THE MINING PLAN**

1.	Name of the RQP	:	Mr. Prabal Kumar Goswami
2.	Address	:	H/no. 17, Ganga Path, Anandapur, Hengrabari, Ganeshguri P.O. Dispur, Guwahati-781006
3.	Registration No.	:	DGM/RQP/37/2018, approved by The Directorate of Geology & Mining, Govt. of Assam, Kahilipara, Guwahati-19
4.	Validity of Registration	:	Upto 20-02-2028
5.	Contact Number	:	+919435116542 and +91 7896652563
6.	Email ID	:	goswami.prabal16@gmail.com

Mining Plan is Approved

30-8-18
Director
Directorate of Geology &
Mining Assam, Guwahati-19
Prabal Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018



LOCATION OF THE PROPOSED PERMIT AREA

The proposed Ghagar minig zone is just about 1.0 Km away from the National Highway 31, connected by a motorable road passing along the Ghagar river. During our site visit, we had to track upto 500m downstream to reach the proposed area as there is no any connectivity of the quarry site inside the Dullung RF. The location map of the proposed Permit area is shown in the Fig.1

The propose site is in the Ghagar River Bed under the jurisdiction of Lakhimpur Range of Lakhimpur Forest Division, North Lakhimpur, District Lakhimpur, Assam

The other details of the proposed permit area are as follows

1.	Village/ Area District State	Dullung Reserve Forest Lakhimpur Assam
2.	Period allowed for Mining	5(five) years
3.	Total area for mineral to be extracted	5 Ha
4.	Ownership/ Occupancy	Divisional Forest Officer Lakhimpur Forest Division North Lakhimpur District :Lakhimpur Assam
5.	Land use pattern	The area is within the Ranga Reserve Forest and the proposed land is without any agricultural activity for long time.

Prabir Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

Directorate of Geology & Mining Assam, Guwahati-19
30-8-18



THE ALLOTTED LAND AND THE TYPE

The total area proposed for grant of Mining is for 5 (five) years as suggested by the Directorate of Geology and mining, Govt. of Assam and located within the jurisdiction of Lakhimpur Forest Division for extraction as well as collection of sand gravel and boulder materials in 5.0 Hectares area. According to the Forest Department, it is a River Bed deposits and remained barren with no any agricultural activity for long time. (Fig.2 Site photographs)

As per the statement mentioned in the report of Divisional Forest Officer, Lakhimpur Forest Division, the total area available for mining is 5.0 Hectares.

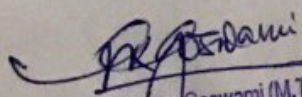
The available mineral of the proposed Mining area i.e. 'sand gravel and boulder' is to be excavated following a simple open cast quarrying method as described elaborately in subsequent chapter.

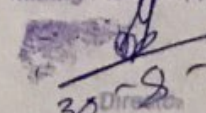
PROPERTIES OF THE SAND GRAVEL & BOULDERS.

The proposed mining zone is full of pebble, cobble and gravels in size loosely compacted and embedded in course grained sands. (Fig. 2).

USE.

The existing minor minerals in the Ghagar river bed deposits can be used for filling and other construction purposes.


Prabal Kumar Goswami (M.Tech)
Regd. No. BCM/RQP/37/2018

Mining Plan is Approved

30-8-18
Director
Directorate of Geology &
Mining Assam, Guwahati



RESERVE ESTIMATION FOR RIVER BED DEPOSITS.

The theoretical calculations of mineral reserves of the Ghagar mining zone to be available for extraction are as stated below

The area of the Permit Site	5.0 Ha = 50,000 Sq.M
The maximum depth allowed for extraction of the mineral in River bed	3 M
Total reserve of the minerals available	$50,000 \times 3 = 1,50,000 \text{ CuM}$

would be

The above quantity may be termed as 'Inferred Reserve' of the mineral. The actual mineral reserve will be less than that of the inferred reserve, since a considerable volume of the minerals have to be left un-mined for preparation of the benches/steps in Open cast mining method. This has been explained separately in the later chapters.

MINEABLE RESERVE OF THE MINERALS.

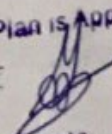
Considering a maximum depth of 3M allowed, the reserve of river bed available for extraction can be estimated as stated below :-

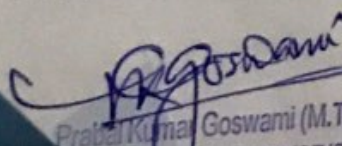
The area of the mining Permit site = 5.0 Hacteres = 50,000 Sq.M

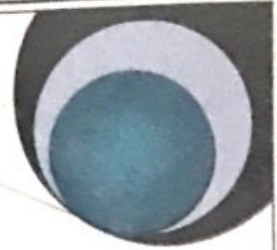
Maximum depth allowed for mining = 3 M

So, the total reserve of the sand gravel & boulder would be

= $50,000 \times 3 = 1,50,000 \text{ Cu.M}$

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 Director,
 Directorate of Geology &
 Mining Assam, Guwahati-78


 Prabal Kumar Goswami (M.Tech)
 Id. No. DGM/RQP/37/2018



As the Ghagar is a perennial river originating from the foothills of Himalaya in Arunachal Pradesh and carries various amounts of materials particularly in the form of sand gravels & boulders from its catchment area. The amount of carrying material is relatively high during rainy season. These materials will replenishes gradually by filling the mined out area in subsequent years. So, one rough estimation is made that 1.5 times of the estimated quantity of minor minerals (here, sand gravel & boulders) will be available for extraction for the allowable mining period of 5(five) years would be :

$$1,50,000 \times 1.5 = 2,25,000 \text{ CuM.}$$

And, the reserve of river bed available for extraction in one year would be about: $225000 / 5 = 45,000 \text{ Cu Metres.}$

For extraction of the river bed deposits (in the form of sand gravel and boulder) under the opencast mining method, three number of benches each of 1M depth and 1.5M width may be maintained as indicated in Fig. 4 & 5.

Assuming the mining loss as 10% during the extraction operation would be -
 $(45000 \times 10\%) = 4500 \text{ CuM per year}$

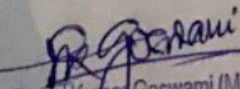
The mineable reserve of river bed deposits in one year

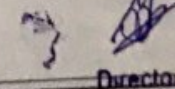
$$=(45,000 - 4500) \text{ Cu.M} = 40,500 \text{ Cu.M}$$

So, mineable reserve of minor minerals awarded for Mining period of 5 year would be $= 40,500 \times 5 = 2,02,500 \text{ Cu.M}$

Generally the extraction/ collection of river bed deposits are carried out for 8 (eight) months in a year and the work remain suspended for rest four months.

Mining Plan is Approved

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Prabal Kumar Goswami (M.Tech)
Sd/- No. GM/RQP/37/2018


Director
Directorate of Geology & Mining Assam, Guwahati-781 001



During these periods, the river bed remains full with seasonal rainfall water and other related problems. Considering the number of working days in a month to be 25, the total working days in a year would be $25 \times 8 = 200$ days. So, the extraction of river bed deposits in the form of sand gravel and boulders in a year (i.e. for 200 days) would be about,

$$= (40500/365) \times 200 = 22,191.78 = 22,192 \text{ Cu.M}$$

The aforesaid quantity of 22,192 Cu.M of river bed deposits in 1 year has been estimated considering extraction up to the maximum permissible depth of 3 metres from the ground level/ top surface.

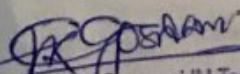
The mineable reserve of river bed deposits available for extraction in one year upto different depths is assessed as shown below :--

Depth(Meter)	Mineable Reserve of Ordinary Earth
3	22192 Cu.M Per Year
2	14794 Cu.M Per Year
1	7397 Cu.M Per Year
0.5	3699 Cu.M Per Year


The extraction of existing minor minerals of proposed mining zone will be within the mineable reserve of river bed deposits in the form of sand gravel & boulders available per year as depicted above.

However, the Competent Authority may prescribe the quantity of river bed deposits to be extracted by the Mining contract/permit Holder as per the terms and conditions of the Permit by taking into account the impact on the ecology and environment of the surrounding areas.

