

## PROJECT BACKGROUND

The Letter of Intent (LoI) was granted vide GO No. **1081/VII-1/2018/20Kha /2018, dated 10 July 2018**, to Sh. Abhishek Rawat S/o Sh. Sham Singh Rawat Resident R/o- Dharchula Road, Siltham, District- Pithoragarh as per **Uttarakhand Notification No.1582/VII-1/2017/31kha/17, dated 31 October 2017** under Uttarakhand Minor Mineral Rules (Revised) 2017, for extraction of Sand, Bajari, Boulders etc (RBM) through E-tender/E-auction floated by Geology & Mining unit, Department of Industries, in a part of village- Jamradi Rantada in Khasara No. 8114, 8115,8228 Ma, Area- 0.482 Hectares. This mine plan is being prepared to abide by change in Mining Policy as per Gazette of Uttarakhand State Government, Industrial Development Section No. 1033/VII-1/2015/146- ऋ /2010 dated 31<sup>st</sup> July, 2015 & **Uttarakhand Notification No.1582/VII-1/2017/31kha/17, dated 31 October 2017** under Uttarakhand Minor Mineral Rules (Revised) 2017.

## LOCATION, GENERAL AND ACCESSIBILITY

(a)	Details of Area	Location Map is attached in this
(b)	District and State	Pithoragarh, Uttarakhand
(c)	Tehsil	Pithoragarh
(d)	Village	Jamradi Rantada
(e)	Khasra No./ Plot No./ Block Range /	Village- Jamradi Rantada, Khasara No. 8114, 8115, 8228, 8212, 8229 Area- 0.482 Ha.
(f)	Felling Series etc.	None
(g)	Area ( hectares)	0.482 Ha.
(h)	Whether the area is in forest (please specify whether protected, reserved etc.)	No, area does not fall under forest area

(i)	Ownership/ Occupancy	Letter of Intent GO released as per <b>Notification No. 1081/VII-1/2018/20kha/2018, dated 10 July 2018</b> under Uttarakhand Minor Mineral Rules (Revised) 2017 for mining of minor minerals by Department of Industrial Development Department, State Govt. (Attached as Annexure I)
(j)	Geographical Coordinates	<ul style="list-style-type: none"> <li>• Latitude- 29°28'18.823"N</li> <li>• Longitude- 80° 9'2.120"E</li>   <li>• Latitude- 29°28'19.344"N</li> <li>• Longitude- 80° 9'2.975"E</li>   <li>• Latitude- 29°28'19.451"N</li> <li>• Longitude- 80° 9'3.529"E</li>   <li>• Latitude- 29°28'19.495"N</li> <li>• Longitude- 80° 9'5.970"E</li>   <li>• Latitude- 29°28'18.279"N</li> <li>• Longitude- 80° 9'7.194"E</li>   <li>• Latitude- 29°28'17.918"N</li> <li>• Longitude- 80° 9'4.205"E</li>   <li>• Latitude- 29°28'18.013"N</li> <li>• Longitude- 80° 9'2.890"E</li>   <li>• Latitude- 29°28'18.391"N</li> <li>• Longitude- 80° 9'2.039"E</li> </ul>

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## GENERAL

(a)	Mineral being worked	Sand, Boulder and Bajri
(b)	Period of mining Lease	Letter of Intent was granted for proposed mining upto five (5) years. LoI attached as Annexure I.
(c)	Category of land use	Revenue land (Non forest land)
(d)	Elevation Range of River Bed	512 to 515m

## ABOUT PITHORAGARH DISTRICT-

Pithoragarh is the easternmost district of Uttarakhand, neighboring Tibet in the north and Nepal in the east. Pithoragarh is at [29.58°N 80.22°E](#). It has an average elevation of 1,514 [metres](#) (4,967 [feet](#)). It is situated in Soar Valley. The valley is spread across around 50 square kilometers. Pithoragarh is popularly known as the 'Little Kashmir'. Pithoragarh town is a historical landmark. It was a major center of power during the regime of the Chand Kings in Kumaon. It is the largest city in the hills of Uttarakhand. The city is strategically important from defense point of view for India as the district shares international boundaries with China and Nepal.

**ACCESSIBILITY TO THE PROPOSED LEASE AREA-** The lease area is situated in district Pithoragarh of Uttarakhand and is approachable through NH 125. The mine lease is connected to NH 125 through an metalled road of about 3 km. The nearest railway station is Tanakpur Railway station and is approachable at a distance of about 50 km.

