No. RK/FCA/<u><u>4571</u> Forest Department, Himachal Pradesh</u>

Dated J/Nagar, the/\_\_\_\_\_\_\_\_\_

From: DFO Joginder Nagar

To: CCF Mandi

Sub: - Diversion of 406.79 hectares of Forest Land in favour of Himachal Pradesh Power Corporation Ltd. for the construction of Thana Plaun HEP (191MW), falling under Forest Division, Jogindernagar and Mandi, (H.P.). Proposal No.: FP/HP/HYD/8255/2014.

Sir,

Kindly refer to Forest Advisory Committee (FAC), MOEF & CC, GOI, New Delhi letter No . : 8-21/2021-FC, dated 20.02.2023 regarding obtaining information from State Govt. In this context, the point wise reply to the information sought by Hon'ble FAC, MOEF & CC prepared in this office and as submitted by user agency is detailed as under:

Sr. No.	Additional information sought	Reply
Vi	Out of 45 patches for CA, 22 CA patches have some discrepancies as reported by the IRO in Site inspection report. The proposed Compensatory Afforestation areas shall be revisited keeping in view the observations of the IRO and areas suitable for plantation and free from all encumbrances shall be provided for the purpose of Compensatory Afforestation.	Additional suitable CA patches of 105 hectares (70 ha. for Mandi Forest Division and 35 ha. for Jogindernagar Forest Division), have been provided copy land identified for CA (Checklist 16) enclosed as Annexure-A copy of the same uploaded at additional information in PAVIESH as well as updated at requisite filed of CA.
i	A study of the project area, impact of the proposed project and feasibility shall be conducted by the Wadia Institute of Himalayan Geology (WIHG), Dehradun at the cost of the user agency.	The said study has been conducted by Wadia Institute of Himalayan Geology (WIHG), Dehradun and the report of the same is attached as <i>Annexure-I</i> .
ii	The approved mining plans in case of the proposed quarry sites shall be submitted.	The approved mining plans (5 no. quarries), of the project have been attached as <i>Annexure-II</i> .
iii	The State Govt. shall explore and make effort to locate the dumping sites on non-forest land.	Generally locations of the dumping sites are selected keeping in view the closest approach to Project site. In case of Thana Plaun HEP due to; (i) terrain of the area downstream of the project (narrow valley) and (ii) Large length of submergence area (16.5 Kms), upstream of the project, there

		was no area available closest to the project site for dumping sites. Thus, after detailed investigations undertaken during Survey & Investigation works of the project the locations of dumping sites were finalized even though these dumping sites were more than 6 Kms. downstream of the project construction site. The same were approved by Central Electricity Authority (CEA) while according concurrence in favour Thana Plaun HEP on dated 07.09.2021 under Electricity Act, 2003. Also, one crushing unit for the project is proposed to be set up in one of the Dumping sites ( <i>Annexure-IV</i> ). However, keeping in view of observation raised by FAC, MOEF&CC, GOI the proposed forest land for dumping sites was again got re-verified from District Collector, Mandi and Certificate
		for Non-availability of Non Forest land for dumping sites has been granted in favour of the project. The same is attached as <i>Annexure-III</i> .
iv	Crusher Units are proposed to be established; however as per SIR received from the IRO, their location has not been given in the proposal. The location plan for the crusher units shall be submitted.	location map and is attached as Annexure-IV.
v	The road/bridge from Kotli to Jogindernagar is coming under submergence zone. In this regard, the NOC from the concerned agency shall be submitted.	NOC regarding realignment/shifting of road/bridge from Kotli to Jogindernagar has been obtained from HP Public Works Department and is attached as <i>Annexure-V</i> .

This is for your kind information and further necessary action, please.

Encl. As above.

Divisional Forest Officer,

Divisional Forest Officer, J/Nagar Forest Division Joginder Nagar, Distr. Mandi, H.P.

Sector 14	0.		L
50	Indiador Nariar F	Divisional Fore	
Joginder Nagar (H.F		S.	ĩ
ă i	1	ö	r
B 2	-	2 (	1
Na	S.	1	-
ga	2	0	4
-		0	Ĉ
H.	Forest Divis	est/of	1
.P	es	0	1
	Ē	fice	ಿ
	ž	ě	
	ŝ	1	
	0		

Area to be diverted from Jogindernagar Forest Division = 170.55 Hectares Area to be proposed under CA Scheme under Forest Division Jogindernagar = 341.1 Hectares

21 20 19 0 17 16 5 4 13 1 Ξ 10 6 00 0 -N 5 # 1 لعا Mandi District Nachan Mandi Karsog Karsog Suket Suket Mandi Karsog Karsog Karsog Karsog Karsog Karsog Division Suket Suket Mandi Karsog Suket Mandi Suket Suket Forest Sundernagar Sundemagar Sundernagar Sundernagar Sundernagar Sundernagar Sundernagar Gohar Padhar Karsog Karsog Karsog Karsog Karsog Kataula Kataula Karsog Karsog Kataula Karsog Karsog Tehsil Kangoo Pandoh Joghani Nal Jaidevi Kangoo Darang Jaidevi Jaidevi Kangoo Pangna Pangna Kangoo Kataula Kataula Pangna Pangna Kataula Pangna Pangna Pangna Pangna Range Pangna Shaishdhar Kanokhar Sawindhar Fatehpur Sawindhar Sawindhar Sawindhar Lanjhnu Batwada Solang Bambola Kunaila Bambola Naval Koon Jamnu Muhal Jamnu Jamnu Jamnu Jamnu 53/E-2 H43E13 H43E15 H43E15 H43E15 H43E15 H43E15 H43E15 H43E15 Sheet No. H43F1 H43F1 H43F3 H43F3 H43F3 H43F3 H43F3 H43F1 H43F3 H43F3 H43F3 Survey H43F3 2229/2209 2205/611 50,94 NIL Khasra 419 210 Z 376 882 434 167 318 292 207 612 548 552 554 546 25 No. N Chargah Bila Darakhtan Grand Total in Ha. Legal Status DPF DPF Total in ha 306.95 40.00 10.00 6.00 16.99 32.44 28.07 23.87 Area in 341.95 5.00 6.00 6.00 8.00 14.48 38.75 5.00 6.07 8.74 8.33 10.28 16.83 16.1 33 Approved under old scheme New area proposed artie to Remarks

Full Title of the Project

Jogindernagar and Mandi Forest Divisions, Distt. Mandi. H.P. FP/HP/HYD/8255 /2014

HEPs, HPPCL, Tehsil Kotli, Distt. Mandi, HP for the construction of Thana Plaun (191MW) HEP within the jurisdiction of

November 29<sup>th</sup>,2014

Date of Proposal:

Proposal No. :

CHECKLIST 16

# DETAILS OF FOREST LAND/ GOVT, LAND IDENTIFIED FOR COMPENSTAORY AFFORESTATION JOGINDERNAGAR FOREST DIVISION

Annepuse - A'

Full Title of the Diversion of 406.79 ha. of Forest land in favour of Himachal Pradesh Power Corporation, Ltd., Thana Plaun & Triveni Project Mahadev HEPs, HPPCL, Tehsil Kotli, Distt. Mandi, HP for the construction of Thana Plaun (191MW) HEP within the Project jurisdiction of Jogindernagar and Mandi Forest Divisions, Distt. Mandi. H.P.

Proposal No. : FP/HP/HYD/8255 /2014

Proposal: November 29th,2014

Approved under old scheme	5.74	Chargah Bila Darakhtan	819/391	H43F2	Nagdhar	Panarsa	Sadar Mandi	Mandi	Mandi	14
Approved under old scheme	6.72	Chargah Bila Darakhtan	156	H43F2	Masad	Panarsa	Sadar Mandi	Mandi	Mandi	13
Approved under old scheme	6.55	Chargah Bila Darakhtan	6	H43F2	Masad	Panarsa	Sadar Mandi	Mandi	Mandi	12
Approved under old scheme	5.58	Chargah Bila Darakhtan	1409/1382	H43E13	Basa	Darang	Sadar Mandi	Mandi	Mandi	=
Approved under old scheme	10.6	Chargah Bila Darakhtan	282/260/253	H43F1	Badaun	Kataula	Sadar Mandi	Mandi	Mandi	10
Approved under old scheme	17.48	Chargah Bila Darakhtan	281/258/22	H43F1	Badaun	Kataula	Sadar Mandi	Mandi	Mandi	9
Approved under old scheme	16.67	Chargah Bila Darakhtan	266/237	H43F1	Badaun	Kataula	Sadar Mandi	Mandi	Mandi	8
Approved under old scheme	24.19	Chargah Bila Darakhtan	220	H43F1	Badaun	Kataula	Sadar Mandi	Mandi	Mandi	7
Approved under old scheme	9.71	Chargah Bila Darakhtan	121	H43F1	Badaun	Kataula	Sadar Mandi	Mandi	Mandi	6
Approved under old scheme	11.16	Chargah Bila Darakhtan	301/299/14 1	H43F1	Badandhar	Kataula	Sadar Mandi	Mandi	Mandi	S
Approved under old scheme	53.72	Chargah Bila Darakhtan	297/128	H43F1	Badandhar	Kataula	Sadar Mandi	Mandi	Mandi	4
Approved under old scheme	38.51	Chargah Bila Darakhtan	284/39	H43F1	Badandhar	Kataula	Sadar Mandi	Mandi	Mandi	υ
Approved under old scheme	8,41	Chargah Bila Darakhtan	768	H43F1	Amehad	Kataula	Sadar Mandi	Mandi	Mandi	2
Approved under old scheme	6.39	Chargah Bila Darakhtan	660	H43F1	Amehad	Kataula	Sadar Mandi	Mandi	Mandi	-
Remarks	Area in Ha.	Legal Status	Khasra No.	Survey Sheet No.	Muhal	Range	Tehsil	Forest Division	District	æ
			MANDI FOREST DIVISION	DI FORES	MAN					

# CHECKLIST 16

DETAILS OF DEGRADED FOREST LAND/GOVT. WASTELAND IDENTIFIED FOR COMPENSTAORY AFFORESTATION

¥

	409.37	Grand Total in Ha.								
Approved under old scheme	20	DPF	IIN	H43E13	Bunga dhar	Kunnu	Darang	Mandi	Mandi	33
Approved under old scheme	15	DPF	Nil	H43E13	Kalon	Padhar	Darang	Mandi	Mandi	32
Approved under old scheme	10	DPF	Nil	H43F1	Nerinishoo	Nerinishoo	Kataula	Mandi	Mandi	31
Approved under old scheme	10	DPF	Ni	H43F1	Algan	Kataula	Kataula	Mandi	Mandi	30
Approved under old scheme	s	DPF	Nil	H43F1	Junah	Nerinishoo	Kataula	Mandi	Mandi	29
Approved under old scheme	8	DPF	Nil	H43F1	Halog	Kamand	Kataula	Mandi	Mandi	28
Approved under old scheme	- 10	DPF	Nil	H43F1	Bairoo	Kataula	Kataula	Mandi	Mandi	27
Approved under old scheme	8	DPF	Nil	H43F1	Jamnu Tunker	Mohar	Kataula	Mandi	Mandi	26
Approved under old scheme	10	DPF	Nil	H43E14	Rehradhar	Bijan	Sadar Mandi	Mandi	Mandi	25
Approved under old scheme	10	DPF	Nil	H43E14	Rehradhar	Tung	Sadar Mandi	Mandi	Mandi	24
Approved under old scheme	10	DPF	IIN	H43E14	Sinhal	Bijan	Sadar Mandi	Mandi	Mandi	23
Approved under old scheme	10	DPF	IIN	H43E14	Siram	Tamlot	Sadar Mandi	Mandi	Mandi	22
Approved under old scheme	8.01	Chargah Bila Darakhtan	1488/1253	H43F1	Tihri	Katauila	Sadar Mandi	Mandi	Mandi	21
Approved under old scheme	10.52	Chargah Bila Darakhtan	1412/1013	H43F1	Tihri	Katauila	Sadar Mandi	Mandi	Mandi	20
Approved under old scheme	13.51	Chargah Bila Darakhtan	1341/1000	H43F1	Tihri	Katauila	Sadar Mandi	Mandi	Mandi	19
Approved under old scheme	7.69	Chargah Bila Darakhtan	239	H43F2	Suma	Panarsa	Sadar Mandi	Mandi	Mandi	18
Approved under old scheme	26.62	Chargah Bila Darakhtan	52	H43F2	Suma	Panarsa	Sadar Mandi	Mandi	Mandi	17
Approved under old scheme	8.41	Chargah Bila Darakhtan	412/339	H43F1	Suhda	Kataula	Sadar Mandi	Mandi	Mandi	16
Approved under old scherne	5.18	Chargah Bila Darakhtan	702/355	H43F1& H43E13	Nandal	Kataula	Sadar Mandi	Mandi	Mandi	15

+

0

3

l

	479.37	Grand Total in Ha.								
New area proposed	30.00	DPF	NIL	HS3EI	Akash Mata (Kufri dhar)	Sainj	Banjar	Seraj	Kullu	40
New area proposed	10.00	UPF	NI	52D/14	Shansha	Jhalma	Udaypur	Lahaul	Lahaul & Spiti	39
New area proposed	5.00	DPF	Ni	52D/10	Gorigoth	Tindi	Udaypur	Lahaul	Lahaul & Spiti	38
New area proposed	6.00	DPF	Ni	52D/10	Chaned-III	Tindi	Udaypur	Lahaul	Lahaul & Spiti	37
New area proposed	7.00	DPF	Nil	52H/2	Silagompa	Keylong	Keylong	Lahaul	Lahaul & Spiti	36
New area proposed	7.00	UPF	Nil	52H/2	Khorpani	Keylong	Keylong	Lahaul	Lahaul & Spiti	35
New area proposed	5.00	DPF	Nil	52H/2	Peukar	Keylong	Keylong	Lahaul	Lahaul & Spiti	34

Mandi Forest Division, Mandi (H.Rbtli, Distt. Mandi (H.P.) General Manager Deputy Conservator of Forestan & TP HEPs HPPCL

5

Area to be proposed under CA Scheme under Forest Division Mandi = 472.48-Hectares

Area to be diverted from Mandi Forest Division for the construction of Thana Plaun HEP = 236.24 Hectares

# **Geological Feasibility Report**

# Thana Plaun Hydro-Electric (HE) Project, Beas River, Mandi district, Himachal Pradesh





# Vikram Gupta

Wadia Institute of Himalayan Geology Dehra Dun – 248 001

July 2023

# Geological Feasibility Report - Thana Plaun Hydro-Electric (HE) Project, Beas River, Mandi district, Himachal Pradesh

This has been with reference to the letter from Himachal Pradesh Power Corporation Limited (HPPCL), Govt of Himachal Pradesh (reference letter No. HPPCL/GM-TM&TP HEP's/TP-E&F/K-1-2023-426-33 dated 15-05-2023), and subsequently numerous discussions on the subject of the geological feasibility report related to the occurrence of geo-hazards in the vicinity of the Thana Plaun Hydroelectric (HE) project. In this regard, all the necessary documents prepared for the subjects, such as test reports, various detailed project reports, and clearance certificates obtained from different organizations, etc. were assessed. In order to take stock of the situation, numerous discussions with the project personnel, and lastly the joint visit of Dr Vikram Gupta (Scientist 'G') along with various project personnel namely Er. Sanjay Kumar Jagota (General Manager), Er. Sanjeev Sharma (Senior Manager), Sh. Rahul Sharma (Dy Manager, Env) and Er. Kapil Katoch (Asst. Engineer) was made on June 04, 2023. The results/inferences drawn from reviewing all the reports and the investigations carried out are summarized in this report.

#### Introduction

The proposed Thana Plaun Hydro-Electric (HE) Project is a storage cum run-of-theriver scheme on the Beas river in the Mandi district of Himachal Pradesh. It has a live storage capacity of 44.93 MCM. The project involves the construction of a 106.70m high and 225.93m long Concrete Gravity Dam near the village Thana. It is located ~ 40 km downstream of Pandoh Dam (Mandi district, Himachal Pradesh) and ~ 1 km downstream of Kunkatar bridge. The project layout comprises a very short water conductor system on the right bank leading to an underground powerhouse cavity located just downstream of the toe of the dam. The powerhouse cavity comprises 3 nos. of main units of 50.33 MW each and 2 nos. of environmental units of 20 MW each. The water coming out of the turbines is discharged back into the Beas River through 2 no's of short tail race tunnels. The normal tail water level at the powerhouse location is EL 634.00m with a gross head of 75.67m. It is planned that the project will be implemented by the Himachal Pradesh Power Corporation Limited (HPPCL), Govt of Himachal Pradesh.

#### **Location of the Project**

The proposed Thana Plaun HE project lies between latitudes 76° 15'E & 77° 45'E and longitudes 31° 45'N & 32° 25'N and is located in the Mandi district of Himachal Pradesh. It intercepts an area of ~ 7378 km<sup>2</sup>. The dam site is located at a longitude 76°50'20.53"E and a latitude 31°49'28.22"N. The entire area is thinly populated. The complete project

including the dam site and the underground powerhouse location can be made accessible from the Jogindernagar – Neri - Dharampur highway through roads.

The total length of the reservoir is ~16.5 km. along the river Beas, 4.5 km along the Rana Khad, and 1.5 km along the Arnodi Khad from the Dam site. The area under submergence is 341.38 ha.

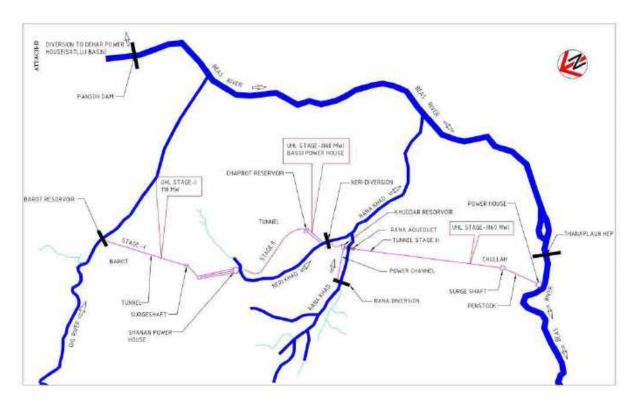


Figure 1 Location map of the Thana Plaun HE project along with the locations of various other projects in the vicinity

#### **Regional Geology**

Thana Plaun H.E. Project site is located to the south of the Main Central Thrust (MCT). Almost N-S trending Sundernagar Fault which has displaced MCT significantly occurs north-east to the site. The Neotectonic Kaurik Fault System is defined by a number of half-graben faults that occur east of the site.