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Prabal Kumar Goswami (M.Tech)
Joint Director, Lakhimpur

Mining Plan is Approved


Director
Directorate of Geology &
Mining Assam, Guwahati-15



CLIMATE AND RAINFALL:

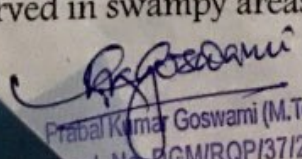
Lakhimpur (/ˌlæktɪmˈpuər/ *LAK-im-POOR*) is an administrative district in the state of Assam in India. The district headquarter is located at North Lakhimpur. The district is bounded on the North by Siang and Papumpare District of Arunachal Pradesh and on the East by Dhemaji District and Subansiri River. Majuli District stands on the Southern side and Biswanath District is on the West.

The Lakhimpur district occupies an area of 2,277 square kilometres (879 sq mi). Located in the North-East corner of the Indian State of Assam, the district of Lakhimpur lies on North bank of the river Brahmaputra. It is bounded on the North by Lower Subansiri and Papumpare Districts of the state of Arunachal Pradesh and on the East by Dhemaji District. Majuli, the largest river-island district is on the South and Biswanath District is on the West. The Brahmaputra is navigable for steamers in all seasons as far as Dibrugarh, in the rainy season as far as Sadiya; its navigable tributaries within the district are the Subansiri, Ranganadi and Dikrong. The exact location of the district is 26.48' and 27.53' Northern latitude and 93.42' and 94.20' East longitude (approx.).

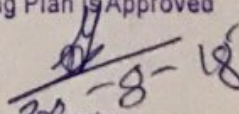
The district has three sub divisions -- Dhakuakhana, Narayanpur-Bihpuria and North Lakhimpur (sadar). Lakhimpur district has eight Police stations. viz. North Lakhimpur, Boginadi, Panigaon, Dhakuakhana, Ghilamara, Narayanpur, Laluk and Bihpuria.

Forests are mainly tropical rain forest. Important reserved forests includes Ranga Reserve, Kakoi Reserve, Dulung Reserve and Pabho Reserve. Wild elephants, buffaloes, tigers, deer etc. are there in the forests. Varieties of bird species are observed in swampy areas.

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Ord. No. DGM/RQP/37/2018

Mining Plan is Approved


30-8-18
Director
Directorate of Geology &
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The great Subansiri River has legends of once famous gold washing. But as of now there is no any major exploration of minerals in the district, except some minor exploration for petroleum by ONGC (Oil and Natural Gas Corporation) near Dhakuakhana. The whole Lakhimpur district enjoys Monsoon type Climate. The summer is hot and humid with an average temperature of 29°C. summer rain is heavy which is both boon and bane for the people. A boon ,for it provides natural irrigation to the agricultural field; and bane, as it causes the river to overflow their banks and causes flood. The winters extends from the month of October to February and are cold and generally dry with average temperature of 16°C. it get quite chilling in late December and early January, on account of snowfall in upper reaches of Arunachal Pradesh.

The climate of the district is subtropical and humid characterized by high rainfall. The annual rainfall is 3268mm and relative humidity 74 to 89 percent with a mean of 81 percent. The district receives SW monsoon rainfall from the month of April and continues up to September/October. The highest rainfall areas of the district are located near the foothills of Arunachal Himalayas, i.e., in the northern part of the district. The maximum temperature goes up to 35°C during June / July and minimum temperature falls to 8°C in December and January

Annual rainfall : 3268mm
Average humidity : 74 - 89%
Max. Tem. : 35°C in June/July
Min.Tem. : 8°C in December & January

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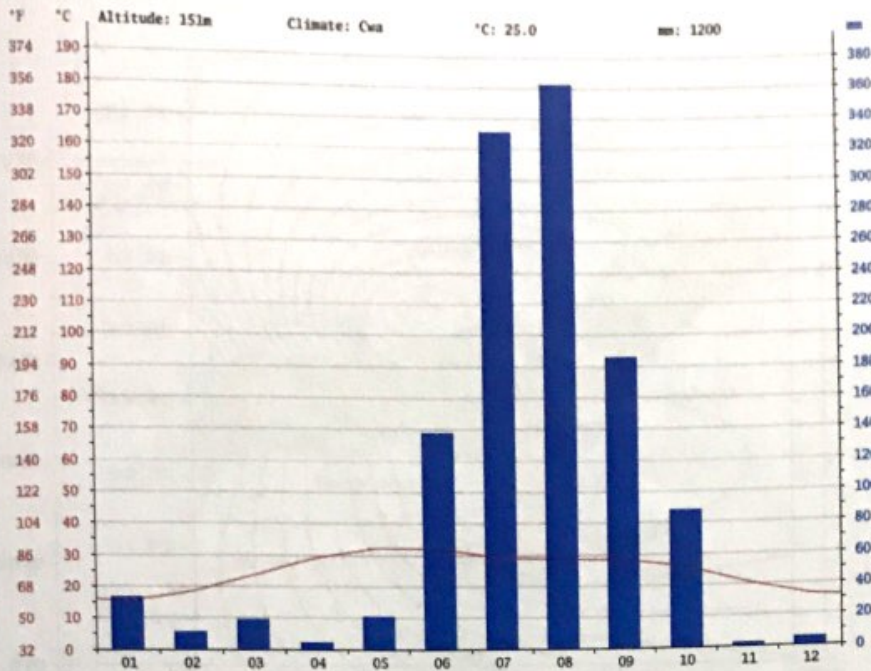


Plate 1 : Climate graph of Lakhimpur District

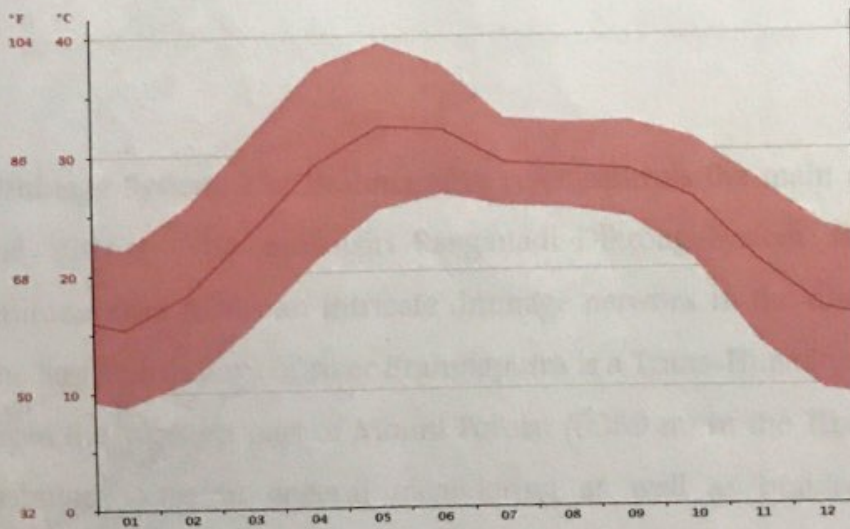


Plate 2 : Temperature graph of Lakhimpur district

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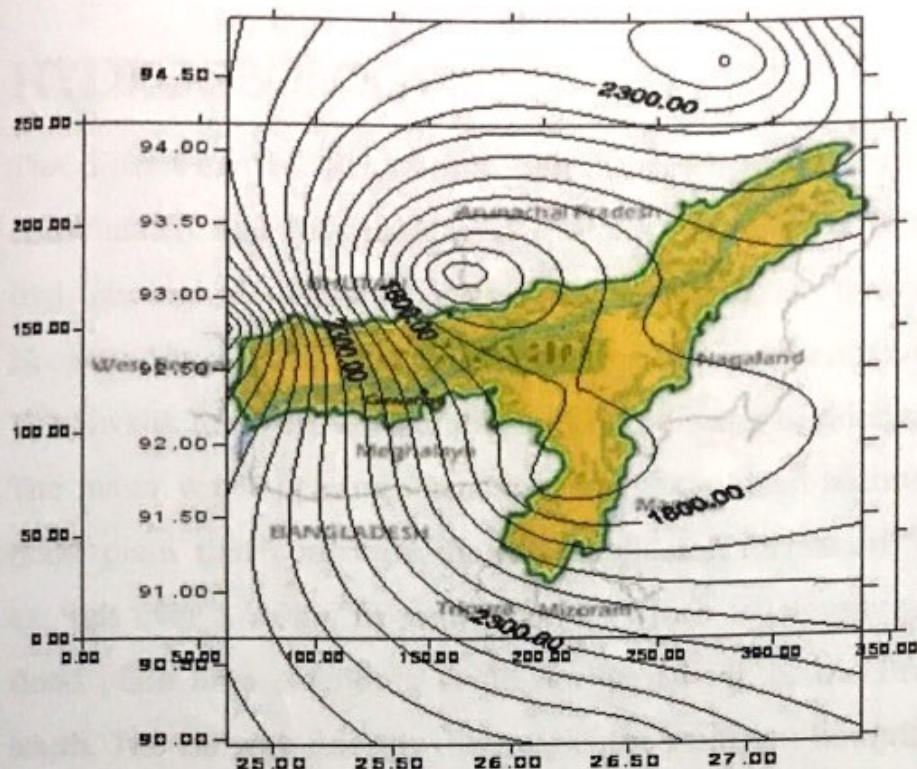