## NEAREST AVAILABLE FACILITIES

<b>Nearest Post office</b>	Ghat, about 4 km
<b>Nearest PHC</b>	Byashghat, about 1 km
<b>Nearest CHC</b>	Pithoragarh, about 30 km
<b>Nearest Primary School</b>	Jamradi Rantada, about 7 km
<b>Nearest High School</b>	Dakula, about 8 km
<b>Nearest Intermediate</b>	Dakula, about 8 km
<b>Nearest Degree College &amp; PG college</b>	Pithoragarh, about 30 km
<b>Nearest Panchayat ghar</b>	Jamradi Rantada, about 7 km
<b>Nearest Major market</b>	Pithoragarh, about 30 km
<b>Nearest distance from Upstream Bridge</b>	about 4 km ( Ghat Bridge)

**ABOUT THE PROPOSED LEASE AREA-** Letter of Intent (LoI) for RBM mining was granted via **1081/VII-1/2018/20kha/2018**, dated- **10 July 2018**, in the Village- Jamradi Rantada, Tehsil- Pithoragarh & District- Pithoragarh. Some of the facts/information about the proposed lease area is given as below:-

**As per point no 13, Amendment of Rule 28 of Miner Mineral Policy, No. 1582/VII-1/2017/31kha/17, dated 31 October 2017;** RQP is authorized to prepare & submit the Mining Plan & after due process, approval authority is Director- Geology and Mining Unit, Department of Industries, Dehradun. (**RQP Certificate Attached as Ann.** )

Following important points, as per the above discussed Rule, must be incorporated in to the Mining Plan-

- 1 Quantity of minable mineral with reference to technically & environmentally safe method of mining (Discussed at Page No.19).
- 2 Description of DGPS coordinates of the proposed mining lease area must be given in the mining plan (Page No.7)
- 3 DGPS Coordinates must be superimposed in Geo referenced Khasara map (Cadastral) (Discussed at Annex. Survey Plate).
- 4 Description about the government land, private land, forest land etc within the proposed lease area shall be given & verified by the revenue department and copy of same shall be attached with the mining plan (Discussed at Annex. ).

<b>Sr. No</b>	<b>Khasra No.</b>	<b>Status of Land</b>	<b>Total Area (Ha.)</b>	<b>Area Utilized for Mining (Ha.)</b>
1	8114	Revenue	0.038	-
2	8115	Revenue	0.009	-
	8212	Revenue	0.033	-
3	8228	Revenue	0.278	-
4	8229	Revenue	0.124	-
			<b>0.482</b>	<b>0.444</b>

- 5 Satellite map (scale 1:10000) of Public place, nearest bridges that fall in 100m circumference of lease area shall be mentioned (Discussed at Annex. Survey Plate ).
- 6 Both bank of the river should be mentioned in satellite map, and marked mineable area clearly mentioned after leaving the specific distance from the river banks. Satellite map shall be attached with the mining plan (Discussed at Plate no.3).

- 7 All DGPS Pillar coordinates of the proposed Mining lease area shall be mentioned on map (in term of larger mining lease area the DGPS point coordinates shall be taken/given at ever 100m interval (Discussed at Annex. Geo referenced map).
- 8 Digital copy of all given the maps shall be given (Annx).

**Georeferencing-** means that the internal coordinate system of a map or aerial photo image can be related to a ground system of geographic coordinates. The relevant coordinate transforms are typically stored within the image file (GeoPDF and GeoTIFF are examples), though there are many possible mechanisms for implementing georeferencing. The most visible effect of georeferencing is that display software can show ground coordinates (such as latitude/longitude or UTM coordinates) and also measure ground distances and areas. In other words, Georeferencing means to associate something with locations in physical space. The term is commonly used in the geographic information systems field to describe the process of associating a physical map or raster image of a map with spatial locations. Georeferencing may be applied to any kind of object or structure that can be related to a geographical location, such as points of interest, roads, places, bridges, or buildings.

#### **Need**

Georeferencing is crucial to making [aerial](#) and [satellite imagery](#), usually raster images, useful for mapping as it explains how other data, such as the above [GPS](#) points, relate to the imagery.

- Very essential information may be contained in data or images that were produced at a different point of time. It may be desired either to combine or compare this data with that currently available. The latter can be used to analyze the changes in the features under study over a period of time.
- Different maps may use different projection systems. Georeferencing tools contain methods to combine and overlay these maps with minimum distortion.
- Using georeferencing methods, data obtained from surveying tools like [total stations](#) may be given a point of reference from topographic maps already available.
- It may be required to establish the relationship between social [survey](#) results which have been coded with [postal codes](#) or street addresses and other geographic areas

such as [census](#) zones or other areas used in public administration or service planning.

### **Methods-**

There are various GIS tools available that can transform image data to some geographic control framework, like the commercial ArcMap, PCI Geomatica, TNTmips (MicroImages,Inc) or ERDAS Imagine. One can georeference a set of points, lines, polygons, images, or 3D structures. For instance, a GPS device will record latitude and longitude coordinates for a given point of interest, effectively georeferencing this point. A georeference must be a unique identifier. In other words, there must be only one location for which a georeference acts as the reference.

Images may be encoded using special GIS file formats or be accompanied by a world file.

To georeference an image, one first needs to establish control points, input the known geographic coordinates of these control points, choose the coordinate system and other projection parameters and then minimize residuals. Residuals are the difference between the actual coordinates of the control points and the coordinates predicted by the geographic model created using the control points. They provide a method of determining the level of accuracy of the georeferencing process.