Geologically, the project area and its environs are represented by the rocks of the Sirmur Group, Siwalik Group, and Quaternary deposits (alluvial plains). The rocks of the Sirmur Group are represented by Kasauli and Dagshai formations of the Oligocene - Miocene age. The rocks of the Kasauli Formation are represented by thickly bedded micaceous sandstone having minor red and grey clayey bands, whereas the Dagshai Formation is represented by purple-red colored clay, siltstone, and subordinate sandstone having intra-formational conglomerate bands in the upper parts. These are thrust over the rocks of the upper Siwalik Group along a northerly dipping regional feature termed as Main Boundary Fault (MBF). In the southern part of the area, the Siwalik Group of rocks is separated from the alluvial deposits (Quaternary age) by a northerly dipping Himalayan Frontal Thrust (HFT). The alluvial deposits represent flat to gently southerly sloping country and are dissected by drainage emanating from the Siwalik range. Siwalik Group has been subdivided into Lower, Middle, and Upper Siwalik sub-groups of the Miocene to Pleistocene age. In general, the project site is represented mainly by the sandstone intercalation of light red, brown, or greenish-grey clay and boulder conglomerate.

Seismically, the project area falls in seismic zone V as per the seismic zoning map of India. The project area lies in the vicinity of the major thrust zones, viz. MBT, Drang Thrust, Gambhar Thrust, Sundernagar Fault, and Jawalamukhi Thrust. The studies for seismic design parameters have been carried out by IIT, Roorkee. Based on these studies, the maximum value considered for horizontal peak ground acceleration (PGA) is 0.50g for MCE and 0.29g for DBE for designing the project.

## **Geology of the Project Area**

Physiographically, the project area between the proposed dam site and Tail Race Tunnel (TRT) and further downstream lies in the foothill ranges of the Himalaya and is covered by the rocks of the Middle and Lower Siwalik. The rocks comprise greycolored, medium to coarse-grained, and massive to medium-bedded sandstone with intercalations of light red, brown, or greenish grey colored clay/claystone, siltstone; and boulder conglomerates. The Quaternary sediments along the rivers and streams (Khads) are represented by recent alluvium. The land surfaces are generally rugged with deep valleys, depressions, and gullets. A fairly good amount of area is covered by river terraces, particularly in reservoir submergence.

In the Detailed Project Report of the project, the area around the proposed dam / underground powerhouse site, surface powerhouse site, parts of HRT, and the reservoir has been mapped on 1:1,000, 1:10,000, and 1:22,000 scales. Rock outcrops have been marked and the boundaries of different quaternary deposits have been delineated. Geological mapping in the project area revealed the presence of various geological units and are briefly presented hereunder: -

#### <u>Colluvium</u>

Colluvium of variable thickness covers most of the slopes and parts of valley segments. Its estimated thickness varies between 1.0m to  $\pm$ 10.0m. It comprises angular, subangular, and sub-rounded boulders and rock fragments of sandstone mixed with finer rock fraction, silt, and humus. On the slopes, it rests at an angle of

~15°- 40° with a few exceptions due to local variations. On steeper slopes, its thickness is less. It is generally covered with natural grass/bush turfing and a canopy of small trees.

## **River Borne Material (RBM)**

RBM mainly covers the river channel in a linear stretch and comprises mostly rounded, sub-rounded, and sub-angular boulders of sandstone and finer fractions (cobbles, pebbles, sand, and silt). Some boulders of granite gneiss and quartzite which are distantly transported are also present. Its thickness is estimated to vary between  $\pm 5m$  and  $\pm 10m$  but the deepest being of the order of + 30m in the Beas River.

## Bed Rock - Sandstone with siltstone/claystone bands

Bedrock covers the entire project area and is often exposed or overlain by an overburden of varying thickness. Mostly the rocky outcrops are fresh but sometimes slightly to moderately weathered (W1-W2). The depth of weathering is anticipated to vary between >1.0-3.0m. The sandstone is grey and buff colored; medium to coarse-grained, often micaceous, thickly bedded, and sometimes slightly friable. Bedding in the area dips at 45° to 70° in the direction of N70° to N80° and in N245° to N 260° with some local variations. This reversal of dips is due to folding. At places, cross-stratification is also noticed. Field observations indicate the rock has moderate to good compressive strength.

Sandstone is massive as the joint planes are widely spaced. Bedding planes are not very clearly defined and have been deduced from the graded bedding and a few pebbly bands. Thin gravelly beds are sometimes noticed in the sandstone. At around 5 km downstream of the dam site, the area is dominated by purple to buff-colored siltstone/ claystone and poorer quality sandstone. Potholes are visible in the sandstone. However, they are of smaller dimensions, generally <50cm in diameter, and not very deep. These are generally formed by the milling action of the river water charged with sand and sediments. At places, these are aligned straight which indicates selective erosion along the weaker discontinuity planes.

Six sets of joint planes including the bedding joint have been reported in the project area. Besides, sub-surface exploration of various project components has been done using 24 boreholes amounting to 1458.5 m of core drilling and eight numbers of drifts totaling 390 m of excavation. The details about these were in the comprehensive report in DPR, Vol-IV, 7.2, and various in-situ tests have been performed and are presented in the Comprehensive report in DPR, Vol-IV, 7.2.

#### **Reservoir Survey**

The storage Dam of 106.7m height on river Beas will create submergence along the main river and its tributaries, viz. Rana khad and Arnodi khad and their subdrainages, and, the spread of the reservoir shall cover an area of 3.16 km<sup>2</sup> with FRL of 716 m.

The topography of the area is rugged with sharp crested ridges and narrow valleys. In general, the Beas River has a steep to moderate gradient and its banks are covered by colluvium supporting luxurious vegetation. No major unstable area and/or major structural discontinuity have been observed in the area. Arnodi Khad joins Beas on its left bank, just upstream of the dam axis. Numerous gullies and depressions are present on both banks of the river which are normal features in a mountainous terrain. These gullies are not perennial and have flowing water during rains only. Along Rana Khad, some areas on the left bank and right banks are habitated and cultivated at higher reaches. Village Pipli Panchayat is situated on the left bank of Rana Khad above an elevation of 716m and the area is covered with slope wash material. Most of the habitats and cultivated lands are situated above FRL and will not be inundated by reservoir impounding.

Terrain slopes above the FRL are generally moderate and the estimated thickness of colluvium is of the order of 1 to ±10m and is generally thickly vegetated. The area is mostly devoid of habitation. However, the settlements in the area are far from the FRL. These are few and scattered. Therefore, any significant danger is not envisaged for the settlements.



Figure 2 Panoramic view of the slopes of the reservoir along the Beas River

Sporadic exposures of grey-colored, medium-grained, and generally micaceous sandstone with subordinate siltstone/ claystone bands amid colluvium cover are noticed in the area. Rock is moderately jointed. Some of the areas of the reservoir rim are certainly covered with colluvium, but, its thickness is very shallow. Thus, fluctuations of the reservoir would have a low possibility of mass slumping. Necessary stability measurement should be adopted wherever required as per the site conditions with regular surveillance.

Assessment of the submergence area reveals that no major potential slide zones could get activated during the filling and functioning of the reservoir, leading to the generation of large waves in the reservoir and causing overtopping of the dam. However, it may lead to siltation which has duly been considered in the silt load factor in the reservoir. No occurrence of any mineral of economic importance has been reported.

#### **DIFFERENT STUDIES COMPLETED**

As per requirement, the following studies were performed by the respective organizations.

Sr No.	Agency	Study Performed
1	HPPCL	24 exploratory bore holes amounting to 1458.5 m of
		core drilling and its logging thereof
2	ERS Constructions, M/s Arihat Drillings	Permeability and Lugeon Tests (Water Permeability Test
	and SMEC India	at different Location of the project components)
3	Central Soil and Materials Research	Shear Strength Parameters of Rock Mass in Right Bank
	Station (CSMRS), New Delhi	Dam Axis drift D1 of Thana Plaun HEP.
4	CSMRS, New Delhi	In-situ Deformability Characteristics of Rock Mass by
		Uniaxial Jacking in Left bank Drift D2 at EL 679.29 m on
		Dam Axis of Thana Plaun HEP.
5	CSMRS, New Delhi	In-situ Deformability Characteristics of Rock Mass by
		Uniaxial Jacking in Left bank Drift D5 at EL 650.18 m on
		Dam Axis of Thana Plaun HEP.
6	CSMRS, New Delhi	In-situ Deformability Characteristics of Rock Mass by
		Uniaxial Jacking in Power House Drift D7 at EL 657.65 m
		of Thana Plaun HEP.
7	CSMRS, New Delhi	Deformability Characteristics of Rock Mass in Right Bank
		Dam Axis Drift of Thana Plaun HEP.
8	CSMRS, New Delhi	Stress Measurement by Hydro-fracturing Test in Power
		House drift of Thana Plaun HEP.
9	CSMRS, New Delhi	In-situ Shear strength Parameters of Rock Mass in Left
		bank Drift D5 at EL 650.18 m on Dam Axis of Thana
		Plaun HEP.
10	Department of Earthquake Engineering,	Earthquake Engineering Studies (Soil Profiling using

	IIT, Roorkee	MASW) of Thana Plaun HEP.
11	Department of Civil Engineering, NIT, HP	Petro-graphic Tests of Rocks
12	Petrology Division, Geological Survey of	Petro-graphic Analysis of Suspended Sediments of
	India, Faridabad	Kunkatar and Kandapattan Area of Thana Plaun HEP.
13	CSMRS, New Delhi	ASR and Petro-graphic Analysis of RBM samples from
		Quarry Sites of Thana Plaun HEP.
14	CSMRS, New Delhi	Laboratory Investigation of Rock from Thana Plaun HEP.
15	CSMRS, New Delhi	Laboratory Investigation of Rock from Thana Plaun HEP,
		2018.
16	Department of Earthquake Eng. IIT,	Site Specific Design Earthquake Parameters for Thana
	Roorkee	Plaun HEP.
17	Department of Earthquake Eng. IIT,	Micro-Earthquake studies around Thana Plaun HEP.
	Roorkee	
18	Geological Survey of India, Chandigarh	Preconstruction Stage Geo-Technical Investigations of
		Thana Plaun HEP.

These studies indicate that there is not any concern that adversely affects the said project, however, the results of the tests should be utilized for the design and construction of the various components of the project.

After detailed deliberation with the project personnel and reviewing various reports, it has been noted that the following necessary approval has been obtained from the concerned authority:-

Sr No.	Authority	Dated
1	Directorate of Barrage & Canal Design (N&W), CWC	27.02.2018
2	Thermal Civil Design Division, CEA	08.09.2020
3	Construction Machinery Consultancy and Plant & Machinery	11.12.2019
	Directorate, CWC	
4	CMDD (N&W) Directorate, CWC	01.08.2019
5	Construction Power by Hydro Project Appraisal Division, Ministry of	27.02.2019
	Power	
6	CSMRS, Department of Water Resources, RD&GR, Ministry of Water	09.09.2019
	Resources	
7	Defence Clearance, Ministry of Defence	03.12.2020
8	E& M Works by Hydro Project Appraisal Division, Ministry of Power	03.02.2020
9	NCSDP, F.E & S.A Directorate, CWC	16.10.2020
10	Directorate of Gate Design (N&W), CWC	16.10.2019
11	EPE Division, DGCO, GSI	26.09.2017
12	Hard Cost Estimates, Hydro Project Appraisal Division, Ministry of	10.09.2020
	Power	
13	HCD (N&W) Directorate, CWC	05.07.2019
14	Hydro Engineering and Technology Development Division, CEA	29.10.2019
15	Hard Cost Phasing, Hydro Project Appraisal Division, CEA, Ministry of	28.01.2021
	Power	
16	Hydrology (N), Directorate, CWC	06.03.2018
17	Instrumentation Directorate, Central Dam Safety Organization, CWC	07.02.2020
18	Indus Wing, Ministry of Water Resources, River development and Ganga	27.02.2018

	Rejuvenation	
19	Inter State Matters-2 Directorate, CWC	11.05.2018
20	Legal Division, CEA	29.06.2021
21	Power System Planning and Appraisal-I Division, CEA	10.06.2020
22	Hydro Electric Potential Reassessment Division, CEA	18.01.2017
23	BOQ & Construction Schedule, Thermal Civil Design Division, CEA	16.10.2019
24	Zero Date, Thermal Civil Design Division, CEA	14.01.2021
25	Cost Appraisal (HWF) Directorate, CWC	15.06.2020
26	Financial and Commercial Appraisal Division, CEA	24.02.2021
27	Final Concurrence by Central Electricity Authority	07.09.2021

#### Landslide and related geohazard assessment

Landslides and related hazards are common and have been noted to increase in the Himalaya during recent times, greatly affecting the human development and infrastructures located along its path. One recent example of destruction by landslides and its cascading effect is the Feb 2021 Rishigange-Dhauliganga Chamoli disaster destroying the 13.2 MW Rishiganga hydel project near Raini, and the Barrage site of the under-construction 520 MW Tapovan-Vishnugad Hydel project of the National Thermal Power Corporation (NTPC). In this context, it is necessary to understand any such kind of possible disaster in the future for the said project. Therefore, a landslide susceptibility map of the upper Beas Valley has been prepared using the XGBoost machine learning (ML) algorithm. The methodology for the preparation of a landslide susceptibility map (LSM) involves the (i) preparation of datasets: - inventory of landslides and the thematic maps of various conditioning factors of landslides. A total of 13 possible conditioning factors namely elevation, the inclination of the slope, slope aspect, plan curvature, profile curvature, topographic wetness index (TWI), Geomorphology, lithology, Land use and land cover (LULC), rainfall, and distance to drainage, road, and thrusts for the occurrence of landslides in the area were selected (ii) collinearity test to understand the independency of the various conditioning factors of landslides, (iii) training and optimization of the model, (iv) preparation of the landslide susceptibility map (v) validation of the model (vi) sensitivity analysis to understand the sensitivity of the model with respect to each conditioning factor.

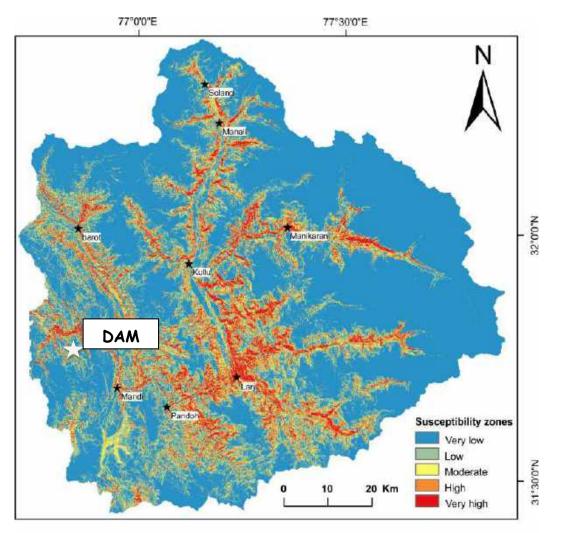


Figure 3 Landslide susceptibility mapping of the upper Beas valley using XGBoost machine learning algorithm

LSM map prepared using optimized XGBoost algorithm of the ML technique indicates that the most dominant factors for the occurrence of landslides in the area are the inclination of slope, elevation, distance to road, and drainage, with a higher number of landslides in 31°-50° slope, 2001-3000 m elevation. The study further indicates that the inclination of the slope, distance to the road, and elevation are the most sensitive factors. Conditioning factors such as distance to thrust, Topographic Wetness Index, and slope aspect have lower relative importance in occurrence than factors like distance to drainage, and profile curvature, yet are more sensitive as they had a high change in landslide susceptibility index relative to other factors. The accuracy of this map as achieved by hyperparameter optimization is ~91%. Still, there are a few limitations on the accuracy of input data and the selection of the causative factors of landslides in the area. For example, there are great variations in lithological characteristics at the local scale but these were not accounted in the lithological map used in the present study.

Though there are several isolated landslide hotspots for the occurrence of landslides in the LSM, still the formation of a landslide in the upstream of the dam in the valley is ruled out, as the valley width in the area is quite high. Thus, the adverse effect of the cascading impact of landslides in terms of flash flooding is minimal. Following is the list of 20 HEP that have been running successfully or under construction upstream of the proposed Thana Plaun HE project site.

Sr.No.	Name of Project	Capacity	Developer	Status
		(MW)		
1	Beas Sutlej Link	990	Bhakra Beas Management Board	Commissioned
2	Parbati-IIIHEP	520	NHPC Limited	Commissioned
3	Allain Duhangan HEP	192	AD Hydro Power Ltd.	Commissioned
4	Larji HEP	126	HPPCL	Commissioned
5	Uhl-I(Shanan)HEP	110	Punjab State Power Corporation	Commissioned
6	Malana-IIHEP	100	Everest Power Pvt. Ltd.	Commissioned
7	Sainj HEP	100	HPPCL	Commissioned
8	Malana-IHEP	86	Malana Power Company Ltd.	Commissioned
9	Uhl-II(Bassi)HEP	66	HPSEB	Commissioned
10	Baragaon SHEP	24	Kanchanjunga Hydro Power Ltd.	Commissioned
11	Patikari SHEP	16	Patikari Hydro Electric Project Ltd.	Commissioned
12	Toss SHEP	10	Toss Mini Hydel Power Project	Commissioned
13	Beas Kund SHEP	9	Kapil Mohan and Associates	Commissioned
14	Sarbari-IISHEP	5.4	DSL Hydro wattL td.	Commissioned
15	Balargha SHEP	9	Sandhya Hydro Power Projects	Commissioned
16	Parbati-IIHEP	800	NHPC Limited	Under Construction
17	UhlIII HEP	100	HPSEB	Under Construction
18	Lambadug HEP	25	KU Hydro Power Pvt. Ltd.	Under Construction
19	LowerUhl SHEP	13	Trident Power Systems Ltd.	Under Construction
20	Fozal SHEP	9	Fozal Power Pvt. Ltd.	Under Construction

#### CONCLUSIONS

Different studies have been undertaken to complete the detailed project report of the Thana Plaun HEP. The reviewing and vetting of these studies, along with the observations of the site visit indicate the following: -

- The entire layout of the project along with the dam site was selected based on the favorable topography and geometry of the gorge. Explorations have revealed nominal stripping and thus it is considered the best option for a concrete gravity dam
- Geological mapping at the project site exhibits favorable geology and does not indicate any adverse structural unit, like a major fault or shear zone. Further, the powerhouse cavity orientation has been planned in a favorable

orientation with respect to the geological discontinuities and keeping in view the engineering obligations.