Plate 3 : Isohyetal map of Assam

Drainage System. The Brahmaputra river controls the main drainage system in the district. The Subansiri-Ranganadi-Dikrong-System that debouches in Brahmaputra forms an intricate drainage network in the district. The Subansiri the largest tributary of river Brahmaputra is a Trans-Himalayan river originating from the Western part of Mount Pororu (5059 m) in the Tibetan Himalaya. The tributaries are in general meandering as well as braided in nature. Peak discharge observed during monsoon and generally perennial in nature. However, near the foothills small streams generally dry up during the month of March/April. The riverbed and the bank materials are boulders, cobbles, pebbles and sands of various grades with very low clay materials concentration.

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Prabankumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

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HYDROGEOLOGY

The district can be divided into two distinct hydrogeological units, viz., semi-consolidated and unconsolidated (Plate. 4) formations based on geology and hydrogeological character. The semi-consolidated formation composed of Neogene Siwalik Group of rocks bordering the northern boundary of the district. The Siwalik rocks are not suitable for ground water development.

The major water bearing formations include alluvial sediments in foothills and flood plain that constitute the unconsolidated formation. The piedmont zone extends over 8-10km from the foothill, which is laterally followed by younger flood plain area extending up to northern bank of the Brahmaputra River in south. The railway line roughly marks the southern boundary of the piedmont zone (Bhabar Belt). The alluvial formations in the foothills are composed of sand, pebble, cobble and boulders. These materials have high permeability. In the flood plain area, however, little gravel mingles with different grades of sand.

Shallow Aquifer

The water bearing horizons occur within 30-50mbgl is considered to constitute shallow aquifer system. Ground water in this aquifer occurs under unconfined to semi-confined conditions. The aquifer materials comprise sands of different grades with varying proportions of gravels. The grain size of the aquifer materials is found to decrease towards the southern part of the district. The semi-confining layers are not persistent throughout the district. The top-confining layer is consisted of clay with interlayer sand and its thickness is varying from 15m to nearly 1m. The lower confining layer is generally 3m thick and is not regionally extensive.

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[Signature]
Subal Kumar Goswami (M.Tech)
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[Signature]
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Directorate of Geology &
Mining Assam, Guwahati-781005



Deeper Aquifer

In the deeper aquifers, ground water occurs under semi-confined to confined conditions. The upper confining layer is generally 3 to nearly 9m thick. The aquifer materials are composed of sands and gravels of different size grade. In this district, CGWB, NER had explored the subsurface down to the depth of 200m in Panigaon and Jalukata areas. The cumulative thickness of the granular zones in the deeper aquifer varies from 60 to 150m. There is a clear distinction of grain size of aquifer materials in the northern, southern and western part of the district. Presence of multi aquifer system in the western part of the district around Dholpur and Narayanpur is deciphered from litholog. The confining layers are not persistent. However, towards east, around Panigaon and Dhakuakhana, single aquifer zone is found down to the depth of 130 mbgl. The grain size of the aquifer material increases towards north, i.e. towards foothills.

Ground Water Movement

As mentioned earlier the district is bounded in the north by Arunachal Himalayas and the south by the Brahmaputra River, evidently the ground water flow direction is from the higher elevation in north towards the plain area in the south. In the western part of the district the ground water flow is from northwest to southeast. Whereas in the central and eastern part (around Dhakuakhana and Ghilamara area) of the district the flow is almost north – south. The highest water table is 110 m above mean sea level in the flood plain area towards south. In general the gradient of flow is high towards west as compared to the gradient in the eastern part. In the northern foothill region, the water table gradient is steeper (1.5m/km) and it forms the recharge zone for the entire district.

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Depth to Water Level

CGWB is monitoring 20 ground water wells (GWW) in Lakhimpur district. During 2012, pre-monsoon depth to water level varied from 1.59 to 5.33 mbgl and post-monsoon depth to water level varied from 0.36 to 3.60 mbgl.

During pre-monsoon period about 50% of GWM stations showed water level above 3mbgl and rests showed water level below 3 m bgl. During post-monsoon period about 10% of GWM stations showed water level above 3mbgl and rests showed water level below 3 m bgl.

Water Level Fluctuations

The study of the water level data has revealed that the general fluctuation of water table during pre and post-monsoon is in between 0 to 2 m in plain area and more than 2 m in areas adjacent to river Dikrang. The major parts of the gross rise in water table during April to July dissipates quickly. Low ground water fluctuation in the area is due to low ground water draft and rapid ground water movement through the aquifer where by and large scale draft at one place is compensated by ground water recharge from other places.

Long Term Water Level Trend

Long term ground water level trend for post-monsoon period (Nov, 2001 to 2010) shows that 7 (41%) GWMS indicate rise in water level whereas 11 (59%) GWMS indicate fall. Rise in water level ranges from 0.005 to 0.139metre/year while fall in water level ranges from 0.017 to 0.298 metre/yr.

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Ground Water Quality

Water samples were collected from Ground Water Monitoring Stations (GWMS) of the district for assessing the chemical quality of ground water and determining the suitability for drinking and irrigation purposes.

From the chemical analysis data of ground water samples, it can be said that the ground water of dug well of the district is slightly acidic to slightly alkaline (pH= 5.83 to 7.11). Electrical conductance (EC) of ground water varies from 89 to 473 detectable limit. However, in Panigaon, Dolonghat Chariali and Kadam GWMS fluoride content are 0.44, 0.18 and 0.11 mg/l respectively, which are within permissible limit. Iron content generally varies from 0.13 to 6.98 mg/l. It is observed that iron content is generally high in permanently water-logged areas like Bhogpur Chariali, Bihpuria and Kadam.

As per the information available in National Rural Drinking Water Mission, there are 354 habitats affected by iron contamination.