In situations where data has been collected and assigned to postal or area codes, it is usually necessary to convert these to geographic coordinates by use of a definitive directory or gazetteer file. Such gazetteers are often produced by census agencies, national mapping organizations or postal service providers. At their simplest, these may simply comprise a list of area codes or place names and another list of corresponding codes, names or coordinate locations. The range and purpose of the codes available is country-specific. An example is the UK's National Statistics Postcode Directory which shows each postcode's membership of census, administrative, electoral and other geographical areas. In this case, the directory also provides dates of creation and deletion, address counts and an Ordnance Survey grid reference for each postcode, allowing it to be mapped directly. Such gazetteer files support many web-based mapping systems which will place a symbol on a map or undertaken analysis such as route-finding, on the basis of postal codes, addresses or place names input by the user.

**Cadastral Maps-** Cadastre is a technical term for a set of records showing the extent, value and ownership (or other basis for use or occupancy) of land. Strictly speaking, a cadastre is a record of areas and values of land and of landholders that originally was compiled for

purposes of taxation. In many countries there is, however, no longer any land tax and in practice the cadastre serves two other equally important purposes. It provides a ready means of precise description and identification of particular pieces of land and it acts as a continuous record of rights in land.

A modern cadastre normally consists of a series of large-scale maps or plans, and corresponding registers. Both the plans and the registers may be stored in computers, as discussed in the chapter “computerization of maps and registers”. The present chapter deals with the essential features of cadastral maps with particular reference to the form they take when drawn on paper or displayed on a computer screen. While the survey of an individual parcel of land has in some countries resulted in a “cadastral map” for that plot of land and may have been unconnected to any adjoining land parcels, the true cadastral map covers all parcels within an area rather than isolated plots. It can act as an index for other land parcel surveys that show more detailed information or can be of sufficiently large scale for the dimensions of each plot to be obtainable from the map. In this chapter, and throughout this monograph, the term ‘cadastral map’ will be associated with any parcel of land whether defined by ownership, value or use provided that the parcel has an independent identity and is relevant to the management of land as a resource. A cadastral map will show the boundaries of such parcels but may in addition incorporate details of the resources associated with them, including the physical structures on or beneath them, their geology, soils, and vegetation and the manner in which the land is used.

The scale of cadastral maps is of great importance. Since the object of the map is to provide a precise description and identification of the land, the scale must be large enough for every separate plot of land which may be the subject of separate possession (conveniently called a “survey plot” or “land parcel”) to appear as a recognizable unit on the map. When map data are stored in a computer, they may be drawn at almost any scale and this can give an impression of greater accuracy than the quality of the survey data may warrant.

**Differential Global Positioning Systems (DGPS)** are enhancements to the Global Positioning System (GPS) which provide improved location accuracy, in the range of operations of each system, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations. Each DGPS uses a network of fixed ground-based reference stations to broadcast the difference between the positions indicated by the GPS satellite system and known fixed positions. These stations broadcast the difference between the

measured satellite pseudoranges and actual (internally computed) pseudoranges, and receiver stations may correct their pseudoranges by the same amount. The digital correction signal is typically broadcast locally over ground-based transmitters of shorter range.

## **GEOLOGY**

The proposed mining area belongs to Lesser Himalayan zone bounded by MCT in the north and by North Almora Thrust in the south. The Lesser Himalaya consists of the sediments of the Precambrian Palaeozoic and locally Mesozoic age, metamorphosed and subdivided by the thrusts with progressively older rocks towards the north. The Pithoragarh region has the exposures of an extensive sedimentary belt including an outer Krol belt and an inner Tejam-Pithoragarh belt. It consists of a thick sequence of argillo-calcareous and arenaceous sediments constituting the Garhwal super group. The Garhwal super group is divisible into three Groups i.e. the lower argillo-calcareous Tejam Group, middle predominantly arenaceous Berinag Group and the upper metamorphites of the Didihat Group.