- Subsurface drilling and drifting in the underground powerhouse area have not revealed any major adverse geological features, thereby minimizing the possibility of geological surprises during construction. Nevertheless, geological surprises are common in the Himalaya.
- The rim of the reservoir has been evaluated to be stable, however, there are a few isolated slope failure locations as in Himalayan hills. The landslide susceptibility map of the upper Beas Valley indicates the possibility of the occurrence of landslides, however, the formation of the major landslide dam in upstream of the dam and subsequently its cascading effect in terms of its breaching is minimal. The rim protection measures as depicted in the environment management plan (EMP) should be adopted.
- There are about 36 major & minor hydropower projects upstream of the proposed Thana Plaun HEP and in the past > 40 years no major disaster has been reported.

In view of the above, the proposed site is considered suitable for the Thana Plaun HEP

(Vikram Gupta)

# MINING PLAN

3

D

D

D

9

9

۵

Ð

0

0

0

٦

D)

0

D

0

0

Ó

0

0

OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI KHASRA NO.3185, 3187/1, 4/1 & 108 MEASURING 7.7259 HECTARE MAUZA TATOLI PARDANA, NARAINGARH & THATHI, TEHSIL –DHARAMPUR

LETTER OF INTENT GRANTED IN FAVOUR THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPs, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

> Jhumpa C. Jamwal HP/RP/21/1/2016.

APPROVE

# INDEX

と言

3

D

p

1

₽

9

D

0 0 0

₽

Ð

DD

Ð

D

0

ø

Ø

D

D

D

Ð

D

D

D

8

0

13

0

ò

0

0

S.NO	INTRODUCTION	PAGE NO
	PARTI	
	INTRODUCTION	1
1	GENERAL	2
1,1	Name & Address of the applicant	2
1.Z	Status of the Applicant	2
1.3	Mineral which the Applicant intends to Mine	2
1.4	Period for which the mining lease is granted	2
1.5	Name & Address of H.P.R.Q.P preparing the Mining Plan	2
1.6	Name of the Prospecting Agency	2
2	Location and Approach of the Area (Location Map)	3
2.1	Topo-sheet no.	3
2.2	Location of the Area	5
2.3	Address details	5
2.4	Distances from Important places in Kilometers	5
2.5	Approach of the Area	6
3	Physiographical Aspect of the Area	
3.1	General	6
3.2	Altitude of the Area	7
3.3	Climate of the Area	8
3.4	Rainfall	9
3.5	Any other important Physical Feature	9
15000451	PART-I	
1	Description of the area in which mine is situated	10
1.1	General	10
1.2	Name of River/ Stream and its gradient in which the lease is situated	12
1.3	Drainage System	-12
1.4	Drainage System Type of Drainage Origin of river	
1.5	Origin of river	12
1.6	Altitude of Origin	12
1.7	Geometry of the Catchment of the river ingatting the	/FD /
1.8	Annual Deposition of the Place of Mining	3×12/
1.9	The Competency of the river/stream at the mining site	12 12
1.10a		13

1.10b	The thread of deepest water in meandering.	13				
1.11	Altitude of the Area					
1.12	Description of groundwater table					
2	Geology					
2.1	The Regional Geology of the Area					
2.2	Local Geology of the area	14				
2,3	Geology of the lease area	18				
2.4	The nature of boulders, cobbles, sand etc	19				
2,5	Nature of rock and their Altitude	20				
2.6	Description of Annual Deposition w.r.t the Geology of catchment area and other factors	20				
3	Reserves	21				
3.1	General	21				
3.2	Percentage wise distribution of Mineral	21				
3.3	Estimate of Geological Reserve	21				
3.4	Estimate of Mineable Reserves of each Mineral	22				
3.5	Estimate Annual Deposition of Mineral	24				
4	Mine development and plan of Progressive Mining, Method of Mining	25				
4.1	Development and Production Programme for 5 years					
4.2 a	Development and Production at the end of 1= year					
4.2 h	Development and Production at the end of 2nd year					
4.2 c	Development and Production at the end of 3rd year					
4.2 d	Development and Production at the end of 4th year					
4,2 e	Development and Production at the end of 5th year	31				
4.3	End use of Mineral	32				
4.4	Detail of Road Transport	34				
	PART II	1				
1	Base Line Data (Detail of the Land use and Social aspect of area)	36				
1.1	Detail of Population Distribution	36				
1.2	Coole Demonde of the Still and a still and	39				
1.3	Land use within 5km radius mdustries	41				
1.4	Land use within 5km radius industries	43				
1.5	Horticulture	46				
1.6	Animal Husbandry	48				
1.7	Horticulture Animal Husbandry Fisheries Flora & Fauna	49				
1.8	Flora & Fauna	50				
1.9	Climate of the Area	54				
2	Climate of the Area Environment Management Plan	56				
2.1	Impact on Lond Use Pattern and Topography	56				

调

卤

0 0 0

ē

歯

đ

0 0 0

.

2.2	Impact on Climate	56
2.3	Impact on air	56
2.4	Impact on Noise Level	57
2.5	Impact on Flora & Fauna	57
2.6	Impact on soil cover	57
2.7	Impact on Hydrology	57
2.8	Waste Disposal Management, if any	58
2.9	Socio-economic Benefits	58
2.10	Transportation of Mined Mineral	58
PAR	T III PROGRESSIVE MINE CLOSURE PLAN/RECLAMA	TION PLAN
1.1	Reclamation	59
1.2	Mine waste Disposal	59
1.3	Top Soil utilization	59
1.4	Preventive Check Dams	59
1.5	Plantation Work	59
2	Strategy for Protection Of Point Of Public Utility Etc.	60
3	Manpower Development	60
4	Use of Mineral	60
5	Disaster Management & Risk Assessment	61
6	Recommendation for Risk Reduction	61

医静脉

10

D

1

D

₿

Ð

Ð

D

D

3

3

D

b

D

D

Ð

0

3

D

D

p

1

Ð

D

D

D

0

D

D

0

D

D

1

0

Ø

# MAP INDEX

S. No.	Title	Plate No.
1,	Locational Plan	1
2.	Geological Plan	2
3.	Plan Showing working pit Position at the End of 1s to 5th year.	3
- 347	Buffer Zone 5 Kilometer radius Map.	4

Declaration Certificate of RQP

16



1 6 83 6 1 0 6 6 U) 6 8 Ċ 0 6 đ 0 đ 204 0 रामकाय लाखाः 22 नायांग विषयग शिमका ē. healogical wing Justi, of Industria 0 Johnsta 0 PPROVEP Witto Constitute 街 गाउँ वे समय जन्म 1650 - 1650 - 539/17- 1650 0 todet2 6 1 23 5/23 6 A GAN GM/AGM/DM(Smr) Geologist (Zond-IV) Geologisar (Ving JE Deptil of Industries Shimla-1 29:15 0 0 ۲ õ

Malot Khad Quarry

# MINING PLAN OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA NO. 3185, 3187/1, 4/1 & 108, MEASURING 7.7259 HECTARE MAUZA TATOLI PARDANA, NARAINGARH & THATHI, TEHSIL –DHARAMPUR, DISTT – MANDI (H.P.)

# LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPS, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

# **INTRODUCTION:**

10

Э

80

D

Ð

B

3

0

0

3

D

115

13

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' for grant of mining lease for mining sand, stone and bajri for a period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-539/2017-11944 dated 06/03/2019 and extended for further period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-539/2017-6853 dated 09/11/2021.

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely Pabber Valley Power Corporation (PVPC) and Kinner Kailash Power Corporation (KKPC), earlier owned by HPSEB, have been merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31,07,2007.

Thana plaun Hydro Electric Project is located between latitude 76° 15% to 7° 45° 15% between 31° 30°N to 32° 30°N in district Mandi. The project has been planned as or short river our storage scheme on the right bank of river Beas with its Dam across the river Beas and underty and Powerhouse located on right bank of the river near village Thana. The Stone, dag i and tank of materied from lease area will be used in the construction of the Project and its infrastructure APPROVED.

In accordance with Rule 35 of the 'Himachal Pradesh Minor Minoral's (Gencession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015 the lessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the said Rules

		0.0	IINING PL	AN	
GM,	TM	& TP	Projects,	HPPCL,	Mandi.

Malut khad lease area is situated in Dharmpur Tahsil of Mandi District, Himachal Pradesh, The

The quarry lease area is located at about 6.5 Km. from Dhrampur on Dharmpur Seoh Road.

available in the lease area shall be mined (raised) by opencast method of mining.

climate of the area is tropical with well-marked summer, winter, and rainy season. The material

Malot Khad Quarry

0

0

iii

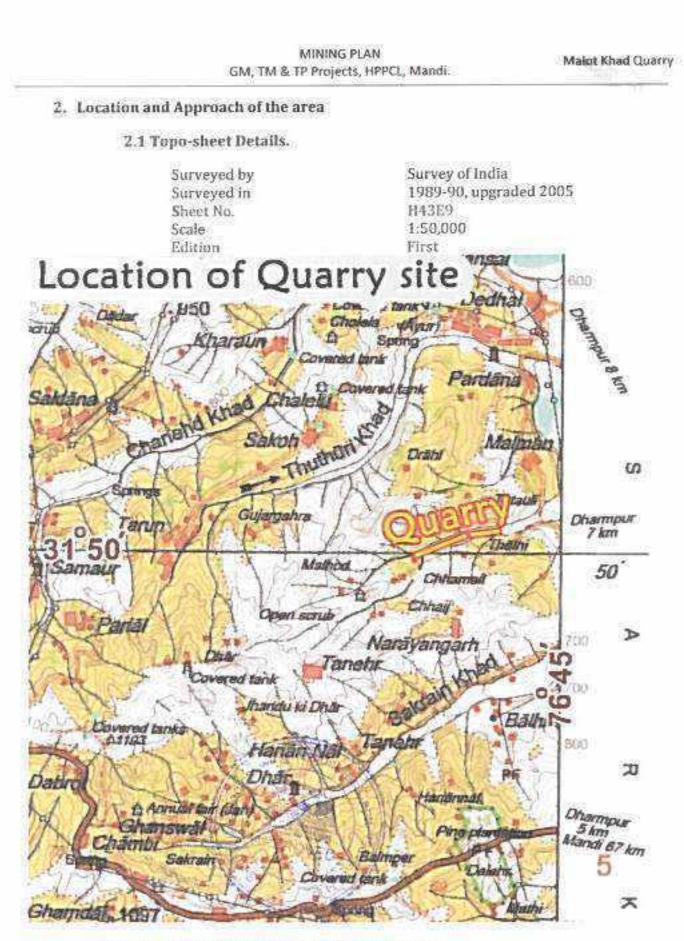
đ

Ċî.

63

6

General: 1.1 Name and address of the applicant 1.1. A. Name of the applicant --The General Manager 1.1. B. Address of the applicant -The General Manager Trivent Mahadey & Thana Plann HEP's, Himachal Fradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi. 1.2 Slatus of the applicant Government undertaking 1.3 Minerals which the Applicant intends to mine The applicants intend to mine stone, Sand and Bajri. The stones, sand and bajriwill be used in construction activities of the Projects. 1.4 Period for which the mining lease is granted Five years effective from the date of execution of lease deed agreement. 1.5 Name and address of the RQP preparing the Mining Plan: humpa C. Jamwal Cottage No. 21, Type IV. HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016 Mobile No. 9418909890. 1.6. Name and address of the prospecting agency 1/1 The base contour map of the leased area was prepared by Star C.A. Nebi, Retired Senior Surveyor, Geological Wing, Department of Immediate of Negi Lodge (West), Indernager, Dalli Shimla, for the ANDRPROVED The detailed prospecting of the area was canned but bysing R Q P for preparation of this report. The Secondary data to cellerted from various Geological reports of the Geological Survey of India, Satluj Jal Vidyut Nigam Ltd., Indian Metrological Department, Department of Economic and Statistics, Himachal Prodesh, and various publications of Government of Himachal Pradesh. The detailed prospecting of the area was carried out by the R O P for preparation of this report. Page Z



10

Ø

3

ß

3

0

D

D

13

3

D

D

3

3

3

b

D

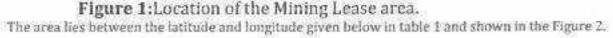
B

D

8

10

Ð



#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi,

Malot Khad Quarry

-

Ø

đ

Ø

đ

g

Ø

ġ

milar -	the standers	twognute
	31° 49' 58,16"	76° 44' 16:66"
B	31° 49' 59.69"	76° 44' 14.16"
6	31°50'01.27*	76° 44' 18,58°
D	31° 50' 02.31"	76° 44' 24.50"
E	31° 50' 05.47*	76° 44' 39.49"
8	31° 50' 05.68"	76° 44' 42.55"
6	31° 50' 09.62"	76° 44' 50,25"
Ħ	31° 50° 05 49"	76° 44' 53.94"
1	31° 50' 04.60"	76° 44' 53,77"
1	31° 50° 64.58*	76° 44' 50.88"
K	31° 50' 02.78*	76° 44' 45.18"
E	31° 50' 03.16"	76" 44' 34.94"
M	31° 50' 02.60"	76° 44' 32.73"
N	31° 50° 00.01*	76° 44' 28.56"
0	31° 49' 59.65"	76° 44' 20.64"
P	31° 49' 58.84"	76° 44' 20.68"
	A STREET	
Normal T	2: Calculated Coordinates o	20000

			MINING P GM, TM & TP Projects		Mal	ot Kh
2	2 Location o	of area of lease	e			
	Details of a					
	CONTRACTOR MANAGERS #	ails of the area ail of the leas	are given below in tal e area	ofe 2		
S. No	Khasra Number	Area Hectares	Owner of Land	Kism	Mauza/mo	ohal
1	3185	2.9053	Government	Gair mumk	in Tatoli	
2	3187/1	0.9576		khad	Pardana	d Man
3	4/1	0.9576			Thathi	
4	108	2.9054		Gair mumk Nali	in Naraing:	arh
	TO	TAL	7.	7259 HECT	TARES	
2.3	Address & D	etail of Lease	3	31		
	eservit inversione	F Office F M M Important	131 11	Tr Tr D M e (Civil): - D rest): - Jc it): - S IPH): - D PWD): - D H Cust H	Thathi anehad anehad harampur andi harmpur ogindernager arkaghat harampur harampur machal Pradesh	
		om	s from the Qu	Bista	ICE	
	CONTRACTOR AND	en e	151	VED A (In K		
-	1 Q	uarry	Roadside NH 3	3W	0.10	
	2	19970899 14	Dharampur		7	
	3	Str.	Kotil		50	
	4 3 R	oadside	Mandi (District Offic	:85)	72	
1	5		Shimla (State Hq) Airport		172 175	
			L su l		a hall and	

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Malot Khad Quarry

6

6

6

đ

6

6

e

6

01

đ

6

đ

6

0

1

商

6

旧

63

1

0

闼

0

0

6

8

8

0

8

8

7	Jogindernager Metre gauge Riy Stn.	55
B	Sarkaghat	28
9	Dharamsala	95

#### 2.5 Approach to the Area.

The leased site is part of Riverbed and is at 6.5 km from Dharampur via Dharampur-Seoh Road, which is approx, 100 m from the quarry site by a Tatoli Pardanu link road. Figure below shows the approach map of the area.



Figure 3: Approach to the Centre of Quarry site

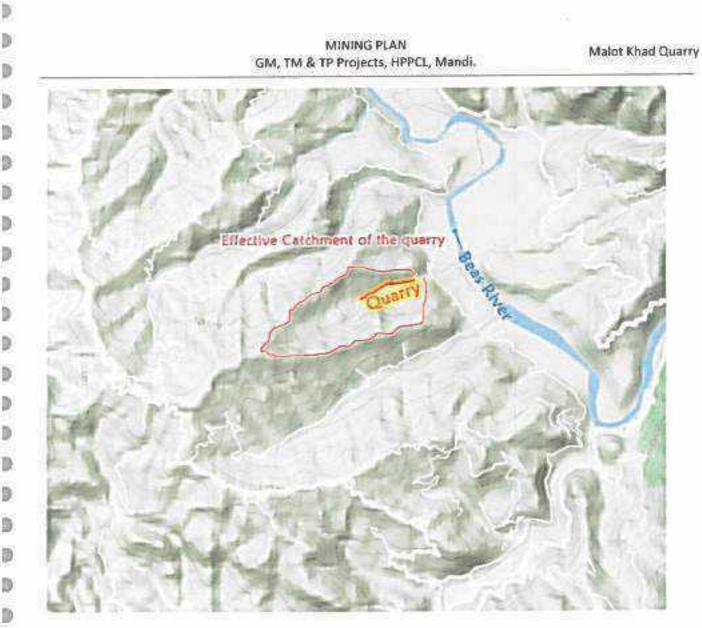
# 3. Physiographical Aspect of the Area

# 3.1 General

The area in general is a part of the Lesser Himatayor. The Lesser Himatayas, located in north-western India in the states of Himachal Bradeshand Uttar Pradesh, in north-central India in the state of Sikkim, and in north-central India in the state of Sikkim, and in north-central India in the state of Sikkim, and in north-central India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters/in tercom

The general relief of the Malot Khad region is as given between the figure -

Page 6



# Figure 4: The terrain map of the Malot Khad region.

The Satellite photograph was taken from the Google is given below (Figure: -4) to depict the general physiography of the area showing that the major ridges/water divides are generally running N-S and all spurs are running parallel to the NE-SW line. HING INGUS

#### 3.2 Altitude of the area

19 Ð

b

D

1

10

3

Ð

D

D

D

Ð

Ð

D

D

B

3

9

D

9

Ð

D

D

3

9

13

Ð

3

B

D

13

0

- The highest contour of leased out argain Malot Khad is 695 Meters above MSL, è
- The lowest contour of the leased-out area in Malot Kluad is 647 Meters above MSL.