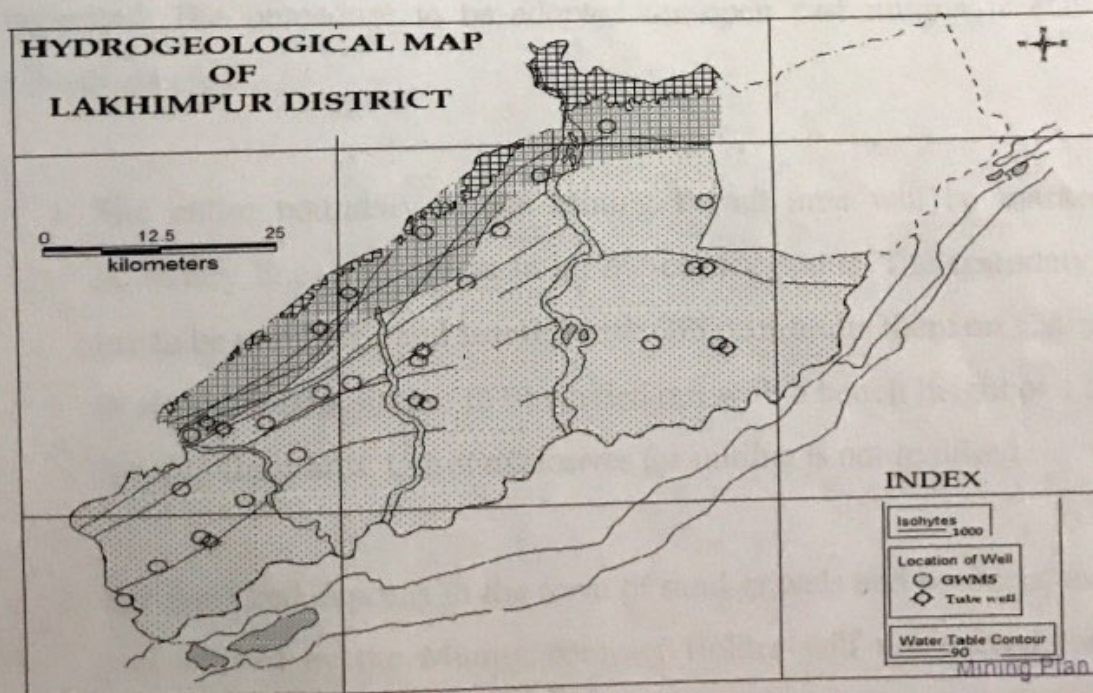


Plate 4 . Hydrogeological map of Lakhimpur District

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Prabhu Kumar Goswami
Prabhu Kumar Goswami (M.Tech)
Regd. No. DGM/ROP/37/2018

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MINING

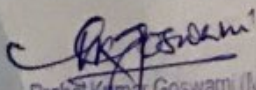
In order to ensure the conservation of mineral, Systematic mining and protection of environment, the Assam Minor Mineral Concession Rules (AMMCR), 1994 has been replaced by AMMCR, 2013 and it has been made mandatory to prepare mining Plan and progressive Mine closure Plan for grant of any mineral concessions like "Mining Lease", "Mining Contract" or "Mining Permit" in respect of minor minerals for systematic and scientific development of all mines, quarries as well as river bed mining.

In this case, it is proposed to extract the sand gravels and boulders from the flood plain deposits on Ghagar River Bed.

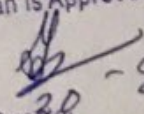
The minerals available for extraction are loose to semi-compact deposit of cobbles, pebbles, boulders of various grades embedded in coarse sands and to extract the same from this deposit, manual opencast method of mining is suggested. The procedure to be adopted for open cast mining is elaborately described below:

1. The entire boundary of the Mining Permit area will be marked with boundary lines and pillars in all the corner points. The boundary pillars are to be numbered and marked with GPS coordinate there on. Extraction of river bed deposits are to be carried out with a bench height of 1.0 meter for the whole area. Use of explosives for mining is not required.
2. The river bed deposits in the form of sand gravels and boulders, extracted and stacked by the Mining contract Holder will not exceed twice the average monthly production.

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Prabati Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

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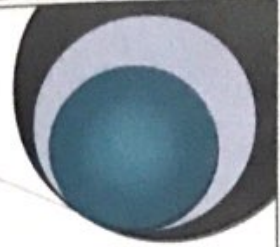

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3. No mining would be permissible in a river bed upto a distance of five times of the span of a bridge on upstream side and ten times the span of such bridge on downstream side, subject to minimum of 250M on upstream and 500M on the downstream side.(rule 39(i) of AMMCR, 2013)
4. There shall be maintained an un-mined block of 50M width after every block of 1000M over which mining is undertaken or at such distance as may be directed by the competent authority.(rule 39(ii) of AMMCR, 2013)
5. The depth of the river bed mining will not in any way exceed 3 meters at any point in the Permit area from the top of the unmined river bed as per rule 39 (iii) of AMMCR 2013.
6. The extraction of sand gravel & boulder will be restricted within the central $3/4^{\text{th}}$ width of the river. The average mineable width of the Permit area is to be kept 50 meters out of the average width of the river being 67 meters as per rule 39(iv) of AMMCR, 2013 (Figure-6).

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Directorate of Geology &
Mining Assam, Guwahati-19Prabal Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018



PRODUCTION OF RIVER BED DEPOSITS :

The Mining Plan is proposed to be prepared in favour of the DFO, Lakhimpur, for extraction of sand gravel and boulders from the Ghagar river bed manually.

In the letter No FLKT/B/Mahal Genl/Proposal/2018/5421-22 dated 03/08/2018 of the Divisional Forest Officer, Lakhimpur Forest Division, North Lakhimpur, the total Mining period is ten years, but, the Directorate of Geology and Mining, Govt. of Assam is allowing the time period to be 5(five) years.

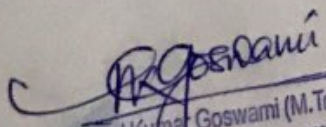
As has been estimated and stated in the chapter at on Mineable Reserve of mineral, the total quantity of the sand gravel & boulder available for extraction in a year up to a depth of 3 metres would be = 22,192 Cu.M


Considering the total working days in a year for transportation of the minerals as 200 days, the transportation of the mineral per day would be .

$$= 22192 \text{ Cu.M} / 200 \text{ days}$$

$$= 110.96 = 111 \text{ Cu.M per day}$$

Considering the carrying capacity of the Trucks/Dumpers to be deployed is of 5 Cu.M average, the total trips to be made by the Trucks/ Dumpers a would be about- $111/5 = 22.2 = 22$ trips per day


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The quantity of river bed deposits stated above is an estimated quantity that may be available for extraction considering the extent of the area of the Mining zone. However, the competent authority shall decide and fix the quantity of aforesaid minor minerals to be lifted as per terms and conditions of the Mining Permit/contract with due emphasis on the impact on environment and ecology of the surrounding areas.

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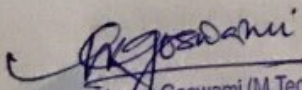


PROGRESSIVE MINE CLOSURE PLAN

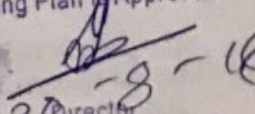
The "Assam Minor Mineral Concession Rule 2013" published in March 2013, has made it mandatory to incorporate "Progressive Mine Closure Plan" in the Mining Plan vide Rule 52(5)(VIII) of the said rules. Such a Mine Closure Plan is useful in case of opencast mines or quarries only wherein the question of phased restoration and/or rehabilitation through afforestation, land reclamation and rehabilitation of land affected by mining operation.

The Ghagar River is a meandering, perennial as well as braided river and hence, during the monsoon rains, considerable amount of mineral (boulders, cobbles, pebbles and sand) is transported by the flow of river water. The deposits are to be extracted from the river bed in a systematic manner as described in earlier chapters. The void created by extraction of minor minerals from the river bed would gradually be filled up with the pebbles, cobbles, boulders, clay and sand carried by the flow of river channel and would be replenished every year. This filling up process is slow in the dry season and rapid during the rainy season. The restoration of the river bed to its original position through natural process is more congenial to the aqua-marine environment than the reclamation with earth/ silt etc. brought from elsewhere. Since the river bed will regain its original position through natural process after closure of the mine on expiry of the Permit Period, a progressive mine closure plan would not be necessary in this case.

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Prabal Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

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CONCLUSION

The proposed Mining Plan prepared in favour of the DFO, Lakhimpur and is meant for extraction/collection of river bed deposits of sand gravel & boulder from the Ghagar River bed within a period of ten years. The area is a loose to semi-compact flood plain deposits of boulders, cobbles, pebbles and coarse sand on the Ghagar River bed. A simple opencast mining method for collection of river bed deposits would be applied as explained in the previous chapters. There would be no cutting of trees and any dynamite blasting is carried out under this mining permit. After a thorough study with site verification physically, the conclusions is drawn with the following points :

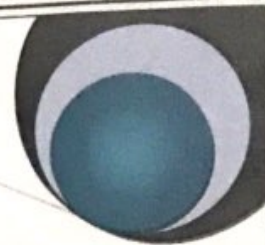
- 1) The mining proposal involves the extraction and transportation of river bed deposit in the form of sand gravel & boulder from the Ghagar river within a period of 5 (five) years at the rate of 22,192 CuM per year (max.).
- 2) It is entirely a manual open cast mining and the use of machinery is strictly prohibited for extraction.
- 3) There is no any endangered species of flora and fauna found in this area as per record of Forest Department.
- 4) There will be no chance cutting of trees on that particular site.