Stratigraphy as Follows (after KS Valdia)-

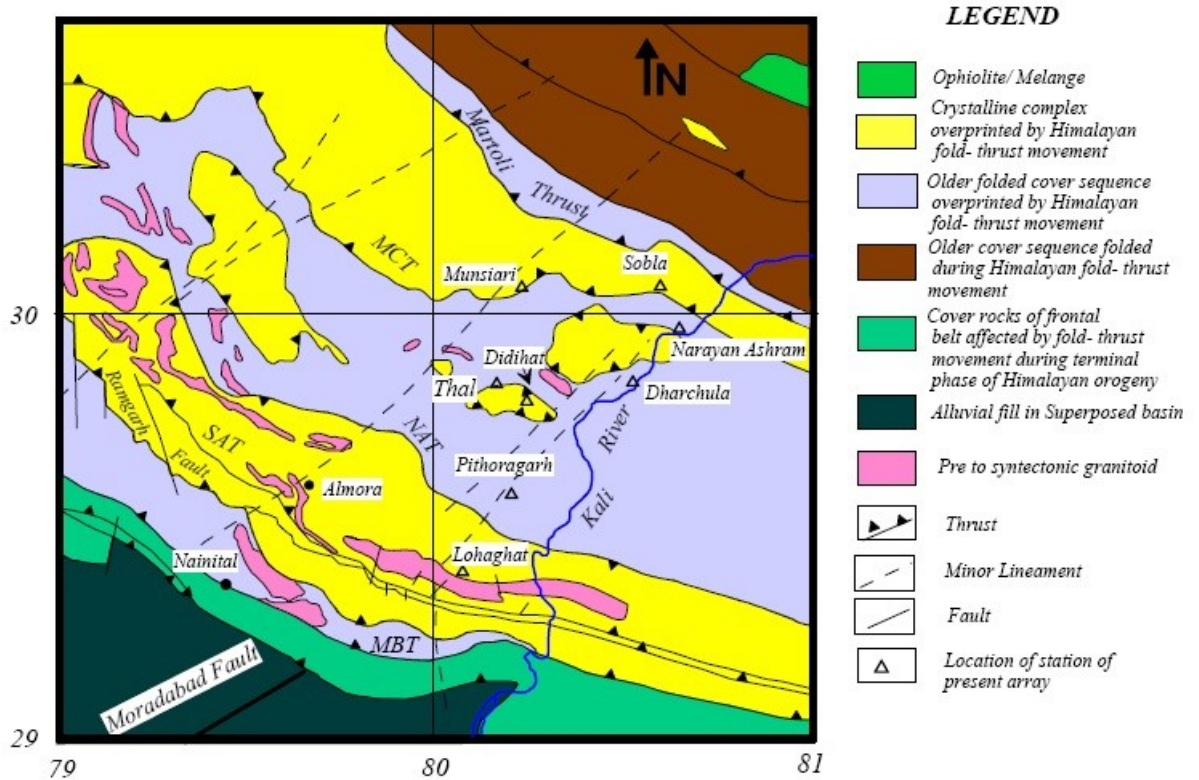
### **Berinag Quartzite**

.....Unconformity.....

**Devban/Gangilhat Formation**, lithologically major as Dolomite, Dolomitic limestone, Limestone, Magnesite etc

**Sor Slates**, lithologically major as Shale, Slate, Phyllites

Proposed mining area belongs to Terrace Deposit, Regionally belongs to Lesser Himalayan Zone.



**GEOLOGY MAP OF DIST. PITHORAGARH**

## EXPLORATION

Adequate amount of sand, bajri and boulder in reserve is available for meeting consumer demand.

## ESTIMATION OF RESERVE

The method of cross section has been adopted for computing the reserve. The mining lease boundary, proven and mining limits are marked on the plan which is thereafter transferred to cross section for determining the different categories of reserve.

The geological reserves have been estimated as per UNFC in all the three axis is as below

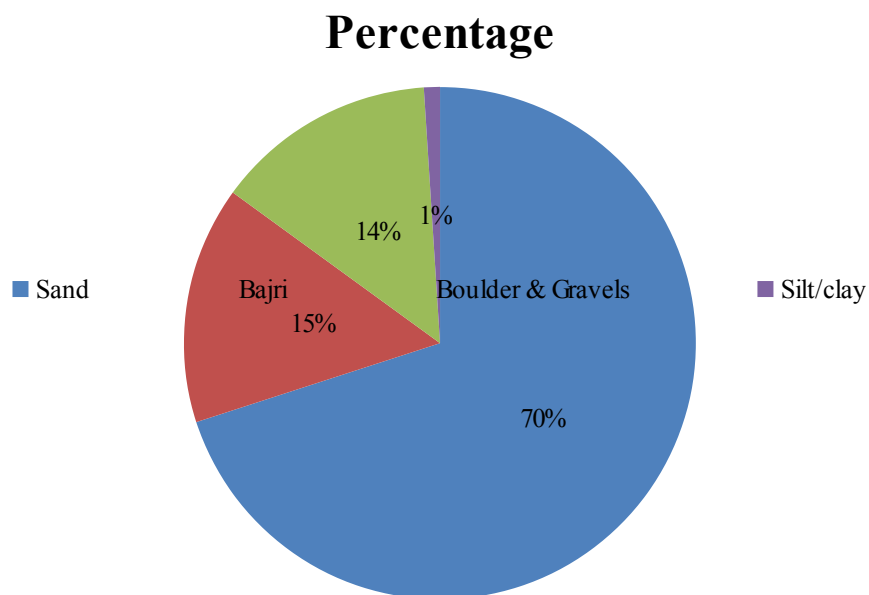
- a) Economic Axis (E-1):** The RBM is exists within the entire stretch & having no problem selling in the market. The road is near the less area & RBM shall be loaded into tipper with the deployment of an excavator & transport to crusher. On the feasibility study, economics viability of deposit has been established & RBM in economic viable, therefore economic axis has been considered as E-1.
- b) Feasibility Status (F-1):** Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a

level of confidence as compared to that of feasibility study. It has been revealed that exploitation of RBM is feasible & Economic viable & feasibility axis under UNFC code has been considered as F-1.