#### MINING PLAN GM: TM & TP Projects, HPPCL, Mandi.

Maint Khad Quarry

đ

f

8

0

0

6

6

自

0

创

0

0

10

6

8

8

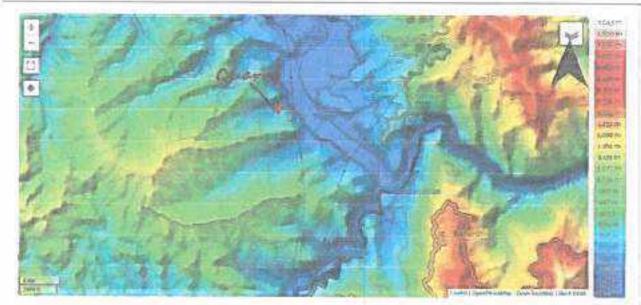
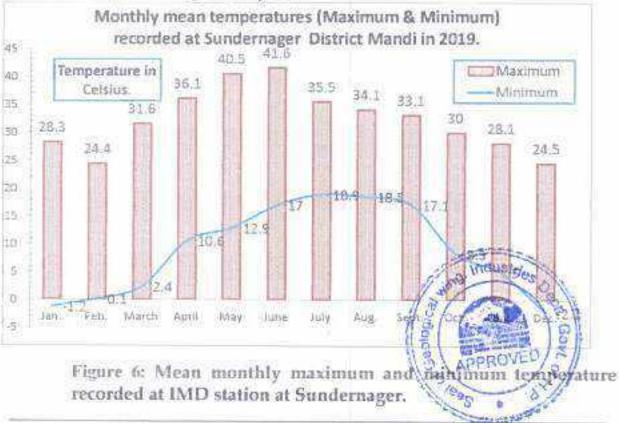
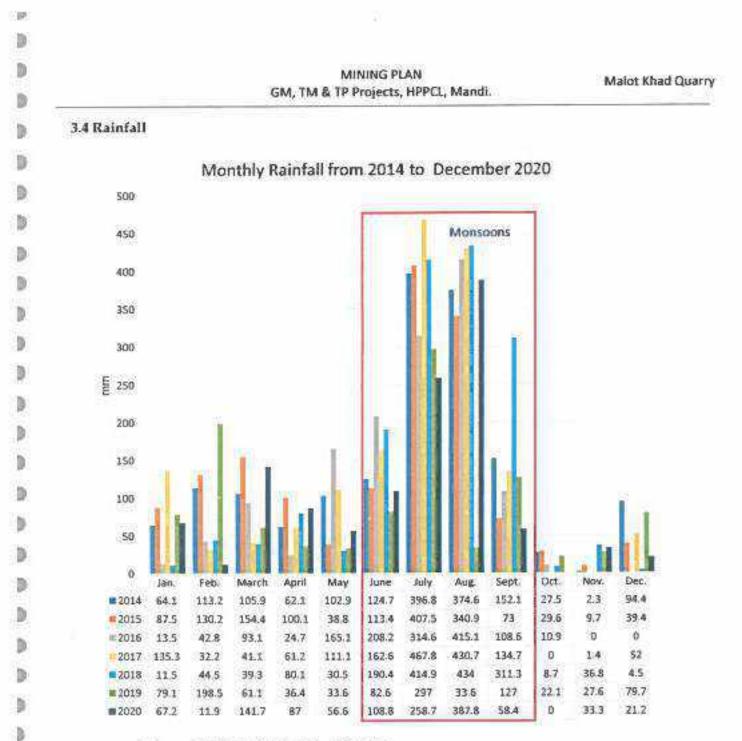


Figure 5: Terrain Map of the Area.

#### 3.3 Climate of Area

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 7.





#### Figure 7: Rainfall of the District.

# 3.5 Any other important feature

Þ

D

9

Ð

3

D

b

D

₿

The mining leased area falls in bed of Malot khad tributary of Beas River and accessibility to the quarry site is through a kutcha road from Dharmpur-Seog Rural Road.

đ

iß.

ť

ſ

# PART1

# 1. DESCRIPTION OF RIVER/STREAM BED IN WHICH THE LEASED IS SITUATED

# 4.1 General

The leased area is situated in the Malot Khad, a primary tributary of Beas River Malot Khad originates at a height of 1118 meter above mean sea level, from a peak northwest of Dudhla village (origin lies in the Survey of India, toposheet NoH43E9). The general flow is SW to NE

The attitude at confluence with Beas River is 604 Metres above MSL (lies in the Survey of India, toposheet No H43E9). The total length is about 3.31 Km. (The total catchment of the Malot Khad lies on survey of India Topo-sheet Nos H43E9.

The general analysis of the drainage system of Malot Khad is given below in table 5 (as per 1: 50000 scale)

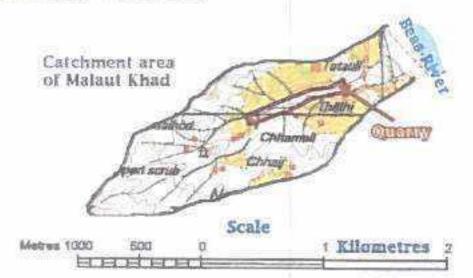


Figure 8: Catchment of Malot Khad.

There is no uniformity/ equational order of average length in each order suggesting that river has not attained proper age and valley is in process of expansion i e erosion in upper reach will be unavoidable. Bifurcation ratio also suggest that it has not attained maturity particularly 1<sup>st</sup> and 2<sup>nd</sup> order hence regular erosion in the upper reaches. The low bifurcation ratio of the 3<sup>rd</sup> order stream is indicated start the valley is in the stage of further expansion. The average length of 2<sup>rd</sup> order is loss than 1<sup>st</sup> order is indicative of structural control of the valley.

- section

# Basic Geometry of the catchment is as: -

Area of the Catchment = 2.38 Sq. Km Perimeter of the Catchment = 8.65 Km Length of the river 3.31 Km

Page 10

<b>D</b>	
D.	MINING PLAN Maiot Khad Quarry GM, TM & TP Projects, HPPCL, Mandi.
D	Average width of valley 0.75 Km
D	Width of the catchment at maximum 1 km From various analysis of the drainage the Malot Khad can be divided into two
10	parts
	<ul> <li>From origin to the 800 meter above mean sea level</li> </ul>
μ.	The zone of active erosion-Young stage
D	<ul> <li>From 800-meter contour to confluence with Beas River</li> </ul>
D	The zone of erosion during very high flood otherwise deposition -
1	Maturity stage.
D	The leased area is situated in the zone of Maturity.
D	
Ð	1.2 Name of River/ Stream in which the leased is situated

Malot Khad - Primary tributary of Beas River.

# 1.3 Drainage System

Beas River

10

Ð

þ

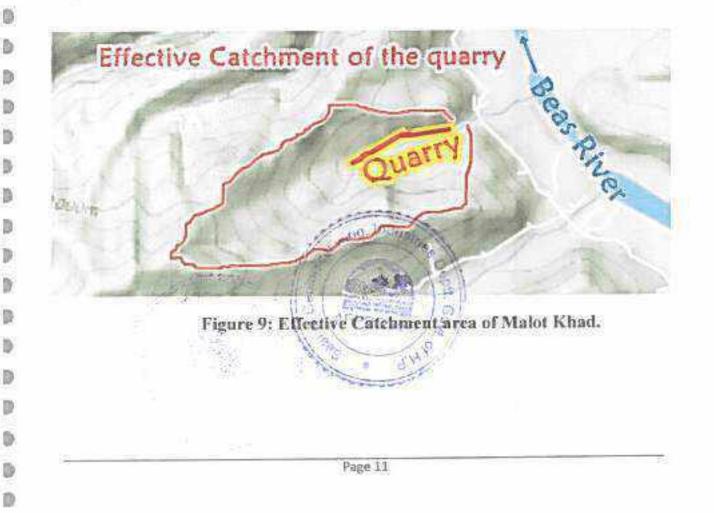
D

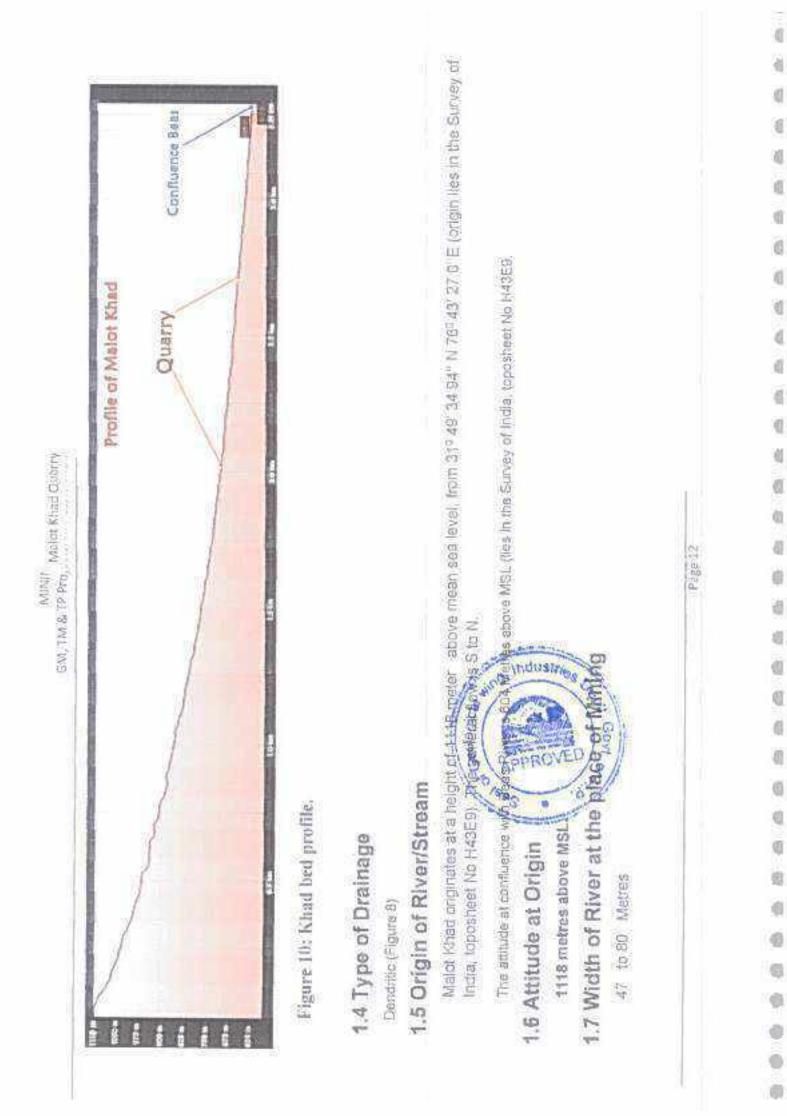
1

13

隐

The effective catchment of the Malot Khad is given below in the figure 8.





# 1.8 The annual deposition at the place of mining

6 to 8 Cm, at different location, in the Malot Khad.

譚

8

3

1

D

B

3

B

B

D

b

3

b

3

D

D

3

33

Ð

D

1

5

3

15

D

50

3

13

ø

ib.

# 1.9 The Competency of the River/ Stream at the mining site

The general competency at the mining area is 6 to 10 Kg approx. The largest boulder varies 20 to 34 cm X 16 to 34 cm X 18 to 30 cm (length X breath X height) (Photo1)

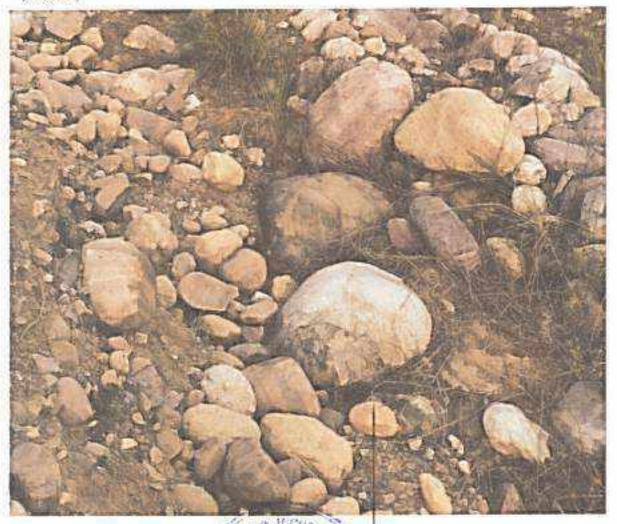


Photo 1:Showing the competency of river in leased area

1.10 The level of HFL

During monsoon floods the water level rises by about one metre, at times for short spells.

1.11 The level of LFL

Khad is seasonal.

1.12 The thread of deepest water in meandering.

-

6

1

đ.

Ű.

63

0

6

0

0

0

0

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

# 1.13 Groundwater table.

The depth of groundwater level varies in the area according to season and distance from water current. It lowest in the pre-monsoon period and highest in the post monsoon period. Thus, depth of groundwater table may vary from few centimetres in post monsoon period and more than a metre in the pre-monsoon period depending upon distance from flow.



# 2. Geology

諁

Ð

3

D

D

Ð

0

ľb

D

#### 2.1 Regional Geology

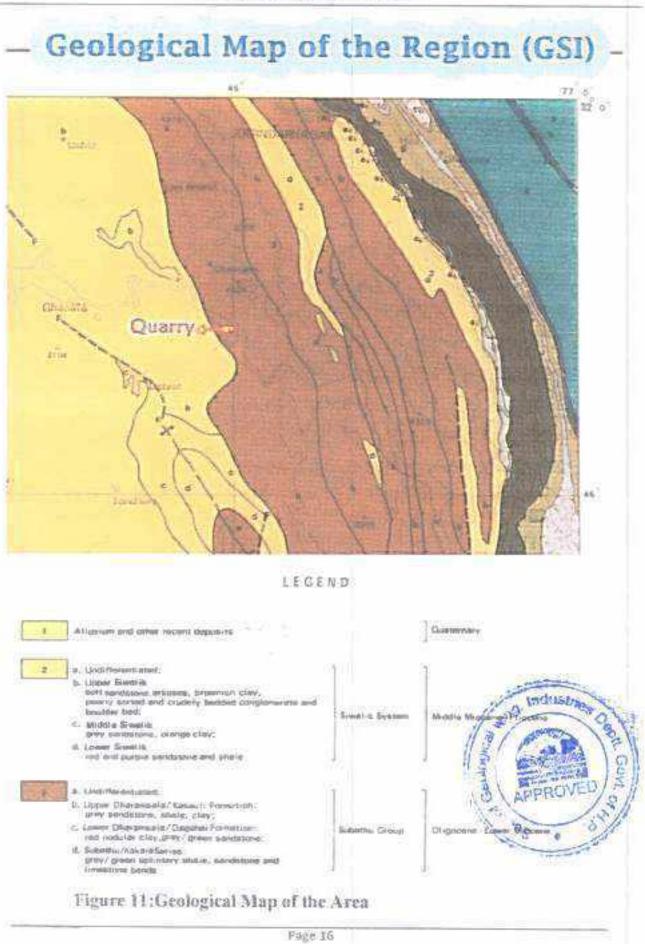
GEOLOGICALLY Himachal Pradesh can be broadly divided into two major geo-tectonic zones viz. the Lesser Himalayan tectogen in the south and the Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectonic break collectively designated as Main Central Thrust in the sense defined by Srikantia (1988). Mandi District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterozoic to Quaternary. The oldest rocks are of undifferentiated Proterozoic age, comprising canrbonaceous phyllite, schist, gneiss, quartzite and marble. The Ghoghar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Meso- Proterozoic age is represented by quartzite with basic flows. The Shali Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at places stromatolytic) slate, & quartzite. The Subathu consists mainly, of olive-green shales and grey shales. At the top, a band of white quartzite is exposed; this band of white quartzite has been taken as the marker, defining the top of the Subathu sequence. The thick sequence of brackish and freshwater sediments immediately succeeding the fossiliferous marine Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Miocene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles and cobbles occurring along present channels of Middle to Late Pleistocene and Holocene age.

### 5.2 Local Geology

The local geological sequence in the area is given in the figure WP-7 and stratigraphy of the area is given in the table WP-5

100 MAR 19

Malot Khad Quarry



ē

		MINING PLAN SM, TM & TP Projects, HPPCL, Mandi. Malot Ki	had Quarr
7	able: Stratigraphy c	f the Malot Khad and surrounding region Area	
Sr. No	Formation	Rocks	
1	Newer Alluvium Channel Alluvium	Grey micaceous, fine to coarse grained sand, silt, clay, boulders, cobbles and pebbles of sandstone and quartzite	
2	Upper Siwalik	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown claystone	
3	Middle Siwalik	Massive Sandstone with minor conglomerate and local variegated claystone	
4	Lower Siwalik	Alternation of fine to medium- grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium maroon claystone in the middle part	
5	Upper Dharamshala	Medium to fine grained, hard, bluish grey and massive Sandstone, green clay and siltstone	
6	Lower Dharamshala	Hard, grey, well bedded, and high mica content sandstone	

#### 2.2.1 Dharamshala Group

診

b

D

3

D

D

3

5

3

13

0

0

The thick sequence of brackish and freshwater sediments immediately succeeding the fossiliterous manne Subathic Pormation is the Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline.

APPR

Geat

151

This highly folded and faulted sequence of Dharamshala aggregating to about 4000 meter displays a contrasting topography with that of younger and softer Siwalik rocks. The thick, hard, and highly competent Dharamshala rocks stand out as prominent ridges with higher relief.

Dharamshala Group is divided into two Formations:

Upper Dharamshala

ਿ

6

ťľ.

Q

1

đ

Ø

đ

đ

Ð

0

0

60

83

6

#### Lower Dharamshala

#### 2.2.1. a: Upper Dharamshala Formation

Upper Dharamshala consists of thick sequence of sandstones, sitistones, and clays. The Sandstones are medium to fine grained, hard, bluish grey and massive while the clays and sitistone are usually green.

#### 2.2.1. B: Lower Dharamshala Formation

Lower Dharamshela formation consists of very bright and red and mauve coloured clay and shales with thin bands of sandstone which are steel grey in colour, highly micaceous and well bedded.

#### 2. 2.2 Siwalik Group

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They comprise mudstones, sandstones, and coarsely bedded conglomerates laid down when the region was a vast basin during Middle Miocene, to Upper Pteistocene times. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive multiordered drainage systems. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times), subsequently resulting in a unique topographical entity - the Siwalik Hills. The Siwaliks are divided stratigraphically into three major Subgroups -Lower Middle, and Upper. These Subgroups are further divided into individual Fermations that are all laterally and vertically exposed today in varying linear and random patterns.

Ongoing erosion and tectonic activity have greatly affected the topography of the Siwatiks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), and earthpillars, filled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and Choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates.