Mining Plan is Approved

Director

Directorate of Geology &
Mining Assam, Guwahati-78

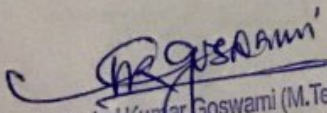
Pradeep Kumar Goswami (M.Tech)
Sd/- NA DGM/ROP/37/2018



- 5) Adverse impact on the surrounding environment due to the operation of mining will be negligible.
- 6) The "Progressive Mine Closure Plan" to restore the ecology of the surroundings is not necessary as the river water, during rainy season, will fill the void spaces by the materials carried from the catchment area.
- 7) The extracted minerals from the Ghagar River bed deposits would be utilised for filling and other construction work.
- 8) The operation of the Mining Permit would generate both direct and indirect employment and thereby help in uplift of socio-economic scenario of the locality.

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Mining Assam, Guwahati-19


Prabal Kumar Goswami (M.Tech)
Regd. No. DGM/RQP/37/2018

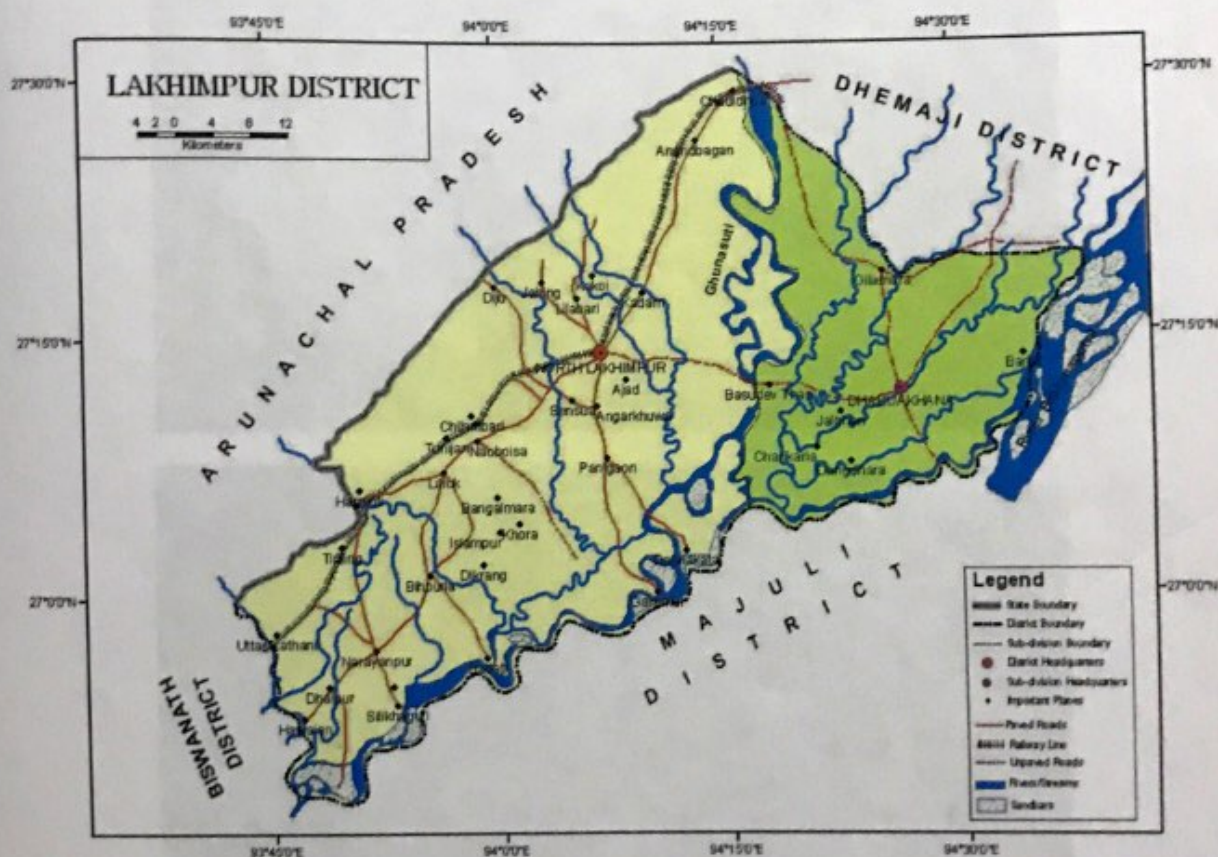


Fig : 1 Political map of Lakhimpur district

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Directorate of Geology & Mining Assam, Guwahati-19



Fig 2 :SITE PHOTOGRAPH

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Mining Assam, Guwahati-19

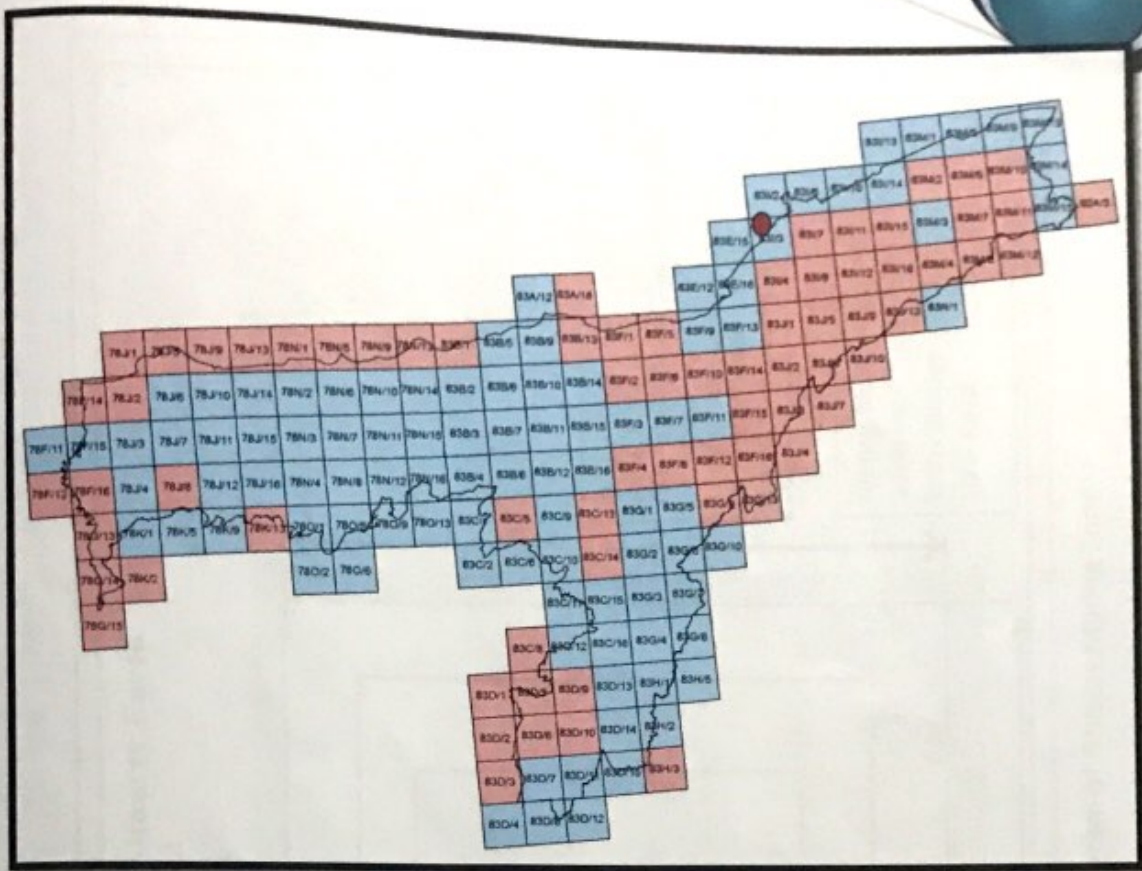


Fig3 , TOPOSHEET MAP OF ASSAM (SURVEY OF INDIA)