- c) **Geological Axis:** The exposure of RBM is seen in the entire stretch & thickness of RBM varies 2.5m to 3.0m. Therefore geological axis has been considered as G-1. In order to calculate the mineable reserve the geological map on the 1:1000 scale was prepared and main litho units were marked on the plan to know the surface spread of each unit. The different constituents of the deposits such as sand, bajri, boulder and mixture of clay, soil, silt, based on sized classification were considered for the reserve calculation. Although it is not possible to mark these units separately on the geological map, as such three pits of 1x1x1 meters were got dug in the mineable lease area and material so excavated was separated into different size and their percentage was worked out. This percentage was taken into account during calculation of the reserve. The cumulative result of the test pits are given in the following Table no 1.

**Table No. 1. Classification of Mineral Constituents available**

Sr. No.	Mineral	Size	Percentage
1.	Sand	0.06-2 mm	70%
2.	Bajri	8-64 mm	15%
3.	Boulder & Gravels	256 mm<	14%
4.	Silt/Clay	1-62.5 $\mu$ m	1%



## PIE GRAPH OF % OF MINERAL CONSTITUENTS

Bulk density is taken as 2.2 for calculation (as per Go UK, Industrial Development Section Notification 1033/VII-1/ 2015/ 146– Kha/ 2010, dated 31<sup>st</sup> July 2015). Calculation of reserve has been done as following:

- 1 Cross sections have been prepared at intervals. Refer Plate No.5
- 2 Area of every cross section has been taken. For example, if the area of cross section A-A' is 'X' and area of B-B' is 'Y', then average of both calculating the reserve (i.e. (X+Y)/2).
- 3 Distance between the two sections has been multiplied with the average area of the two sections to get the total volume. Eg. [(X+Y)/2] x Distance between A-A' & B-B'.

The overall geological reserves have been estimated through geological cross section method. The area of each section line is calculated. The section area is multiplied by the strike influence to get the volume. The target geological reserve classified in to three categories i.e. Proved reserve, Probable reserve & possible reserve. In this project the proved reserve assessed as 3m depth & further 2m as probable reserve whereas 1m considered as possible reserve. Out of total volume the 90% considered as the recoverable reserve & 2.2 bulk density.

**Table No. 2. Reserve Estimation (Proved Reserve)**

Cross-Section Line	Sectional Area (m <sup>2</sup> )	Strike influence (m)	Volume (m <sup>3</sup> )	Quantity (MT)
1-1'	108	30	3240	6415
2-2'	138	40	5520	10929
3-3'	120	35	4200	8316
<b>Total</b>			<b>12960</b>	<b>25660</b>

**Table No. 3. Reserve Estimation (Probable Reserve)**

Cross-Section Line	Sectional Area (m <sup>2</sup> )	Strike influence (m)	Volume (m <sup>3</sup> )	Quantity (MT)
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1-1'	72	30	2160	4276
2-2'	92	40	3680	7286
3-3'	80	35	2800	5544
<b>Total</b>			<b>8640</b>	<b>17106</b>

**Table No. 4. Reserve Estimation (Possible Reserve)**

<b>Cross-Section Line</b>	<b>Sectional Area (m<sup>2</sup>)</b>	<b>Strike influence (m)</b>	<b>Volume (m<sup>3</sup>)</b>	<b>Quantity (MT)</b>
1-1'	36	30	1080	2138
2-2'	46	40	1840	3643
3-3'	40	35	1400	2772
<b>Total</b>	-		<b>4320</b>	<b>8553</b>

**5.3.1 Geological Reserves:** The summarized category-wise geological reserve estimated by is:-

**Table No. - 5.**

<b>Mineral Reserve</b>	<b>Code</b>	<b>Quantity of RBM in (m<sup>3</sup>)</b>	<b>Quantity of RBM in Tons</b>
Proved Reserve	111	<b>40200</b>	<b>79596</b>
Probable Reserve	122	<b>26800</b>	<b>54432</b>
Possible Reserve	133	<b>13200</b>	<b>26136</b>

**5.3.2 Mineable Reserve:** - The mineable reserve is calculated as referred in **Notification No.1582/VIII/2017/31kha/17, dated 31 October 2017** under Uttarakhand Minor Mineral Rules (Revised) 2017.

- Total Area= 0.482= 4820 M<sup>2</sup>
- Proposed mine working shall be confined up to 1.5m bgl or above the ground water table, whichever is less.

## **MINE REPLENISHMENT**

It has been assessed that proposed mining area/ mineral picking area generally gets flooded during monsoon season and gets completely replenished. However, The Department of Geology & Mining may monitor the replenishment within the lease area and specific consultation or study may be conducted whenever required.