The congiomerates in general are poorly cemented but at places they are very hard. These consist rearry et pebbles and cobbles of quartzite. The stray pebbles of granite. Idnestone Stad core, breccias and lumps of claystone are also observed at places. Other the size of pebbles is large enough to be called as Boulders. The condicationers hot only occur as regular band but also as lenticular bands intervene with micaceous sandstone and clay beds. The sediments were burger Spein/2 to 25 million years ago by the numerous fast flowing rivers useding forth user rapidly Rising Mountain mass of the Himalaya, in the north. The Siwalik Group is divisible into three sub-groups respectively the Lower. Middle and Upper on the basis of the lithostratigraphy as given in the table (Table -4)

> 2. 2.2.a: Lower Siwalik: - The lower Siwalik consists essentially of a sandstone-clay alternation. In district Kangra the lower sequence of the lower Siwalik consists of medium grained sub-graywacke interbedded with thick red clay, but higher up in sequence, sandstones are coarser, and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartzite possible derived from the Shali. The total thickness is 1600 metres:

> 2. 2.2.b: Middle Siwalik: - The Middle Siwalik Subgroup comprises of large thickness of coarse micaceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 metres

> 2. 2.2.c: Upper Siwalik: -The Upper Siwalik is mainly represented by sandstone inter-bedded with silt and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clay's intercalations. The general thickness in the district is 2300 metres.

#### 2.2.3 Newer Alluvium

Newer Alluvium is composed of cyclic sequence of grey, micaceous, fine to coarse grained sand, silt, boulders, cobble, pebble and clays, Newer alluvium exposed as point bar/channel bars within the active channels.

#### 2.3 Geology of the leased area

訮

b

Ŋ,

0

3

b

ß

3

9

9

ß

The quarry out area forms a part of the stream bed covered with boulders, cobbles, pebbles, river born bajn and sand and ctay deposit of Channel alluvium. The rocks in the catchments of Matot Khad is of Upper Siwalik Formation. The area is comprising predominantly the quartizte Boulders, Sand and river born bajn of Sandstone. The boulders are white spotted white, greenish white, pink, purple and dark green in colour.

#### 2.4 Nature of the Boulder/ Cobble/ Sand

The area lies with in the regular course of the Malot Khad gets flooded in the rany season

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white,

đ

6

6

0

1

1

đ

a tertiary

pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit varies from one to three meter.

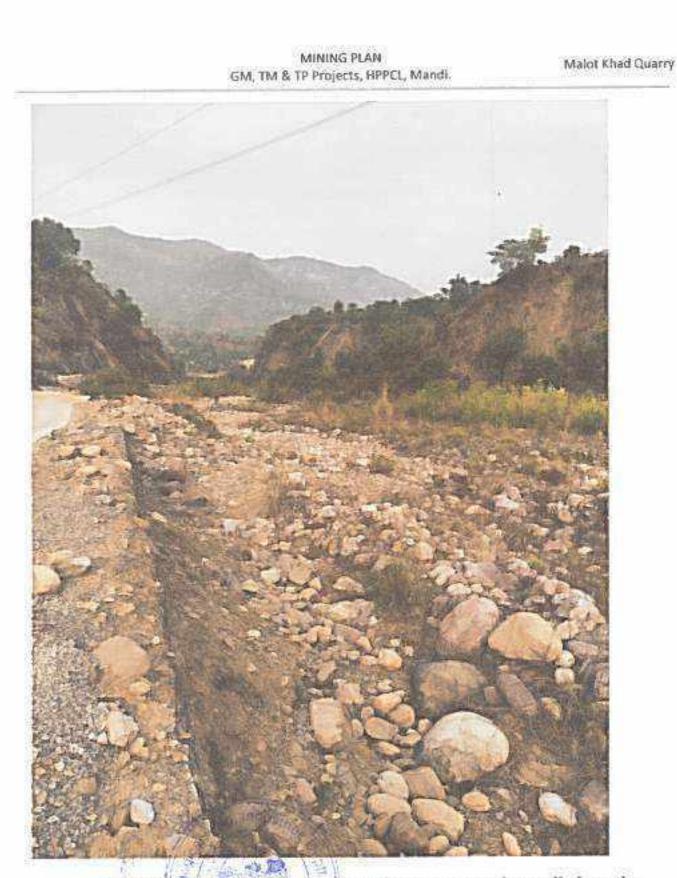
During the monsoon this bed replenishes to a large extend from the Upper Siwalik. Formation rocks due to erosion by heavy flow from higher reaches. Due to sudden decrease in the carrying capacity and competency of the river the annual deposition of one to three cm is received.



Photo 2: Showing the nature of the Lease area in the Malot Khad.

# 2.5 The Nature of the rock along the bank

The rocks along the left bank belong to Terrace Deposition of the Ox consisting of boulders, cobbles, pebbles, river born bain, and said ar formations consisting of sandstone, claystone, and boulder bads



3

Ð

3

b

D

D

0

3

9

b

D

D

B

D.

Ð

Þ

D

9

B

Ð

D

þ

3

В

9 9

D

5

3

B

Э

3

(b)

Photo 3 Nature of Banks showing wire crat protection wall along the rural road. 2.6 Estimate Annual Deposition of Mineral

The area being part of the river/Khad which receives annual rainfall, the mining pits will get replenished during the rainy (monscons) season. As abundant precaution, keeping in

MINING PLAN	MINING PLAN				
GM, TM & TP Projects, HPPCL,	Mandi,				

Malet Khad Quarry

đ

Ø.

6

0

6

13

63

0

0

Ű)

6

0

view the variation in rainfall particularly highest per day rainfall, which generally causes floods, the factor of five cm annual replenishment is taken into consideration. The annual replenishment of the material also depends on the discharge, grade of river and goology of catchment area. The rocks of the catchment area are formed of tertiary boulder bed formations are very much prone to weathering as the rains easily erode the comenting clay, thus loosening the boulders, which are caried down during the floods. Thus, it is generally observed that replenishment of more than five cm occurs in a year as all the old pits get filled with RBM during the very few early floods of the monsoon. Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter. rains

#### 3. RESERVE ESTIMATE

#### 3.1 General Consideration

The basic requirement of the lessee will be stone, bain and sand for construction of Project

#### 3.2 Percentage wise distribution of Mineral:

The table below shows the percentage wise distribution of minerals and figure 12 depicts the pie chart for the same.

Table shows the percentage wise distribution of minor minerals:



Figure 12: Percentage of each category of mineral present in the leased area

1	Stone	42%
2	Gravel / Bajri	35%
3	Sand, silt & clay	23%

Page 22

		GM, TM 8	MINING PLAN TP Projects, HPPCL, Man	di. Malot K	(had Qu			
3.3 Es	stimate of Geo	logical Reserve		12				
sq thi pu gri	uare metres can ckness of depo rpose of estima avity to be 2.25,	n be considered sit is more than tion of Geologic	for estimation of geol 5 metres. However, c al reserves to a depth deposits in the area a	mining leased area of 77 ogical Deposit. The estim onsidering its depth for five metres and specific re to a tune of about 869	nated			
	Geologica	I Reserves						
	Geological	Thickness.	leaved Area	Reserves Rounded				
	Reserves	in metres	(Square Metres)	off (In tonnes)				
	Proved	2	77239	869159				
	Specific Gr	uvity 2.23						
	Formala =	Sarfare area	X thickness/slepth	X specific gravity =				
			Reserves					
TI gu ca Ad	ne basic require idelines issued loulate the mini dequate safe di	ment of the leas by the State Go cable reserve th	overnment for Mining e following points are	Sand and bajri. As per the polic of River / Riverbed and to taken into consideration: ants of utilities as per Rul	a :			
Ti gu ca Ar ar	ne basic require idelines issued loulate the mini dequate safe di id guidelines.	ment of the leas by the State Go eable reserve th stance has been	ed or is sand, stone a overnment for Mining overnment for Mining over e following points are provided from the po	and bajri. As per the polic of River / Riverbed and to taken into consideration:	o : les			
Ti gu ca Ar ar A R	the basic require idelines issued idelines issued idequate safe dis- id guidelines. s per the policy iverbed, In this c mining Mining (HFL) c area is meters Mining (HFL) c area is meters The wa The dep A geole marked The mined monsoon s The total m 14. The part of th	ment of the lease by the State Go eable reserve the stance has been guidelines issue ase only one-m is constrained to is not permitted f the river / Rive 47 to 80 meters from the banks, form the banks, form the banks, ter table level with the fiver table gical map on 1 on the plan to k ire width of the area gets replet eason. ineable area an e area, i.e., 408	ed or is sand, stone a overnment for Mining of e following points are provided from the po- ed by the State Gover eter area is proposed one metre. within 1/10° of riverb r whichever is higher. thus, no mining is pr whichever is higher. thus, no mining is pr ll go-down as the wate will be at lowest in t 2000 scale is prepa now the surface spre- river gets flooded du hished in the very earl d deposit is shown in	and bajri. As per the polic of River / Riverbed and to taken into consideration: bints of utilities as per Rul nment for Mining of Rive as safety zone as the de ed or 5 meters from the The width of the river in to oposed in the area up to er recedes after the mons he pre-monsoon season red and main litho units	o iles les er / banks leased 5 to 8 soons s were soons of the jures e as il			

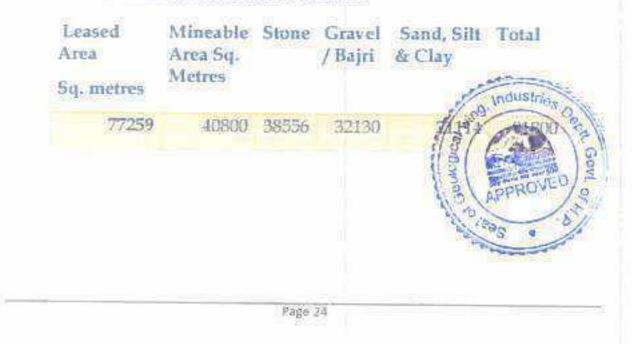
D

MINING PEAN GM, TM & TP Projects, HPPCL, Mandi,



Figure 13: Mineable area.

Table 3 Mineable reserves in the block



Malot Khad Quarty

18

đ

6

đ

6

iđ

Ø.

1

6

¢

¢

¢

1

¢

6

6

0

6

e

-

0

Ę

0

6

f

1

đ

0

đ

(Ö

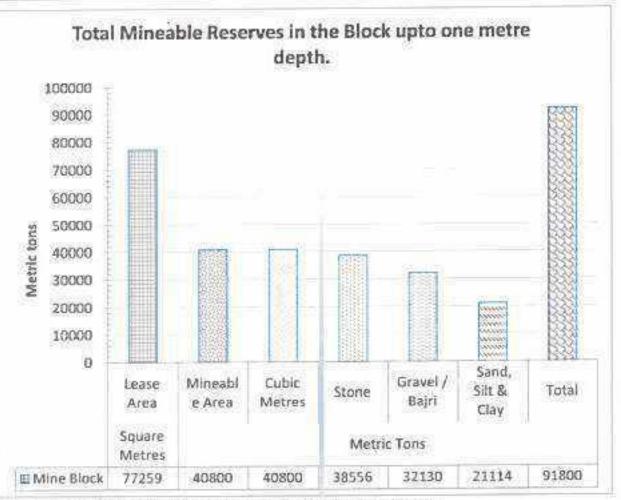
8

-

0

0

0



#### Figure 14: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 40800 square metres contains 91800 tonnes of mineable material. The entire mine able block will be mined every year.

3.4a Depth of mining

Ð.

D

15

3

B

D

3

3

10

D

3

3

D

D

13

B

9

B

The Rule 34 (IV) of Rules stipulates the depth of mining in the riverbed shall not exceed one metre or water level whichever is less.

One metre maximum depth from the surface is considered for mining of the reserve.

3 4b. Specific Gravity

The specific gravity of Quartzite is 2.65 and of sand is 1.85. Hence average specific gravity of 2.25 is taken for calculation of the deposit.

3.5. Estimate of Annual deposition

The reserves of all the constituents of leased block have been calculated for the safe mineable area to be 91800 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure 13. Depending

MINING PLAN				
GM, TM & TP Projects, HPPCL, I	Mandi.			

¢

ŝ

6

6

C

0

0

0

0

0

Ø.

0

60

8

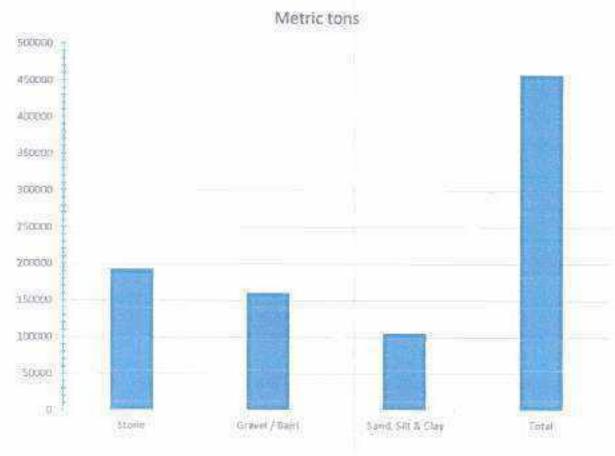
8

8

0

upon normal rainfall from year to year causing erosion in the catchments and flooding of Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

Figure 15 shows the proposed production of materials in five years.



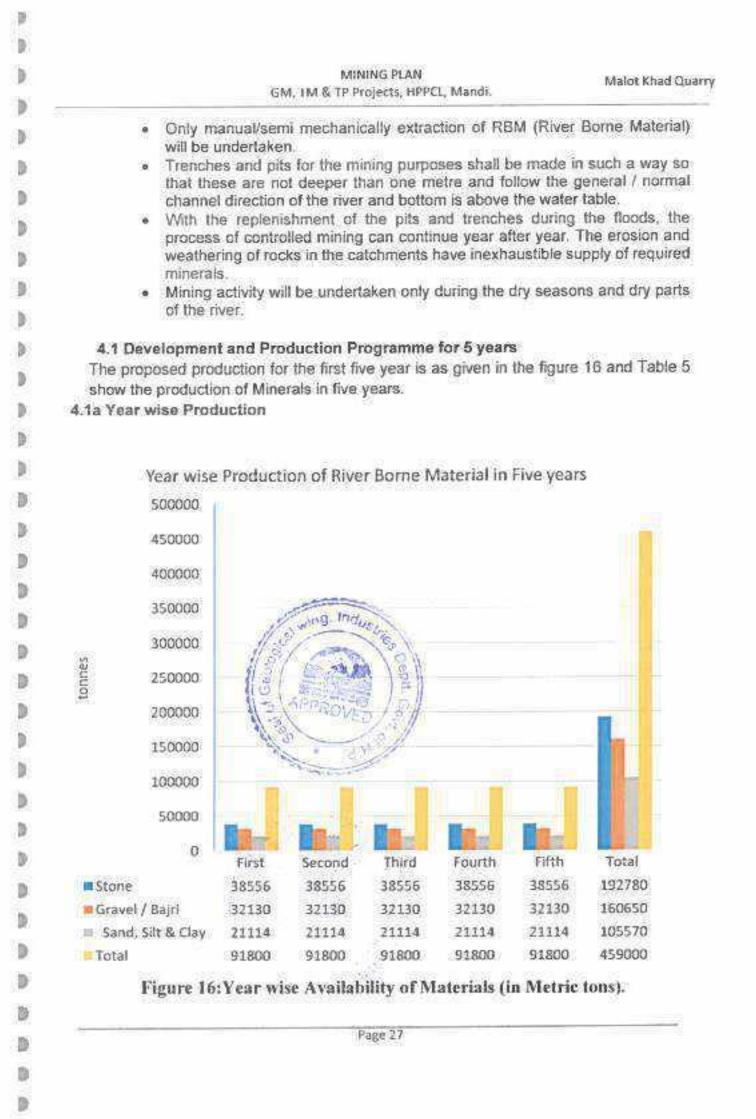
### Figure 15: Proposed production of total material in five years

#### 4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent semi-mechanical. Normally it has been observed that a worker can mine/excavate about three to four tonnes of material in a day. To excavate 340 tonnes of material in a day 85 to 100 workers would be required. Working of so many persons in extractil area would cause congestion and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to both manual as well as international or working are mainly deployed in riverbed mining for extraction and for therefore are mainly to toper truck and tractor trolleys loader/ JCB will be resorted. Operators for loaders, tippers and tractors will be another category of working.

#### Considerations.

No blasting is required.



GM, TM & TP Projects, HPPCL, Mandi.	Malot Khad Quarry
-------------------------------------	-------------------

đ

1

đ

e

đ

Q

前

ų,

0

0

6

6

4

(

8

6

ii)

6

0

0

0

8

0

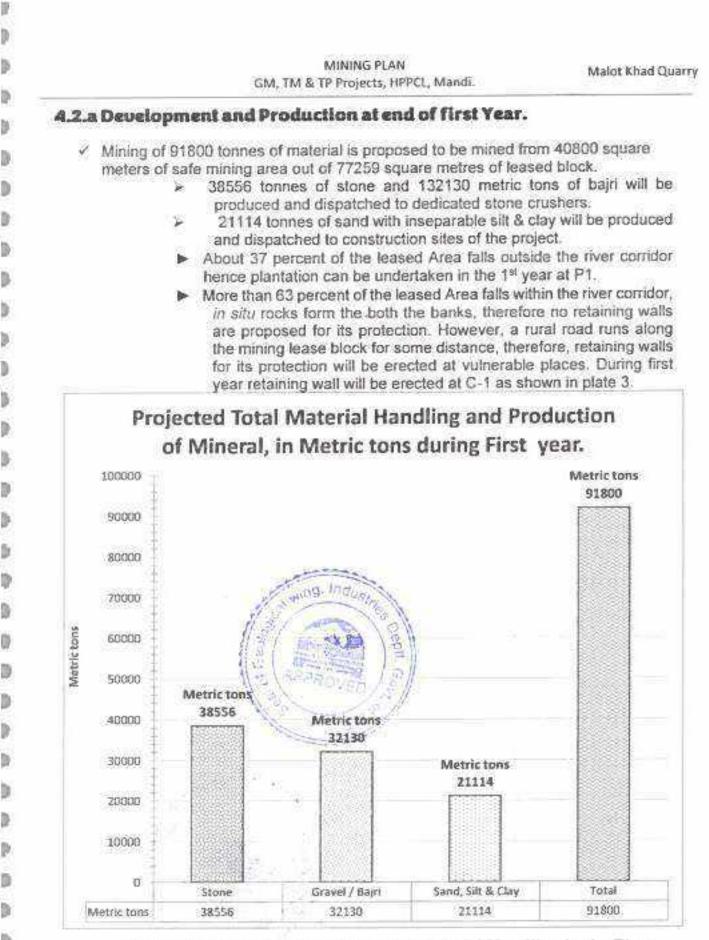
0

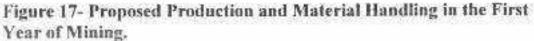
Table 4 \	rear wise	production	of	materials.
-----------	-----------	------------	----	------------

Tear	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
First	38556	32130	21114	91800
Second	38556	32130	21114	91800
Third	38556	32130	21114	91800
Fourth	38556	32130	21114	91800
Fifth	38556	32130	21114	91800
Total	192780	160650	105570	459000

The proposed production is sufficient to for sustaining a viable mining project. The year wise mine working planned for the Quarry is presented in the map 3. Year wise production of River Borne Material, sand, stone and bajri is given in figures 17, 18, 19, 20 & 21.