SHOWING TOPOSHEET No.831/3 OF MINE CONTRACT AREA

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Directorate of Geology &
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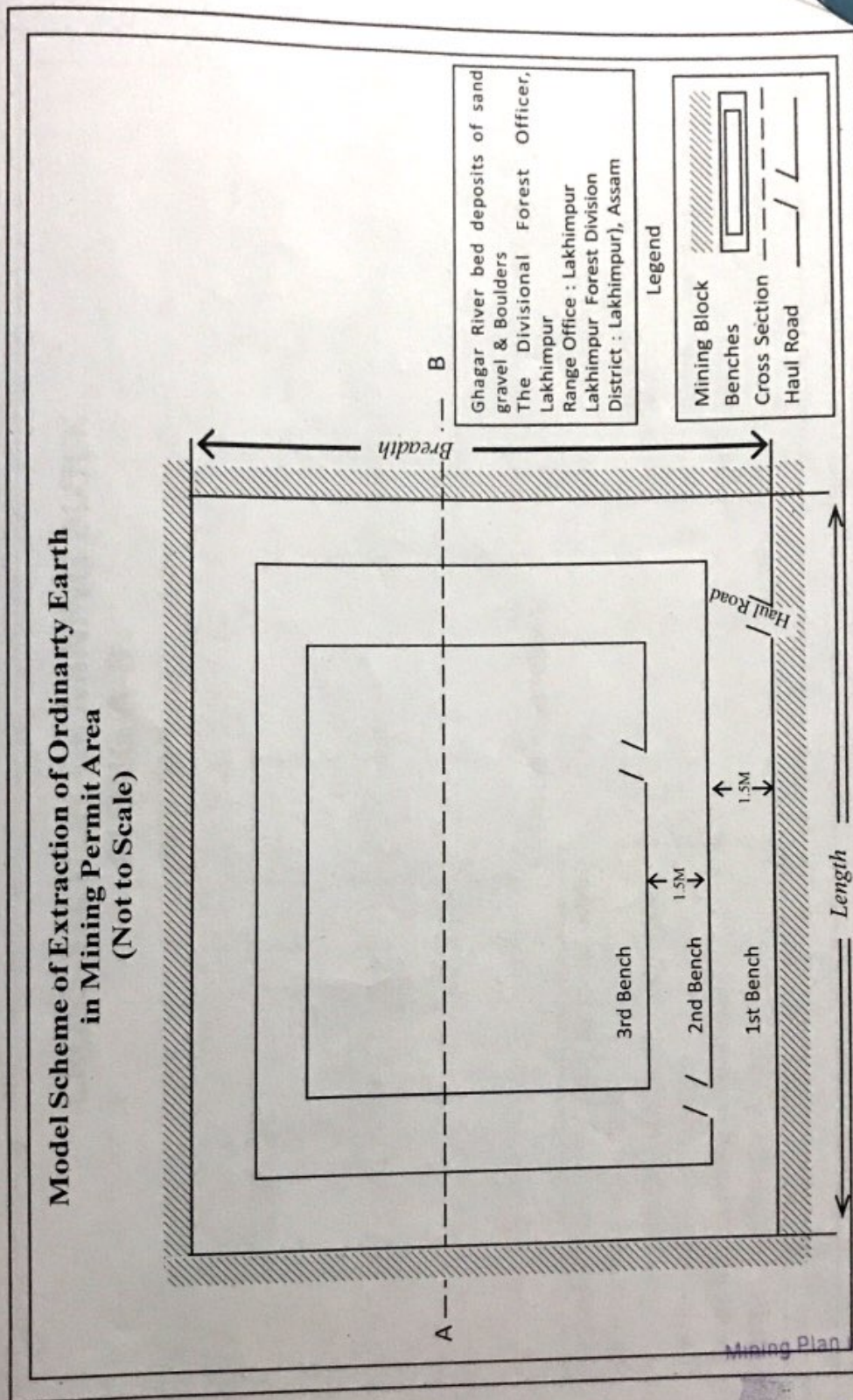
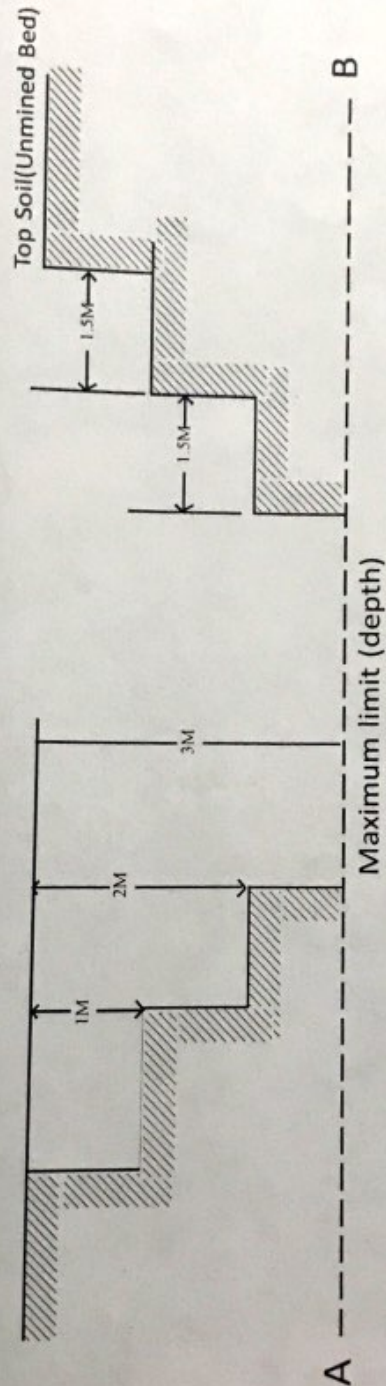


Fig.3 : Schematic Diagram of Ghagar Mining Zone

CROSS-SECTION OF MINING BLOCK ALONG A-B (NOT TO SCALE)



GHAGAR RIVER BED DEPOSITS OF SAND
GRAVEL AND BOULDER
The Divisional Forest Officer, Lakhimpur
Lakhimpur Forest Division
Range Forest Office : Lakhimpur
District : Lakhimpur, Assam

Bench Height	1m
Bench Width	1.5m
Cross Section	AB

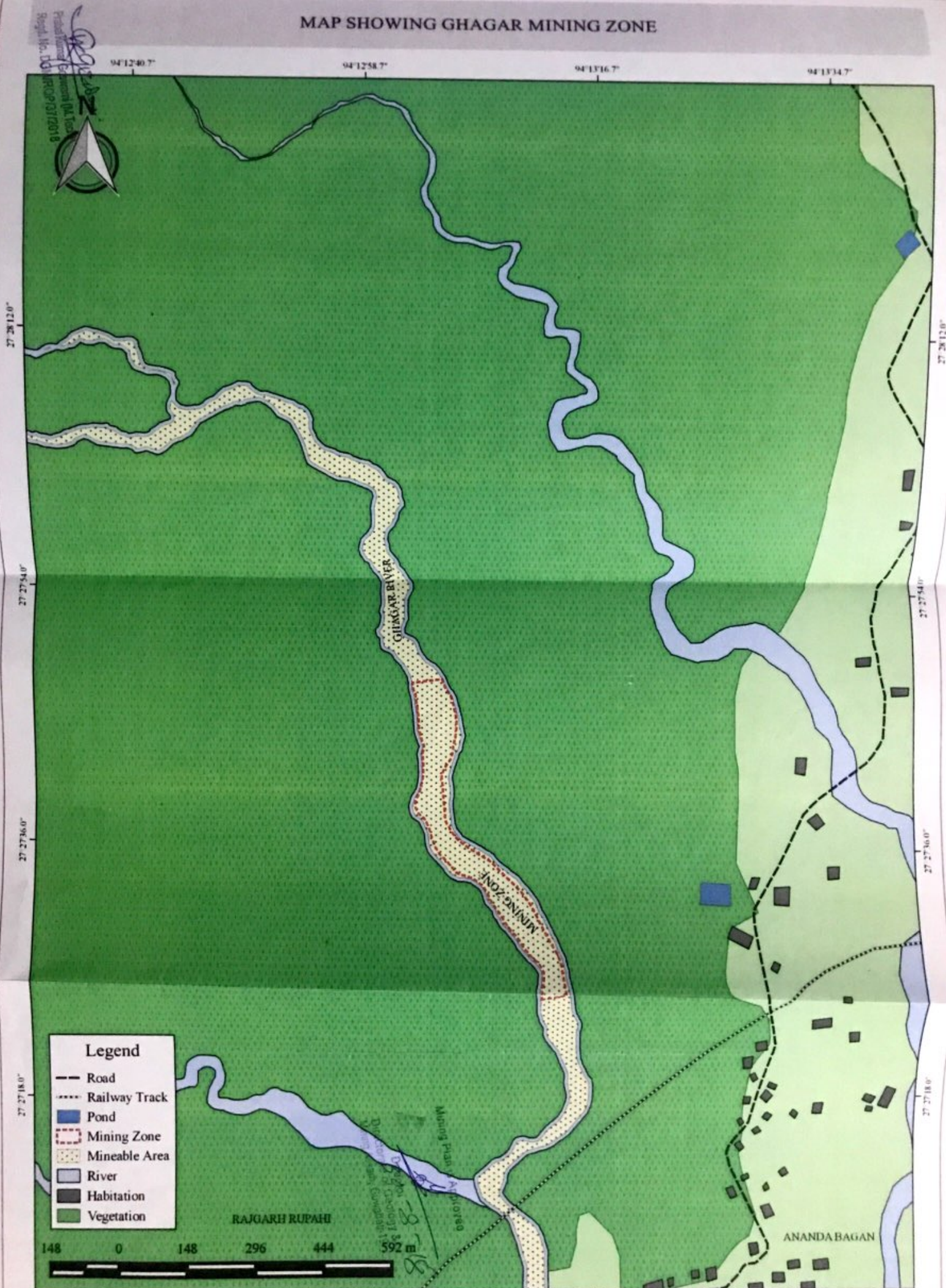
Fig. 4 : Cross sectional view of Ghagar Mining Zone