## **MINING**

**METHOD OF WORKING-** Taking into consideration the matrix of deposit in the river bed and the targeted production, the mine will be worked by fully manual opencast method for collection of Minor Minerals (Sand, Bajri & Boulders) from River - Saryu (ML Area 0.482 Hectare) at Village –Jamradi Rantada, Tehsil- Pithoragarh, District- Pithoragarh, Uttarakhand. The project does not involve any processes such as overburden removal, drilling, blasting and beneficiation. The proposed mining method is conventional opencast river bed mining primarily involves scooping the mineral through use of implements like spade, pick axe and shovel etc. and requires no drilling & blasting. Proposed mining will be started from higher levels to lower levels through phase wise/ block wise, going to the maximum depth of 1.5m below ground levels (bgl) or above ground water level whichever is less. Length of the block may be decided on the spot convenience. The loading of mineral shall be done manually and transported by truck/tipper to the storage points located outside the mining lease. The project proponent engages local labours available from the concerned revenue villages. The implements for mining are arranged by project proponent who are also responsible for administrative control of labours as well as for carrying out mining operations in the sanctioned / demarcated lease area within the ambit of the conditions set forth in the order for execution of mine by the competent authority and also the instructions / guideline issued by the Khanan Vibhag, Uttarakhand. Total lease area is workable and replenishable yearly. After each workable year, a longitudinal wall of about 1m be may be raised and repaired thereafter, as required, on the river bank side to check toe erosion, an environment hazardous phenomenon may be induced by the heavy floods during monsoon season. Mineral extraction will be done for a period of 240 days in a year; during monsoon period mining activity will be strictly banned.

#### **EXTENT OF MECHANIZATION**

No mechanization is required as the operation will be manual method without drilling or blasting.

#### **MODE OF WORKING**

For the optimum utilization of the mineral available in the lease area, mine working has been planned and scientific layout has been designed considering the following parameters:

- The proposed minor mineral extraction area is jointly visited by various district level department officers and boundary pillars been demarcated and informed to applicant.
- The approach road will be repaired from time to time.
- The quarry planning is done in simple rotational manner, since deposit is very simple, shallow and beds are horizontal.
- Simultaneous plantation will also be done along the lease boundary

#### **ABOUT THE RESERVE-**

The proved ultimate mineable reserve from the area is 14, 652 tonnes/year. Other aspects as discussed below-

- Total Area= 0.482 Ha.= 4820 M<sup>2</sup>
- Deposit/reserve at 1.5m Depth= 7230 M<sup>3</sup>
- Non Mineable Area = 0.038 Ha.
- Mineable area after leaving the Non Mineable Area= 0.444 Ha.
- As per Uttarakhand Minor Mineral Policy 2017, Quantity of ultimate reserve (tonnes) = Mineable Area (0.444 ha.) x 1.5 m depth x 2.2 bulk density= 14652 tonnes/year
- As per the data collected during the field test/survey, the quantity of minor mineral (production quantity) i.e. 9009 tonnes, is 61% of the material available i.e. 14652 tonnes (total material available up to maximum allowable depth); rest 39% of material available is planned as residue/waste material, (accordingly planned & backfilled).
- Maximum extractable (sustainable extraction) quantity of mineral recommended by district level committee duly authorized by Minor Mineral Policy 2016 = 9009 tonnes/year.
- Based on above facts and figure, the saleable mineral i.e. 9009 tonnes/year, is a sustainable extractable quantity for this project (final saleable figure from the proposed lease).

#### **YEARWISE DEVELOPMENT & PRODUCTION**

##### **TABLE NO. 6. - YEARWISE PRODUCTION**

<b>YEAR</b>	<b>MINEABLE AREA</b>	<b>DEPTH (M)</b>	<b>ULTIMATE MINABLE RESERVE (tonnes/year)</b>	<b>PRODUCTION (Saleable Quantity of RBM) (tonnes/year)</b>
<b>FIRST YEAR</b>	4440 m <sup>2</sup>	1.5	14652	9009
<b>SECOND YEAR</b>	4440 m <sup>2</sup>	1.5	14652	9009
<b>THIRD YEAR</b>	4440 m <sup>2</sup>	1.5	14652	9009
<b>FOURTH YEAR</b>	4440 m <sup>2</sup>	1.5	14652	9009
<b>FIFTH YEAR</b>	4440 m <sup>2</sup>	1.5	14652	9009
<b>TOTAL</b>	-	-	<b>73260</b> <b>Tonnes</b>	<b>45045</b> <b>Tonnes</b>

#### **ABOUT THE SALEABLE PRODUCTION-**

**DEVELOPMENT & PRODUCTION FOR FIRST YEAR** - For year 1<sup>st</sup> year the Development & Production Programme, the mining is proposed 4440 sqm area. The saleable production of each mineral constituent would be on an average as under:-