6

đ

Ű.

đ

63

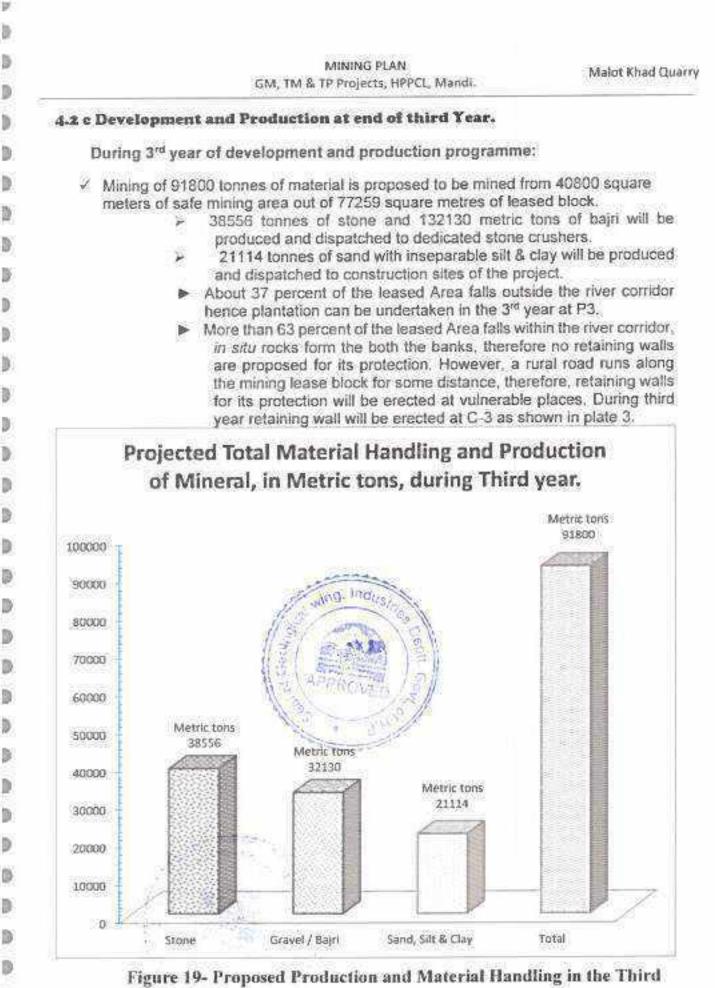
#### 4.2. b Development and Production at end of second Year.

During 2<sup>rd</sup> year of development and production programme:

- Mining of 91800 tonnes of material is proposed to be mined from 40800 square meters of safe mining area out of 77259 square metres of leased block.
  - 38556 tonnes of stone and 132130 metric tons of bajn will be produced and dispatched to dedicated stone crushers.
  - 21114 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - About 37 percent of the leased Area falls outside the river corridor hence plantation can be undertaken in the 2<sup>nd</sup> year at P2.
  - More than 63 percent of the leased Area falls within the river corridor, in situ rocks form the both the banks, therefore no retaining walls are proposed for its protection. However, a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During second year retaining wall will be erected at C-2 as shown in plate 3.



# Figure 18- Proposed Production and Material Plandling in the second Year of Mining.



Year of Mining.

Ŕ

0

Ø

đ

6

đ

đ

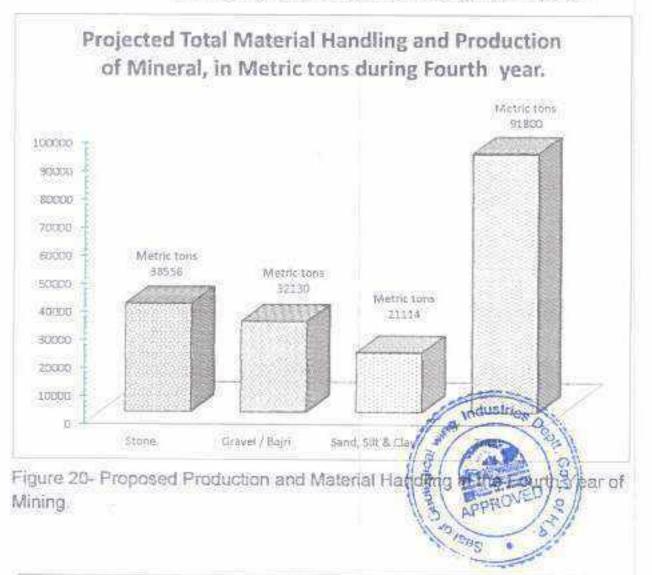
6

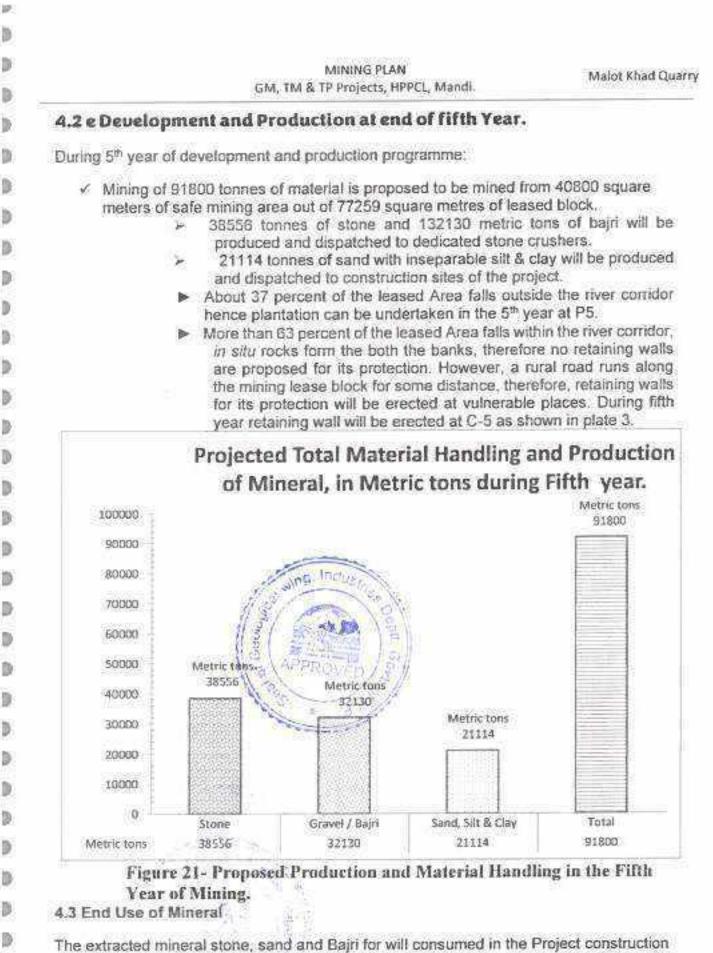
0

# 4.2 d Development and Production at end of fourth Year.

During 4th year of development and production programme:

- Mining of 91800 tonnes of material is proposed to be mined from 40800 square meters of safe mining area out of 77259 square metres of leased block.
  - 36556 torines of stone and 132130 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - 21114 formes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - About 37 percent of the leased Area falls outside the river corridor hence plantation can be undertaken in the 4<sup>th</sup> year at P4.
  - More than 63 percent of the leased Area falls within the over comdor. In situ rocks form the both the banks, therefore no retaining wells are proposed for its protection. However, a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During fourth year retaining wall will be erected at C-5 as shown in plate 3.





activities. Annual production of stone, bajri and sand is shown in figures 22, 23, & 24.





Q

đ

đ

63

6

0

0

đ

ð

43

8

0

ίΰ.

0

8

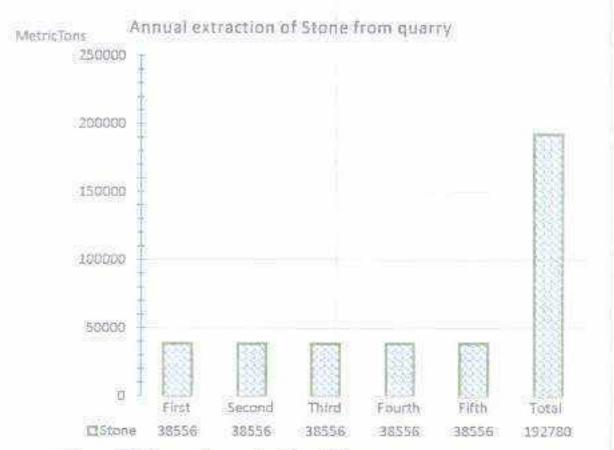


Figure 22: Year wise production of Stone.

MetricTons Mineralwise & Yearwise Production in Five Years.

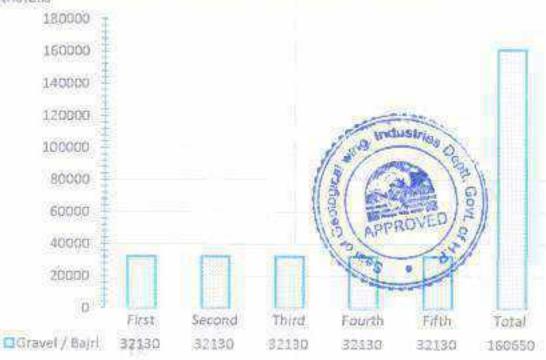


Figure 23: Annual Production of Bajri

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi,

Malot Khad Quarry

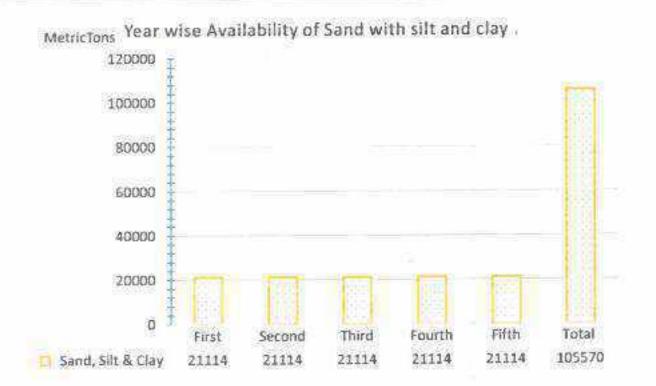


Figure 24: Annual production of sand along with silt & clay.

#### 4.4 Detail of road Transport

D.

b

b

D.

30

3

3

D.

B

D

D

D

3

3

0

D

D

D

D

В

b

D

B

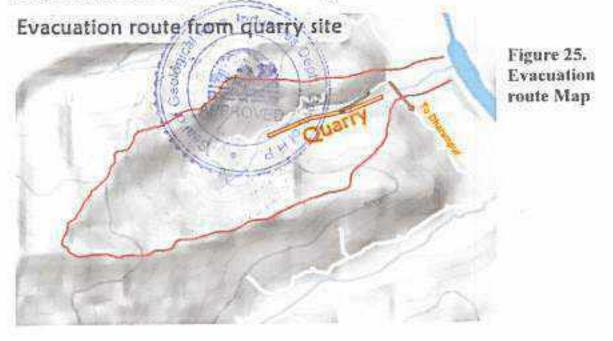
10

D)

D

D

The maximum total extraction of minerals stone, sand and bajri for use in the Project would be 91800 tonnes or 340 metric tonnes per day, considering 270 working dry days. Thus, about 38 tipper truck trips would be required to move the material from quarry to crusher / construction sites. The track through River is about 100 metres along the leased area to roadside. The evacuation route is shown in figure 25.



MINING PLAN		
GM, TM & TP Projects, HPPCL	Mand).	

Malot Khad Quarry

đ

đ

đ

đ

8

#### PARTH

### Environment Management Plan

#### 1.0 Base Line Data

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below:

<ul> <li>Ground Vibrations :</li> <li>Effection Hydrology</li> </ul>	0.141	Rocks.
<ul> <li>Effect on Climate</li> </ul>	es -	Temperature
	-	Rainfall
	= :	Wind Speed
- Air Quality		
<ul> <li>Noise level</li> </ul>		
<ul> <li>Visual Impact</li> </ul>		
<ul> <li>Socio-economic Im</li> </ul>	pact	
Accumulation of Scree - Mine	Waste.	
the line later stress of the constants of	37121124.225	of was collected from various sources suc

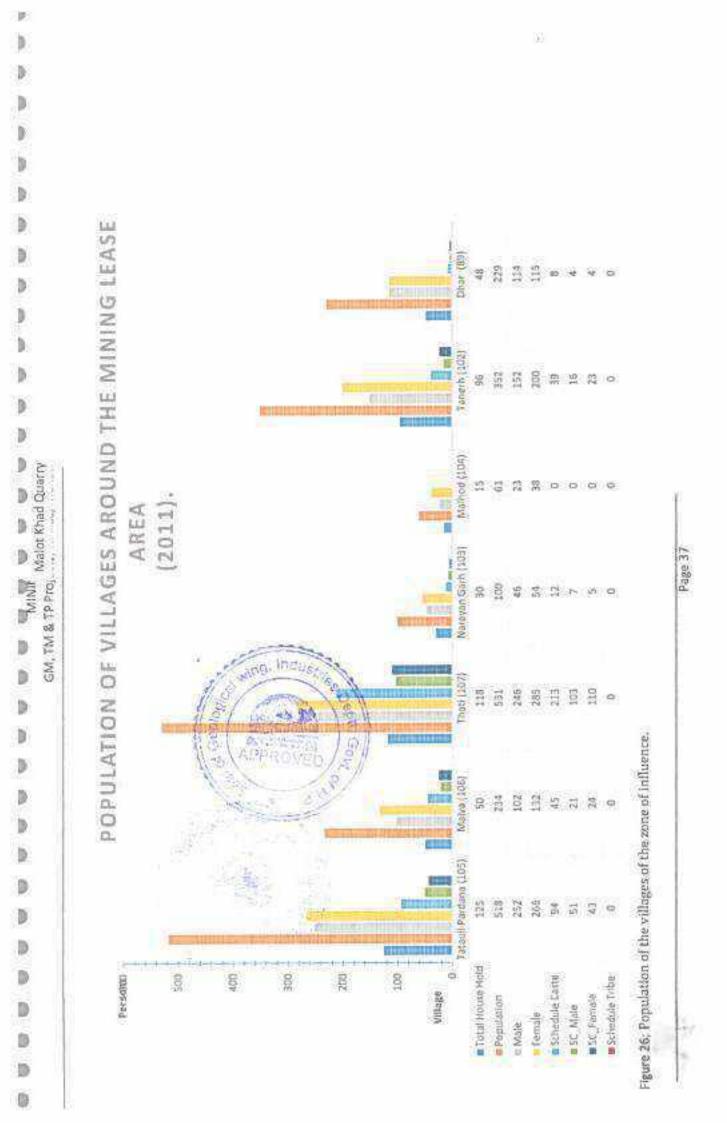
Department of Economics and Statistics, Government of Himachal Prasfesh.

- Directorate of Land Records, Government of Himachal Pradesh
- Directorate of Horticulture: Government of Himachal Pradesh
- Fishery Department, Government of Himachal Pradesh
- Forest Department Government of Himachal Pradesh
- Animal Husbandry Department, Government of Rimachal Pradesh
- 🖌 Survey of India, Government of India
- Metrological Department Government of India

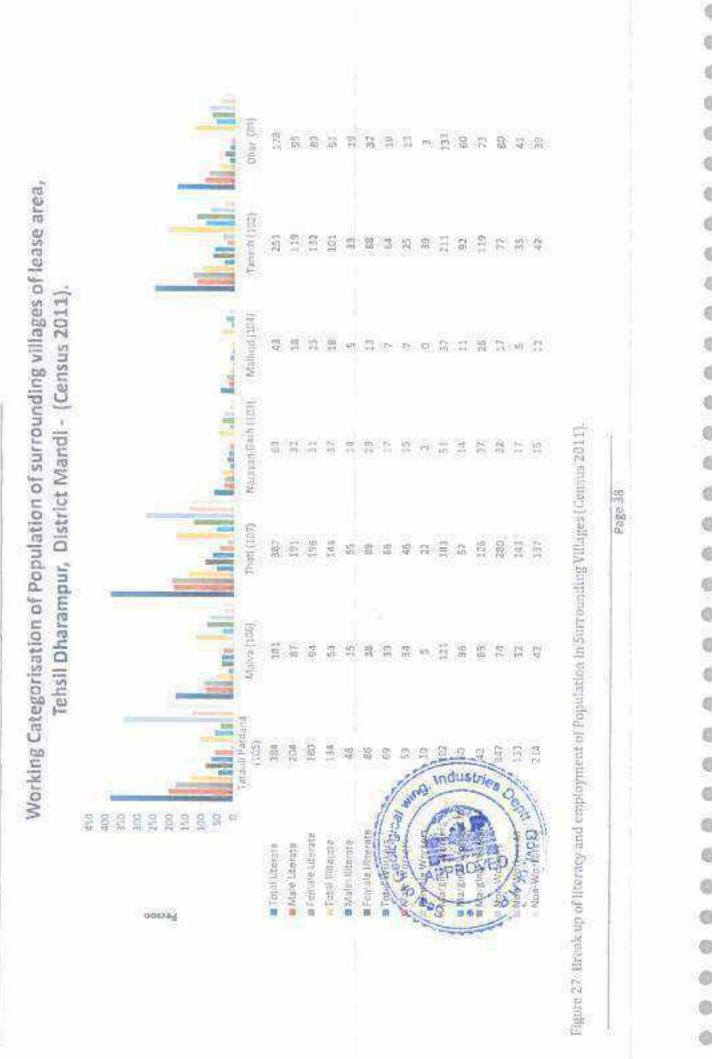
to have in depth understanding of the existing environment and to assess the likely impact of mining, activity in the Area

#### 1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Consumptive below in the figure 26 Education wise and employment wise break of population according villages is given in figure 27. The population details of Mandi District and sub-tenal Information is given in figure 28.