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Mining Assam, Guwahati

MAP SHOWING GHAGAR MINING ZONE



MAP OF GHAGAR MINING ZONE

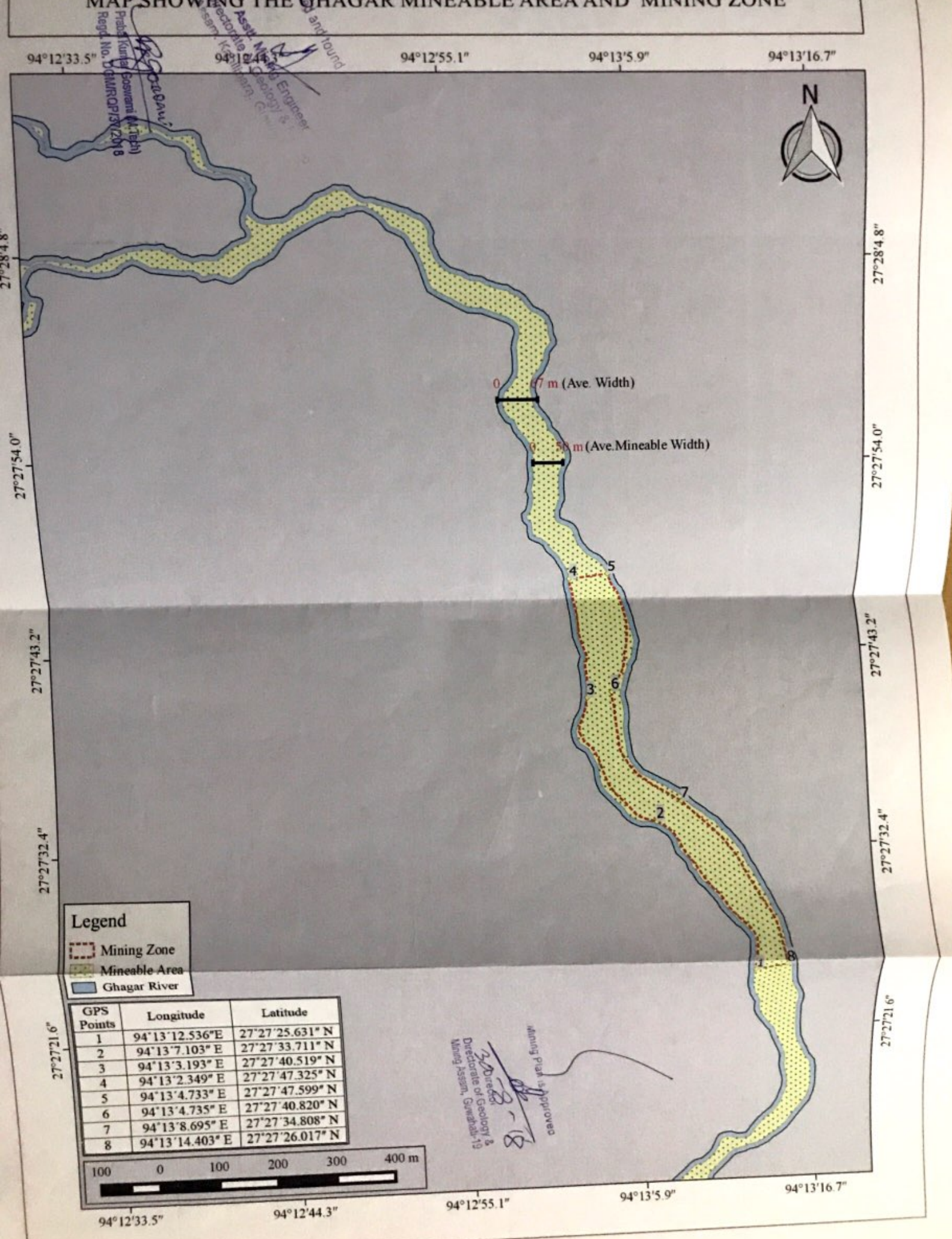
GPS Points	Longitude	Latitude
1	94°13'12.536"E	27°27'25.631"N
2	94°13'7.103"E	27°27'33.711"N
3	94°13'3.193"E	27°27'40.519"N
4	94°13'2.349"E	27°27'47.325"N
5	94°13'4.733"E	27°27'47.599"N
6	94°13'4.735"E	27°27'40.820"N
7	94°13'8.695"E	27°27'34.808"N
8	94°13'14.403"E	27°27'26.017"N

358 m

Image © 2018 CNES / Airbus
© 2018 Google

Google earth

MAP SHOWING THE GHAGAR MINEABLE AREA AND MINING ZONE



**GOVERNMENT OF ASSAM
OFFICE OF THE DIVISIONAL FOREST OFFICER: LAKHIMPUR DIVISION
LAKHIMPUR**

Letter No. FLKT/B/Mahal Genl /Proposal/2018/5421-22

dated 03/08/2018

To,

The Director,
Directorate of Geology & Mining,
Assam, Kahilipara, Guwahati-781001

Sub: -


Preparation and approval of Mining Plan against Ghagar & Kimin Sand Gravel & Boulder Mahals in reserve forest area.

Sir,

With reference to the subject cited above, I am to request you to kindly prepare a Mining Plans for 10 years against **5.0 Ha Ghagar Sand Gravel & Boulder Mahal and Kimin Sand Gravel & Boulder Mahal** under Dullung & Ranga RF in favour of Assam Forest Department (Lakhimpur Division) under Rule 52 (1) of the Assam Minor Mineral Concession Rule 2013. The relevant GPS coordinates and maps of the proposed area are enclosed for favour of you needful action.

Encl:- As stated above

Yours faithfully,


Divisional Forest Officer
Lakhimpur Division, Lakhimpur

Copy to:

Sri Prabal Kumar Goswami, RQP (Recognized Qualified Person), he is requested to prepare Mining Plan for aforementioned proposed Sand Gravel & Boulder Mahals.

/_____
Divisional Forest Officer
Lakhimpur Division, Lakhimpur

Memo No: FLKT/A/Mahal Genl /Proposal/2018/1752-54

dated 03/08/2018

- (i) The Principal Chief Conservator of Forest & Head of Forest Force, Assam, Panjabari, Guwahati – 37 for favour of his kind information and necessary action please.
- (ii) The Chief Conservator of Forest & Nodal Officer, Forest Conservation Act. 1980, O/o the Principal Chief Conservator of Forest & Head of Forest Force, Assam, Panjabari, Guwahati – 37 for favour of his kind information and necessary action please.
- (iii) The Conservator of Forest, Northern Assam Circle, Tezpur for favour of his kind information and necessary action please.