**Table No. 7- PRODUCTION IN FIRST YEAR  
BENCH LEVEL FROM 512 M TO 515 M**

<b>Sr. No.</b>	<b>Mineral Constituents</b>	<b>Production (<math>\approx\pm</math>) in tons</b>
1.	Sand (75%)	6756.75
2.	Bajri (15%)	1351.35
3.	Boulder (10%)	900.9

	<b>TOTAL</b>	<b>9009 TONNES</b>
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**DEVELOPMENT & PRODUCTION FOR YEAR SECOND YEAR** - For 2<sup>nd</sup> year the Development & Production Programme, the mining is proposed in 4440 sqm area. The saleable production of each mineral constituent would be on an average as under:-

**Table No. 8- PRODUCTION IN SECOND YEAR  
BENCH LEVEL FROM 512 M TO 515 M**

Sr. No.	Mineral Constituents	Production ( $\approx\pm$ ) in tons
1.	Sand (75%)	6756.75
2.	Bajri (15%)	1351.35
3.	Boulder (10%)	900.9
	<b>TOTAL</b>	<b>9009 TONNES</b>

**DEVELOPMENT & PRODUCTION FOR YEAR THIRD YEAR** - For year 3<sup>rd</sup> year the Development & Production Programme, the mining is proposed in 4440 sqm area. The saleable production of each mineral constituent would be on an average as under:-

**Table No. 9- PRODUCTION IN THIRD YEAR  
BENCH LEVEL FROM 512 M TO 515 M**

Sr. No.	Mineral Constituents	Production ( $\approx\pm$ ) in tons
1.	Sand (75%)	6756.75
2.	Bajri (15%)	1351.35
3.	Boulder (10%)	900.9
	<b>TOTAL</b>	<b>9009 TONNES</b>

**DEVELOPMENT & PRODUCTION FOR YEAR FOURTH YEAR** - For year 4<sup>th</sup> year the Development & Production Programme, the mining is proposed in 4440 sqm area. The saleable production of each mineral constituent would be on an average as under:-

**Table No. 10- PRODUCTION IN FOURTH YEAR  
BENCH LEVEL FROM 512 M TO 515 M**

<b>Sr. No.</b>	<b>Mineral Constituents</b>	<b>Production (<math>\approx\pm</math>) in tons</b>
1.	Sand (75%)	6756.75
2.	Bajri (15%)	1351.35
3.	Boulder (10%)	900.9
	<b>TOTAL</b>	<b>9009</b>
		<b>TONNES</b>

**DEVELOPMENT & PRODUCTION FOR YEAR FIFTH YEAR** - For 5<sup>th</sup> year the Development & Production Programme, the mining is proposed in 4440 sqm area. The saleable production of each mineral constituent would be on an average as under:-

**Table No. 11- PRODUCTION IN FIFTH YEAR  
BENCH LEVEL FROM 512 M TO 515 M**

<b>Sr. No.</b>	<b>Mineral Constituents</b>	<b>Production (<math>\approx\pm</math>) in tons</b>
1.	Sand (75%)	6756.75
2.	Bajri (15%)	1351.35
3.	Boulder (10%)	900.9
	<b>TOTAL</b>	<b>9009</b>
		<b>TONNES</b>

## **MINERAL PRODUCTION**

The riverbed mining will consist of sand and their production may vary to a great extent depending upon availability. Therefore quantity of sand cannot be estimated on logical parameters, the figures given here above only tentative. The production target is as above.

## **DEVELOPMENT AND PRODUCTION PROGRAMME FOR FIVE YEARS.**

Prior to start production from the area, some development work has to be completed Haul road preparation.

- Erection of a temporary site office and two rest shelter.
- Barbed wire fencing all around the mining/applied area may be provided to avoid accident and inadvertent entry.
- Retaining wall will be raised towards the valley side (river bank) to abstain from toe erosion.

## **DRILLING & BLASTING**

No drilling and blasting is proposed to be done to undertake mining of riverbed minerals.

## **WATER AND DRAINAGE SYSTEM**

As per the proposed mining the working shall be confined up to 1.5m bgl or above the ground water table Mining in the area will be done well above the water table as well as river bed water level therefore impact on water regime is not anticipated. Hence no water clogging is likely to be encountered. Therefore, there is no need of any such arrangements.

## **DISPOSAL OF WASTE MATERIAL**

Exact quantitative calculation about reserve/saleable production/waste generated in RBM mining project is not possible but logical classification/assessment may be considered. As per the logical assessment of the production of mining lease, the Ultimate Mineable Reserve in this project is 14652 tonnes/year, of which about 61% is considered/ assessed as saleable production for proposed mining lease i.e. 9009 tonnes/year and about 39% of total material has been considered as waste material, it includes wastage during transportation and unused/ low value material like silt/clay etc. No waste other than negligible quantity of silt/silty clay, which gets deposited as crust material on the bed profile, shall be scrapped

and carefully stored for depositing into the mine pits in the river bed or in the upper terraces earmarked for plantation purpose.

#### **Sewerage System:**

For disposal of sewage Ecofriendly mobile Toilets will be provided.