ġ

ų

0

0

0

q

¢

A A A

į.

đ

0 0

đ

6

ġ

0000

ę

6

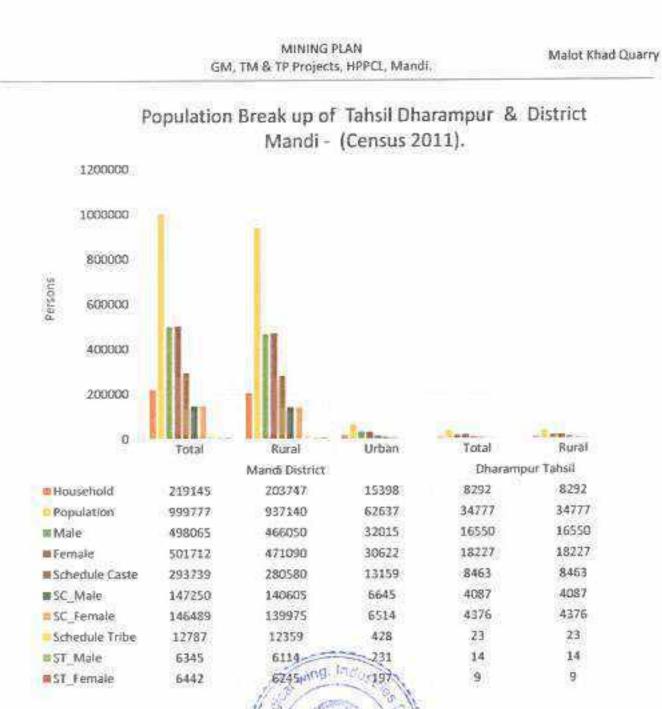
0

6

6

0

0



#### Figure 28: Population break up of District Mandi & Tehsil Dharampur.

1.2 Socio Economy of the Village/Population.

D

B

b

D

3

D

D

D

Э

Ð

1

13

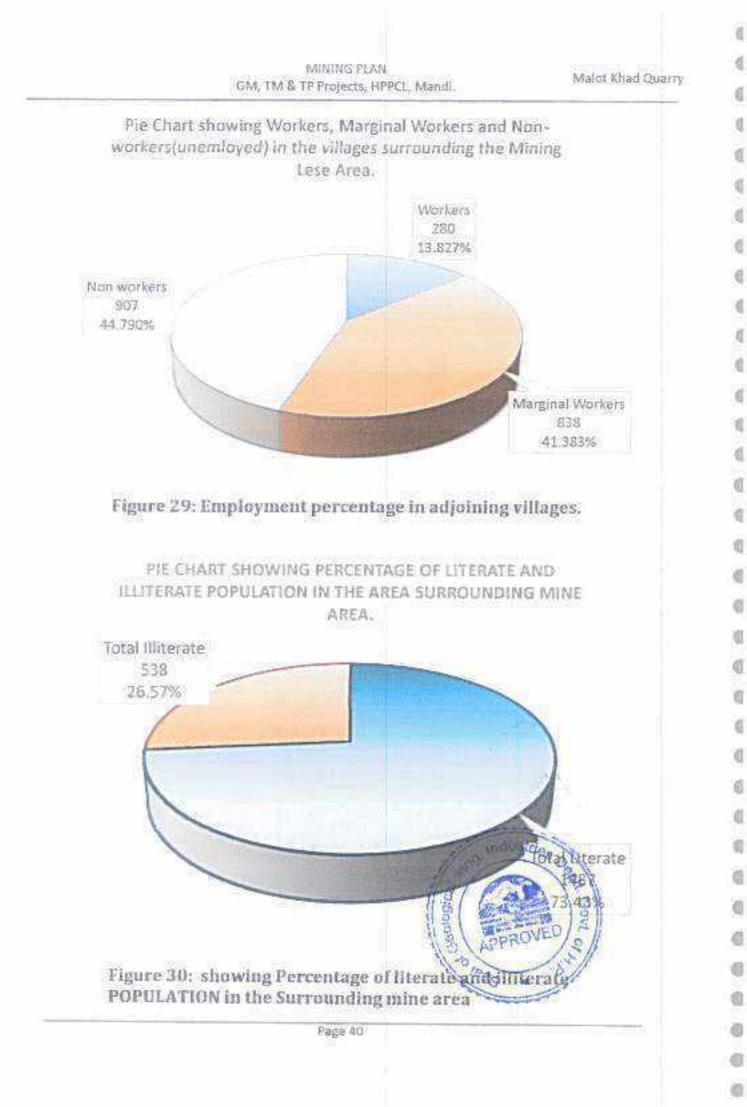
D

No adverse impact on the socio-economic condition of the area is envisaged.

-

The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 29 there is moderately high percentage of *unemployed (44.79%)* and *underemployed (41.383%)* people in the area despite moderately high level of literacy, (73.43%) literates, figure 30) of literacy.

No.



		GM, TM 8	MINING PLA TP Projects, H			Malot Khad Q
1.3. Land Use I	Pattern	000000000000				
	narily the lan re 31.	id of the distr	rict can be cla	ssified in foll	owing 6 catego	ries as shown in
	L Fores	10				
			and (partially	agriculture)		
			eam and corri			
		ulture land	1999/2011/12/2020	1000		
	v. Wast	e land				
foll	District Cen owing nine c 1. Land und 2. Culturabl 3. Fallows I	<b>ategories</b> ler Miscellani le waste land	eous tree crop	IS	e in surroundi	ng villages into
	WELL-CONCOMPANY	er non-agrici nd Un-cultiva Un-cultivabi nt Pastures a www.	area sown iltural uses ble land	ing Land	77-38 E	
	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest WWE Quarry	er non-agrica nd Un-cultiva Un-cultivabi nt Pastures a Nore Land Co	area sown iltural uses ble land e Lând, ad Other Graa	ing Land	77.30°E +	
27.00	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest WWE Quarry	er non-agrico nd Un-cultivabi Un-cultivabi nt Pastures a taree Land Co Chaundra De	area sown iltural uses ble land e Lànd, ad Other Graz wer of District	ing Land	77-34E +	21.48.M
37 87 W	5. Area und 6. Barren ai 7. Barren & 8. Permane 9. Forest Witte Quarry	er non-agrica ad Un-cultiva Un-cultivabi nt Pastures a North Land Co Chaunter De	area sown iltural uses ble land e Lànd, ad Other Graz wer of District	ing Land	17:30 E *****	
37 87 W	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest WWC Quarry	er non-agrico nd Un-cultivabi Un-cultivabi nt Pastures a taree Land Co Chaundra De	area sown altural uses ble land e Länd, ad Other Gras wer of District	ning Land	17.91 • *	
37 87 W	5. Area und 6. Barren ai 7. Barren & 8. Permane 9. Forest Witte Quarry	er non-agrica ad Un-cultiva Un-cultivabi nt Pastures a htere Land Co Chaundra Chaundra Chaundra Chaundra Chaundra Chaundra Chaundra	area sown iltural uses ble land e Länd, ad Other Gras wer of District reng Wer of District	ning Land	IT ME	
37 87 W	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest Name Quarry Cuarry	er non-agrico ad Un-cultivabi Un-cultivabi nt Pastures a terese Chauntet Da Chauntet Da Chauntet Da	area sown altural uses ble land e Länd, ad Other Gras wer of District	ning Land	77.30°E +	21114619
37 87 W	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest Perest Quarry 0. Industrie Rest Rest Rest Rest Rest Rest Rest Res	er non-agrico ad Un-cultivabi Un-cultivabi nt Pastures a terese Chauntet Da Chauntet Da Chauntet Da	area sown altural uses ble land e Lànd, ad Other Gras ren wer of District reng bland, Sad tobr Gischvol	ning Land	777.00°E +++++++++++++++++++++++++++++++++++	21114619
37 87 W	5. Area und 6. Barren ar 7. Barren & 8. Permane 9. Forest WWC Quarry 0. Industrie Level	er non-agrico ad Un-cultivabi Un-cultivabi nt Pastures a terese Chauntet Da Chauntet Da Chauntet Da	area sown altural uses ble land e Lànd, ad Other Gras ren wer of District reng bland, Sad tobr Gischvol	ang Land 77152 Mandi	17:30 E	21114619

D

D

D

0

8

Figure 31: Showing General Land Use Pattern of the District Mandi.

The below figures show the land use pattern of nearby villages and sub tebsil Dharampur respectively.

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi,

Malot Khad Quarry

€

đ

0

đ

1

6

ni

0

0

6

0

12

đ

0

đ

0

6

8

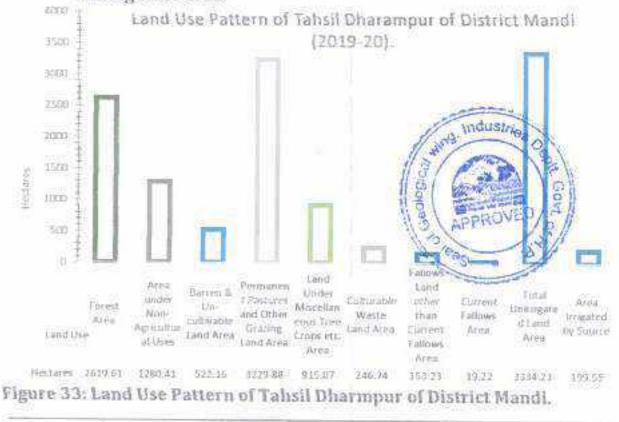
0

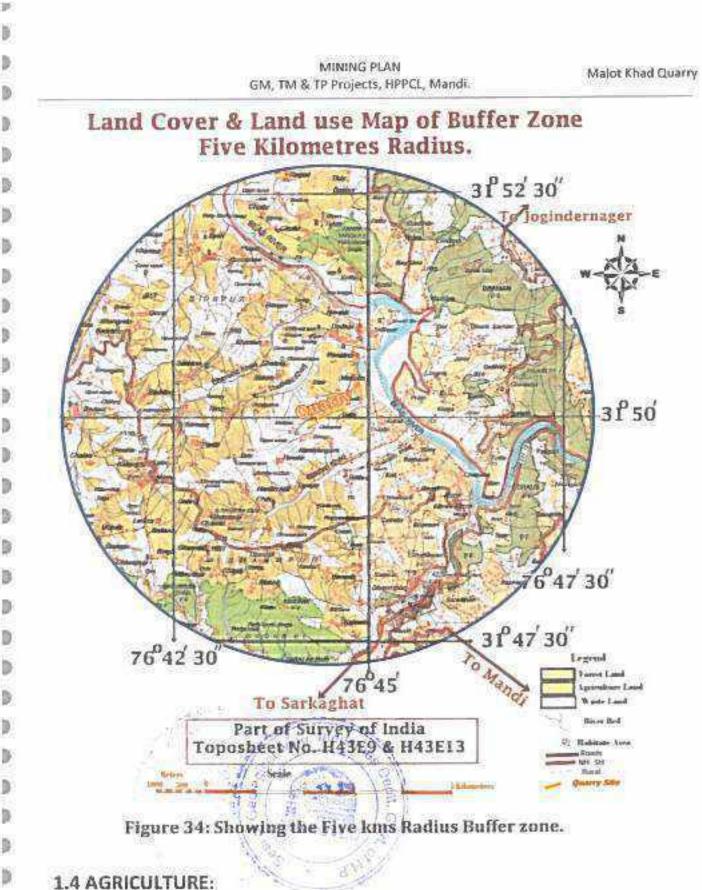
0

6



Figure 32: Showing Land Use Pattern of villages around the mining lease area.





D

Ð

D

D

B.

D

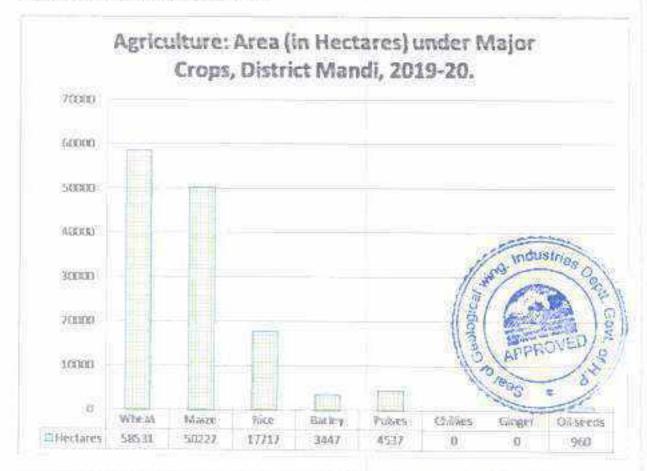
D

The economy of Mandi district is predominately agrarian as around 80 per cent of the total population is dependent on agriculture and activities allied to it for earning their livelihood. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the uneven. The crops usually face moisture stress during the remaining period of the year due to

G	MINING PLAN 4, TM & TP Projects, HPPCL, Mandi,	Malot Khad Quarry
inailequate and irregular rainfall. Th shallow dug wells and medium to d	e irrigation facilities are provided by lifting v eep tube wells in the valley area.	vater from steams,
The source of water and irrigation in	district Mandi can be classified into follown	ng five classes
<ul> <li>Elft tragation Scheme;</li> <li>Nuhls,</li> <li>Well used for domestic purplet well used for tragation,</li> <li>Tube wells/</li> <li>Major food crops are grouped in</li> </ul>		
- Coreals,		
# Pulses,		
<ul> <li>Other food crops like Chille</li> </ul>	, ginger, sugarcane, and turmeric.	
<ul> <li>Non-food coop area is of ta</li> </ul>	क रेग्रेग्रेजर्थ है:	
🖌 Oil seeds,		
<ul> <li>Other non-food crops such -</li> </ul>	is cotton, tobacco, and fodder crop.	

The area under each category of the crop is given below in figure: -35.

Figure: -36 show production of agriculture produces in district Mandi. The area under vegetables and their production is given in the Figure: -37.



# Figure 35:: Showing area under different crops in Mandi District

Page 44

đ

il.

đ

¢

đ

đ

đ

đ

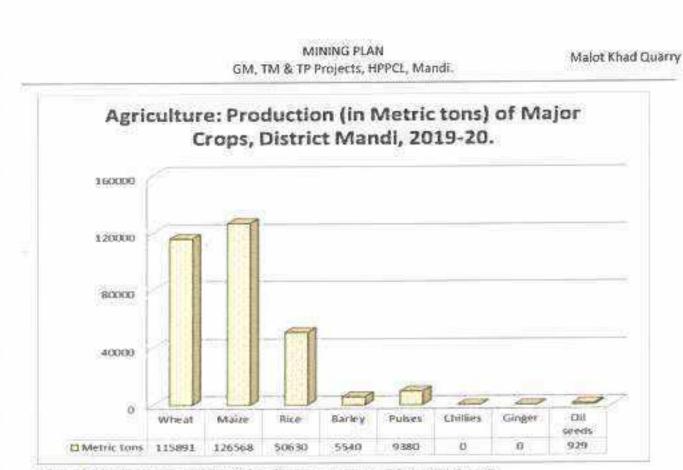


Figure 36 Showing production of each crop in District Mandi.

D

D

D

Ø

0

b

3

3

D

b

D

3

3

Э

Э

D

Э

ß

D

В

Ð,

В

Ð

13

ß

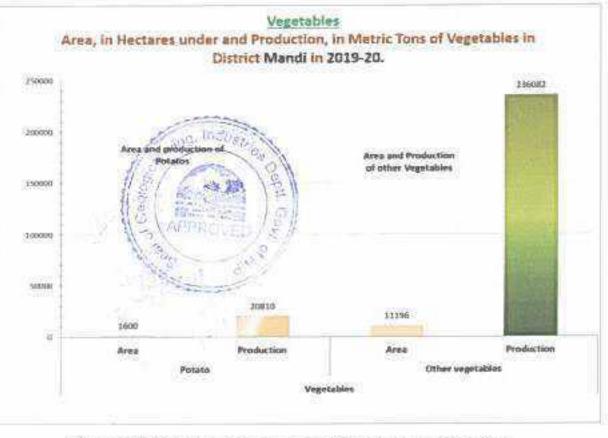


Figure 37: Showing area under vegetable, in Hectare and Production, in Metric tons, of District Mandi.

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Malot Khad Quarry

đ

1

6

đ

Ø

61

尵

đ

đ

6

đ

Ø.

Ø

旧

61

ŝ

#### **1.5 HORTICULTURE**

The topography and the agro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categorias namely high hill areas located at a higher elevation, mid hill areas and low-lying valley areas. Fruits of vancus kinds depending upon the terrain, climatic condition and soil are grown in the district.

The main horticulture produce of the area can be classified into following five categories

- 1. Apple
- 2. Other temperate mults.
- 3. Subtropical fruits
- 4. Nuts and dry fruits
- 5. Citrus Irults

The area under each fruit as well as the production of each fruit in district. Mandi are shown in Table 6.

# Table 5; Area under each fruit and their production in District Mandi.

	tus of Hort trict Mandi.	
Fruit	Area (In Hectares)	Production (In Metric Tons)
Apple	16748	57158
Phan	2856	827
Peach	783	443
Apricot	297	570
Pear	1772	Contraction of the second
Cherry	24	18 600
Green Almonda	0	APPRO
Persimmon	252	AppRD Steel
Olive	298.	6
Kiwi	29	22

MINING PLAN				
GM, TM & TP Projects, HPPCL, Mandi.				