/_____
Divisional Forest Officer
Lakhimpur Division, Lakhimpur

MAP SHOWING THE PROPOSED 5.0 HECTARE GHAGAR MINING ZONE & GHAGAR SAND GRAVEL & BOULDER MAHAL
AREA AT DULLUNG RE UNDER LAKHIMPUR DIVISION



GPS COORDINATES OF THE PROPOSED MINING ZONE & MINING AREA			
GPS POINTS	LONGITUDE	LATITUDE	
1	94° 13' 12.536" E	27° 27' 5.631" N	
2	94° 13' 7.103" E	27° 27' 3.711" N	
3	94° 13' 3.193" E	27° 27' 0.510" N	
4	94° 13' 2.349" E	27° 27' 3.255" N	
5	94° 13' 4.733" E	27° 27' 5.995" N	
6	94° 13' 4.735" E	27° 27' 0.830" N	
7	94° 13' 8.695" E	27° 27' 4.808" N	

NAME OF MINING ZONE

GHAGAR SANDGRAVEL & BOULDER MAHAL

GHAGAR MINING ZONE AREA

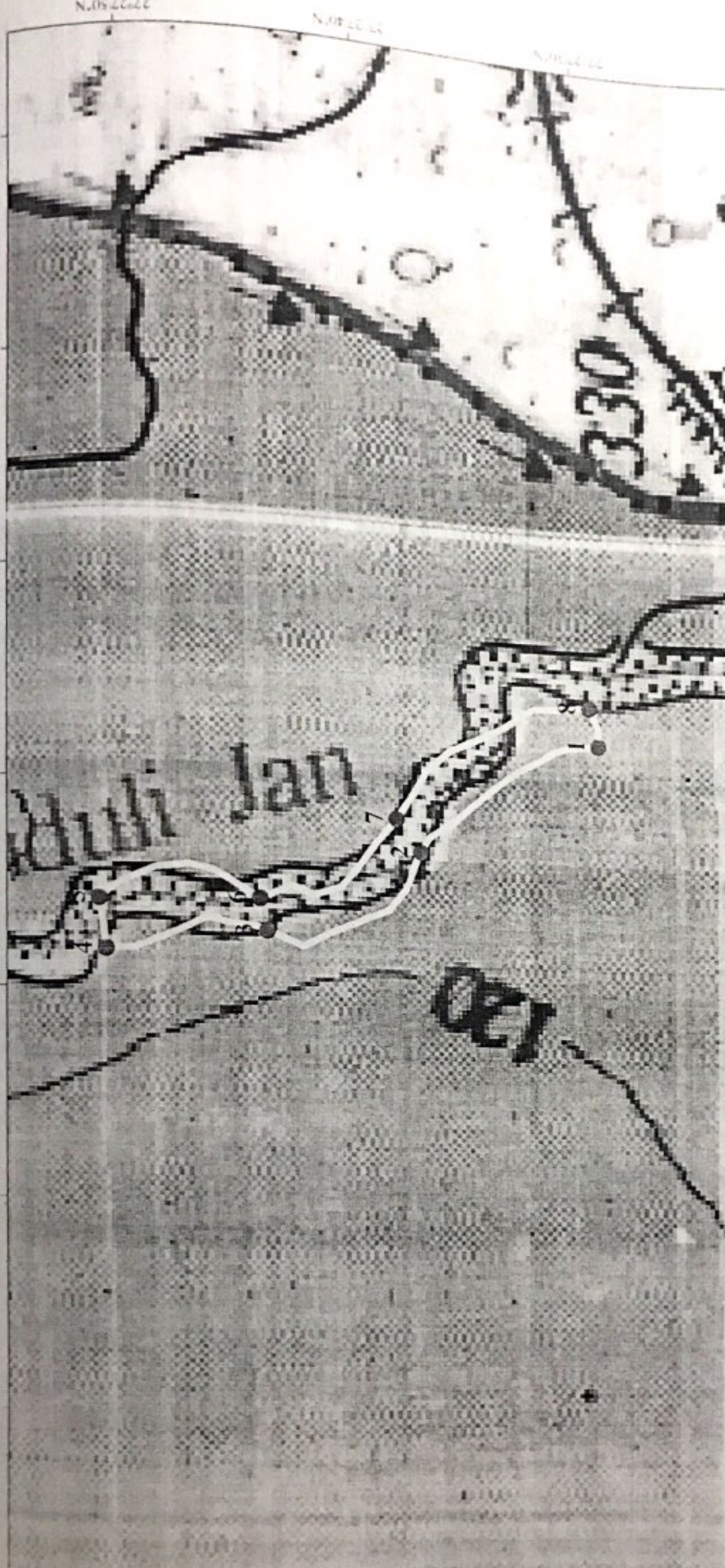
Legend

GPS POINTS OF THE PROPOSED MINING ZONE & SAND GRAVEL & BOULDER MAHAL AREA

GEO-REFERENCE MAP SHOWING THE PROPOSED 5.0 HECTARE GHAGAR MINING ZONE & GHAGAR SAND GRAVEL & BOULDER MAHAL AREA AT DULLUNG RF UNDER LAKEIMPUR DIVISION

SCALE:- 1:5,000

94°12'50"E 94°13'00"E 94°13'10"E 94°13'20"E 94°13'30"E 94°13'40"E 94°13'50"E



GPS COORDINATES OF THE PROPOSED MINING ZONE & MINING AREA			NAME OF MINING ZONE	NAME OF MINING AREA
GPS POINTS	LONGITUDE	LATITUDE		
1	94° 13' 12.536\" E	27° 27' 5.631\" N	GHAGAR MINING ZONE AREA	GHAGAR SANDGRAVEL & BOULDER MAHAL
2	94° 13' 7.103\" E	27° 27' 3.711\" N		
3	94° 13' 3.193\" E	27° 27' 0.519\" N		
4	94° 13' 2.349\" E	27° 27' 7.325\" N		
5	94° 13' 4.733\" E	27° 27' 17.599\" N		
6	94° 13' 4.735\" E	27° 27' 0.820\" N		
7	94° 13' 8.695\" E	27° 27' 4.808\" N		
8	94° 13' 14.403\" E	27° 27' 0.017\" N		

Legend

- GPS POINTS OF THE PROPOSED MINING ZONE & SAND GRAVEL & BOULDER MAHAL AREA

PROPOSED MINING ZONE & SAND GRAVEL & BOULDER MAHAL AREA

94°12'50"E 94°13'00"E 94°13'10"E 94°13'20"E 94°13'30"E 94°13'40"E 94°13'50"E

10/12/2018



CHALLAN
TR Form -5(a)



GRN	AS000000153201819E	BARCODE	Date 16/08/2018-11:21:26		Form ID
Department	Geology and Mining		Payer Details		
Type of Payment	Non-ferrous Mining and Metallurgical Industries102		TAX ID (If Any)		
Office Name	DIRECTORATE OF GEOLOGY and MINING		PAN No.(If Applicable)		
Location	Kamrup Metro		Full Name	The Divisional Forest Officer Lakhimpur Fore Division	
Year	2018-2019 One Time		Flat/Block No.		
Account Head Details	Amount In Rs.	Premises/Building			
0853-00-102-7079-000 Approval of Mining Plan	5000.00	Road/Street			
		Area/Locality	North Lakhimpur		
		Town/City/District			
		PIN			
		Remarks (If Any)	5 Ha Ghagar Sand gravel and Boulder Mahal		
		Amount In	Five Thousand Rupees Only		
		Words			
Total	5,000.00				
Payment Details	STATE BANK OF INDIA		FOR USE IN RECEIVING BANK		
Cheque-DD Details	Bank CIN	Ref. No.	00030302018160864309	IK00SJGPD4	
Cheque/DD No.	Bank Date	RBI Date	16/08/2018 11:04:16	Not Verified with RBI	
Name of Bank	Bank-Branch		STATE BANK OF INDIA		
Name of Branch	Scroll No. , Date		Not Verified with Scroll		

Mobile No. : 9435116542

Print Date 16-08-2018 11:19:26