#### **Solid Waste Management:**

As per the logical assessment of the production of mining lease, the Ultimate Mineable Reserve in this project is 14652 tonnes/year, of which 61% is considered/ assessed as saleable production for proposed mining lease i.e. 9009 tonnes/year and 39% of total material has been considered as waste material, it includes wastage during transportation and unused/ low value material like silt/clay etc which gets deposited as crust material on the bed profile, shall be scrapped and carefully stored for depositing into the mine pits in the river bed or in the upper terraces earmarked for plantation purpose. It would be in fitness of things to repeat that there will be no solid waste generated in the proposed activity (other than mining waste).

### **HAULAGE AND SURFACE TRANSPORT**

Mode of transportation of material is by trucks/tractors, of size of 10 tonnes capacity have been planned. The mine road is adequate to permit easy maneuverability of trucks allowing cross over and changing points. Water will be sprayed two times a day by tractor mounted sprinklers until dust remains airborne.

### **WATER REQUIREMENT**

Water Supply Water requirement for the proposed project will be provided for the workers for drinking & domestic purpose. Water will also be provided for dust suppression. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village. The break up for water requirement is given below:

**Table No. 12. Water Requirement**

<b>S. No.</b>	<b>Purpose</b>	<b>Water Requirement (KLD)</b>
1.	Dust Suppression	2.0
2.	Drinking	1.0
3.	Miscellaneous (Plantation etc)	0.7
<b>Total</b>		<b>3.7 KLD</b>

## EMPLOYMENT

The manpower requirement for the proposed project is given below along with the breakup, who will be utilized for excavation & loading of minerals into trucks. The break up for employment is as under:

### Employment Break-up

S.No.	Category	Numbers
1.	Mining Competent Person	1
2.	Administrative	1
3.	Supervisor	1
4.	Unskilled	18
	<b>Total</b>	<b>21</b>

## SAFETY PROVISION

All provision in safety rules & regulation will be maintained by providing required materials to the employees. The lessee will provide safety shoes, safety helmets to all the employees. There will be no violation of safety provision.

## MINERAL BENEFICIATION

Mineral Sand, Bajari & Boulders doesn't require processing or beneficiation.

## MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS:-

PARTICULARS	MONITORING FREQUENCIES	IMP. MONITOR PARAMETERS
Ground Water	Twice in a year	pH, SS, TDS, Iron, Cl, Hardness, Alkalinity, NO3, PO4
Ambient Air Quality	Twice in a year	SPM, So2 & NOx
Soil Analysis	Twice in a year	pH conductivity, SO4, NO3, PO4, Texture, Alkalinity
Noise	Twice in a year	Noise level in dBA

**LAND USE PATTERN OF THE AREA:-**

<b>Sr. No.</b>	<b>Land Use (Ha.)</b>	<b>Agriculture Land (Ha.)</b>	<b>Forest Land (Ha.)</b>	<b>Waste Land (Ha.)</b>	<b>Grazing Land (Ha.)</b>
1	Mining pits quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, rest shelter etc	-	-	-	-
5	Balance undistributed land	-	-	0.482 Ha.	-
	<b>Total</b>	-	-	<b>0.482 Ha.</b>	-

**Mining:**

Mining will be done as per the guidelines of Uttarakhand Mineral Policy, 2011 and guidelines of Uttarakhand Minor Mineral Concession Rules, 2001.

<b>Sl. No.</b>	<b>Activities</b>	<b>Area (Ha.)</b>
1-	Area already broken up	-
2-	Area already backfilled/reclaimed	-

	<b>Activities</b>	<b>Area</b>
1-	Additional Area proposed to be broken up per year	4440 m <sup>2</sup>
2-	Additional Area proposed to be replenished with flood water	4440 m <sup>2</sup>

**Dump:**

No waste dump is created therefore the question of failure of waste dump does not exist

<b>Sl. No.</b>	<b>Activities</b>	<b>Area (Ha.)</b>
1-	Area already covered by dump	Nil
2-	Additional Area to be covered by soil stack	-
3-	Additional area to be covered by interburden dump	Nil
4-	Dump area to be covered by protective measures	-

**Plantation:**

In the river bed area/lease area the plantation is not possible however in the outer bank area & in the village panchayat land the plantation is proposed with consultation of mining officer and district/local administration. Trees will be planted along roadsides, to arrest auto exhaust and noise pollution, and in such a way that there is no direct line of sight to the working site when viewed from a point outside the foliage perimeter. Fast growing trees with thick perennial foliage will be grown, as it will take many years for other trees to grow to their full height. For revegetation, the plants and saplings suitable for the existing soils and site condition may consider and those plants are recommended which can adapt to the local climate.

<b>Sl. No.</b>	<b>Activities</b>	<b>Area</b>
1-	Area already covered under plantation	-

2-	Area proposed to be cover under plantation & protection work	445 m <sup>2</sup>
	Total	445 m <sup>2</sup>