Þ

9

þ

Ð

3

Ņ

ħ

b

b

b

8

1

b

D

5

Ъ

b

Malot Khad Quarry

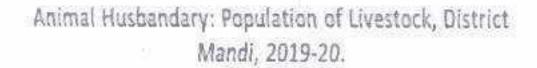
Strawberry	2	0	
OTF	6313	2930	
Almonds	1502	288	
Walnut	1055	137	
Piccanut	392	25	
Nuts & Dry Fruits	2949	447	
Orange	730	25	
Malta	196	0	
K. Lime	2999	245	
Galgal	538	34	
Others	3	0	
Citrus	4466	845	
Mango 4964		268.	
Mango Litchi Gauva	590 S90	. 70	
Gauva 6	693	31	
Papaya S APPROVA	≝」/ ② / 24	32	
Logust 4		0	
Aonala	154	70	
Grapes	2	7	
p-grnate	473	202	
Jackfruit	215	32	
Others	8	15	
OSTF	7127	4059	

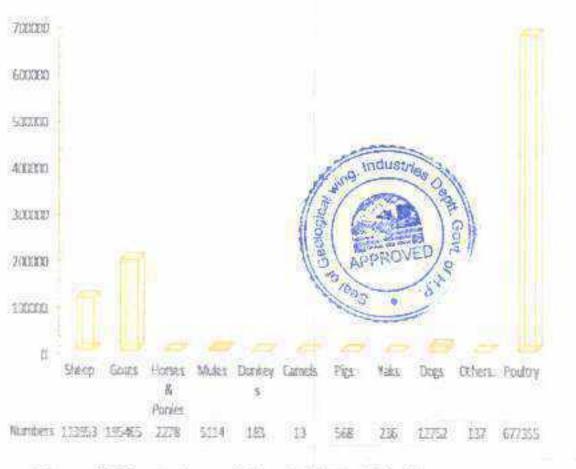
MINING PLAN					
GM, TM	& TP Projects,	HPPCL,	Mandi.		

Malot Khad Quarry



Economy of the district is predominantly agrarian, but role of Animal Husbandry is equally important as the farmers must keep the cattle for the purpose of ploughing the land and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family. The total population of the livestock in District Mandi is given in the figure -38. The population of the Buffalces and Cattle in District Mandi is given in the figure -39.





# Figure 38: Livestock population of District Mandi.

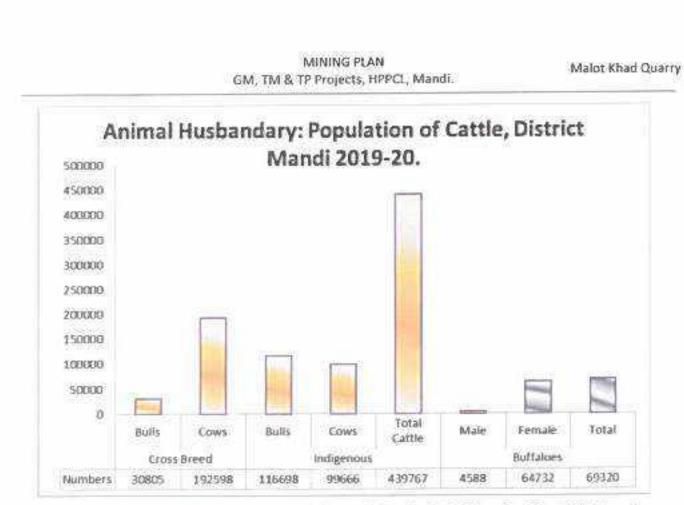


Figure 39: Showing Population of Cattle Buffaloes in District Mandi.

### **1.7 FISHERIES**

8

В

4

a

There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi



Mirror Carps

The exotic trought fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himatayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trought fishing.

No perennial stream passes through the area under consideration.

MINING PLAN GM, TM & TP Projects, HPPCI, Mandi.

Malot Khad Quarry

1

10

đ

ġ.

1

1

N.

1

Fisheries: Annual Production and value of catch, District Mandi, 2019-20. 1600 1.4603 1200 30200 800 600 4(4) 200 ü Total Production (in Metric tons) Value of fish produced (its. in Jakhs) Tisheries 925.85 1391.71

Figure 40: Showing Fish catch / production and its sale value in 2016-17.

### **1.8 FLORA AND FAUNA**

### 1.8.1 Flora

The Chillis considered the prevailing conifer up to about 1950 meter when it gives place to the Deodar and the blue pines. In Mandi district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is 427 meter above sea level and highest range of is at an elevation of 2658 meters in the north. The forests grown between these two extremes vary as the elevation itself.

The most prominent varieties of trees found in the district are

Simbal (Bombex malabancum), Mango (Magniferaindica) Tun (Cedrela foana) Several species of acada and albizia

Page 50

	MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.	Malot Khad Quarr
	Salambra (Odina wodier)	
	Termnalia	
	Jamun ( Engenia jambolana	
	Larger tour	
	Bamboo	2538
11.04203255	ommon fruit trees are banana, apple, ber, jamun, id, peach etc	mango, mulberry,
Shru	bs	
	e most common shrub at the higher elevation is B Id Desmodium and following other shrubs are also	
1.	Vitex	
2.	Munj	
3.	Ber	
4.	lpomea	
5.	Dodonea &	
6.	Bamboo.	
The	ommon fruit trees are banana, apple, ber, jamun,	mango, pear,
mulb	erry, apple, almond, cherry, peach etc	
1.8.2 Fauna		
Animals		
Duel	o wide variations in the attitude a large variety of f	auna is available in
the forests o	f the district. The black bears are common in the h	igher valley. The
	found throughout the district. Barking dears and gration the musk deer or Kastura and serao are four	

1.4

D

0

D

8

b

b

8

# Table 7: Common mammals and birds in the Mandi District.

-12.2A

Common Mammals & Birds in the Mandi District is given in the Table .-7

Table 6	1. 11501223	
Birds		
Zoological Name	English Name	Common Name
Milvus migrants	Vulture	Cheel, Gidh, Eell
Eudynomys scolopacco	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

Malot Khad Quarry

6

đ

1

1

¢

-

6

ġ

4

í

đ

d

ł

1

1

1

6

8

ą

¢

í

đ

đ

ł

t

ł

đ

ł

ŧ

Ĩ

1

### MINING PLAN GM, TM & TP Projects, HPPCI, Mandi.

Kala Tittar Səfed Tittar Mor Bater Bater Chakor Chakor Kanwa Totta <i>Totta</i> <i>Phi/lgor/Jujurana</i> Kathfowta Güghi Güghi
Mar Bater Chakor Kanwa Totta <i>Philogur/Jujurana</i> Kathfowta Güghi
Bater Chakor Kanwa Totta <i>Philogur/Dujurana</i> Kathfowta Güghi
Chakor Kanwa Totta <i>Phidgur/Dujurana</i> Kathfowra Gughi
Kanwa Totta <i>Philogur/Jujurana</i> Kathfowra Güghi
Totta Phidgur/Dujurana Kathfowta Gughi
Phidgar/Dujurana Kathfowra Gughi
Kathfowra Gughi
Güghi
Gughi
Woodpecker
Chaten oustries
Chater noustries Oeu
3 ( 632 ) 8)
ALL APPROPO
1

### Mammals in Mandi

Zoological Name	English Name	Common Name
Felis bengalensis	Leapard Cat	Alirag, Bagh
Felis Chane	Jungle Cat	Jangli Billi

Page SZ

Muntucus muntisk	Barking Dear	Kakkar
Vaulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sus sacrofa	Boar	Suar
Hystrix Indica	Porcupine	Sehal
Lepus nigricollis	Hare	Khargosh, Sherru, farru
Moschus moschifarus	Musk deer	Kastura
Capra ibex Ibex	lbes	1
Hemitragus jemlahicus	Himalayan Thar	Thar
Selenarctos thebatanus	Black Bear	
Ursus arctos	Brown Bear	
Panthera unica	Snow leopard	
Sus scrofa	Wild Boar	
Axis axis	Spotted deer	Chital
Cervus unicolor	Samber and Industry	
Hylopetes fimbriatus	Flying squirrel	1
Panthera pardus	Leopard	Cheetah
Felis chaus	Jungle cat APPROVED	1
Paradoxurus hermaphroditus	Indian Civet	Sakralu
Hipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Malot Khad Quarry

In the area surrounding the mining lease following are the common birds: -

- Chakor
- Crow

来る

D.

b

B.

3

В

9

ß

b

þ.

þ

3

9

į.

10

4.

5

30

37

h.

ų,

- Red Jungle Fowl (Jangli Murga)
- · Black Partridge (Kala Titar)

- Grey Partridge (Safed Titar)
- Woodpecker

Page 53

GN	A, TM & TP Project	s, HPPCL, Mandi.		(Vla	lot Khad Q
In the lease common ani Leopard (Bag	mals: -	ð surrounding	hills	following	are the
Hare	( Total )				
Wild Bore (Ja	ngli Soor)				
Jackal	8477AL1887A3A				
Barking Deer	(Kakkar)				
Monkey Sambar Pig					
Sambar					
Pig					

ų

1

### 1.9 CLIMATE

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. <u>Monsoon</u> brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in Figure 6.

The area enjoys monsoon rainfall from third week of June to mid-September.

The climatic information given is based on the data obtained from Revenue Department of Himachal Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D C office Mandi, and at Sundemage AB promisation available indicates following seasons in the district.

MURICIAN

Winter SummenPre-monsoon Monsoon Post Monsoon/ Autumn



Page 54.



b

Þ

3

5

Э

3

D

D

3

B

₿

D

b

B

3

3

3

3

D

D

1

Ð

D

D

B

Э

B

3

D

D

D

5

3

3

D

Malot Khad Quarry

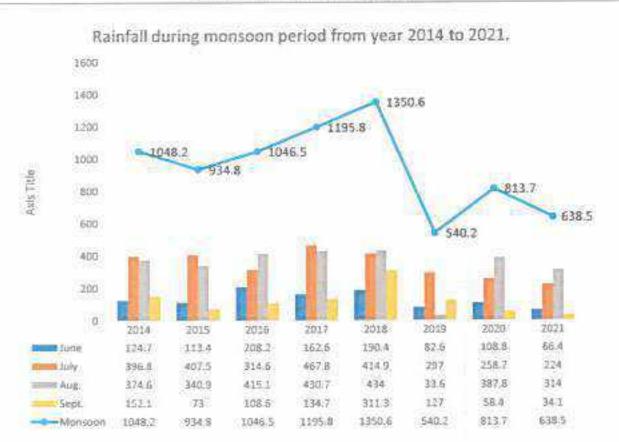
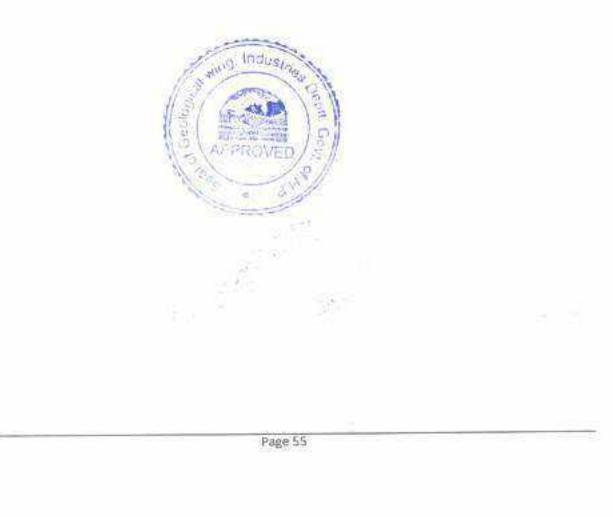


Figure 41: Yearly monsoon Rainfall from year 2014 to 2021.



	MINING PLAN GM, TM & TP Projects, HPPCL, Mandi, Malot Khad Quarry
2.0 ENVIRO	NMENT MANAGEMENT PLAN
	The impact on environment due to mining operation is generally: -
	<ul> <li>Change In Topography&amp; land use pattern.</li> <li>Effect on Flora &amp; Fauna</li> <li>Ground Vibrations and Fly Rocks.</li> <li>Effect on Hydrology</li> <li>Effect on Climate</li> <li>Air Pollution</li> <li>Noise Pollution</li> <li>Visual Impact</li> <li>Socio-economic Impact</li> <li>Accomulation of Scree.</li> </ul>
2.1 CHANG	IN TOPOGRAPHY.
	✓ No.affect.
+	The area is riverhed and mined out pit will be filled during rainy season hence
	there would be no charge. It is part of a Riverbed.
191	the ingreen point of the neares include and the transfer infinite state of the
240	a ne tra sere freque de cara un aporte marti-
240 240	rime targe a programme entire and area.
10#3 5(#3	The meet worth the empiricity representation and the moust involu-
5. 1945	in this ball of the second of
	less.
0.00	A VECTO D
0.00	Thus, the topography or landform of the Riverbed per se will not be changed.
0.00	
	Mumkin khad'
8*2	The land under active mining would always charge riverbed, during as well as
	post mining
2.2 Effect of	13/ AMAR COL
	The mining Lease area is small [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [
	<ul> <li>Mining will be confined in 4080 subscription (Salo) Salo</li> <li>The science destination</li> </ul>
	<ul> <li>The mining depth will be up to one netre or up to way if evel whichever is less, thus water regime will not be disturbed to a</li> </ul>
	<ul> <li>The mining will be confined from within the succession.</li> </ul>
	<ul> <li>Some micro level impact near the freshly exposed surface may happen for</li> </ul>
	short duration as some humid material may be exposed
	<ul> <li>The impact will need no mitigating measures.</li> </ul>
2.3 Impact o	CONTRACT AND THE PROPERTY OF A CONTRACT AND
· No bi	asting material is to be used.

	MINING PLAN Malot Khad Quar GM, TM & TP Projects, HPPCL, Mandi.
	The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspender particulate matter (SPM).
٠	and the second s
	38 tipper truck trips will be able to move the required material from mine to crusher , Project sites.
•	This activity would generate limited disturbance to air quality.
2.41	mpact on Noise Level and Mitigation Measures
0.00	The mining area represents calm surroundings.
() <b>@</b> (	The mining shall be manual causing hardly any noise.
1. <b>R</b> .	The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.
	About 38 trucks trips would be required for transporting mined material per working da
	from mining area to destination.
. •	The dedicated tipper truck would be properly and regularly undergoing maintenance to create minimum noise.
0.000	Care would be taken to properly maintain the silencers of the vehicles.
2.00	No use of horn shall be allowed in or near the mining area.
100	A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of
	River to screen the noise, if permitted by the private land holders.
2.5 EI	fect on Flora & Fauna
38	The mining Lease area is riverbed. * 0 1.
18	There is hardly any flora or faund on the riverbed to attract any protective or mitigatin measures
2.6 Sc	oll Cover
	The mining will be confine to Riverhed.
0.00	It has no soil cover as the area gets frequently flooded during monsoons.
( <b>9</b> .)	Thus, there shall be no impact on any natural soil cover.
2.71	mpact on Hydrology
1	<ul> <li>The mining area is part of riverbed.</li> </ul>
1	<ul> <li>The mining depth will be up to one metre or up to water level whichever is less, thu water regime will not be disturbed</li> </ul>
1	The mining will be confine to central part of riverbed, away from banks.
3	Thus, mining would be dredging the riverbed and reducing the silt burden downstream
1	<ul> <li>The ground water (undercurrent of the river) will not be disturbed as mining will b undertaken above Water table.</li> </ul>

1

1

6

6

0

đ

ď

1

đ

6

đ.

đ

đ

6

6

10

61

đ

0

8

### 2.8 Waste disposal Management

The area is in a regular course of the Khad, and silt clay is the only waste likely to be produced. The waste generated if any will be used as hackfill where separable.

### 2.9 Socio-Economic Impact

- No adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the nocio economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 65 to 100 persons (if only manual mining is resorted to) directly and indirectly, in mining, transportation, and crushing unit. However, to avoid congestion and to improve mining efficiency mechanical mining is recommended if permitted to.

### 2.10 Transport of Mineral

From Quarry to Road heads towards Dharmpur - Seog rural road is about 200m through the Khad track. The mined material is transported through tracks made in the Khad. About 340 metric townes of material shall be transported per day with an average of 38 tipper truck trips. The movement of 38 tipper truck trips would not have much impact on traffic on rural road and would cause negligible environmental impact



	MINING PLAN GM, TM & TP Projects, HPPCL, Mandi	Malot Khad Quar
	PARTIII	
1.Pro	gressive Mine Closure Plan/Reclamation Plan	
1.1 R	eclamation	
12222222 2	The mined area being part of the river course cannot be reclaimed for	r any other purpose
¥3	-1 1 1 1 71 1 70 1 1 707 1 1	evel.
	No mining near the banks up to 1/10 <sup>th</sup> of its width is to be undertake i.e. 5 to 8 metres, from banks.	1911 SEE
0	water regime will not be disturbed.	
( <b>6</b> )	floods.	ver during monsoo
		1948
ିଲ କାମ୍ପର	As such no reclamation work of mined area is required to be underta fine Waste Disposal:	160CH1:
1.2 0	<ul> <li>a) Year wise generation of mine waste and soil cover.</li> </ul>	
	As explained earlier the following category of the wa during riverbed mining.	ste is generated
	<ul> <li>Silt/ Clay Mixture</li> </ul>	
	e silt and clay are generally being inseparable from sand and extrac As such no waste will be generated during the mining of s	ted along with it. tone, sand and
	ajri.	
1.3	The arrangements made for topsoil utilization, if any As the mining area is part of riverbed, having no tops therefore, no topspil is required to be removed, or dis	
1.4.	Preventive Check dams	
	Considering the rocky condition of riverbanks, no check walls are	2 · ^ 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201 · 201
	constructed. There is a rural road passing along the Khad for som	
	to village Thathi. H.P.P.W.D. have constructed crat wire wall for it	LEWICE CONTRACT CONTRACT CONTRACTOR CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT CONT
	check/retaining walls have been suggested to be erected at vulner along rural road C1 to C5. The total length may extend to 250 met	
	Rs.50000/=	the stating about
1.5 P	lantation work	
	As far as the order of Apex court in writ petition(s)No(s) 114/2014	litled as Common
	e Vs Union of India & others is concerned, the riverbed which suffer	
durin	g monsoon period and where no grass growth is possible, as such r	nining area cannol
	59	

ਿ

0

đ

đ

đ

6

6

0

đ

Ø.

be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance
First	100	5	2000
Second	150	15	7000
Third	150	15	8000
Fourth	200	20	10000
Eifth	250	25	15000
Total	850	80	42000

### Year wise survival rate.

The survival rate is about 30 percent in the area because of the rocky nature of the site. However, after yearly review it will be ensuring that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured to be at least 90 percent.

### 2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is a rural road passing along the Khap at callour in mining has been proposed up to ten metres for its protection. There is no other point of utility within radius of 100 metres of the mining lease perturbed, which may need any kind of protection.

### 3 MANPOWER DEVELOPMENT

The mining activity will be mainly manual. Worker are major required in riverbed mining for extraction and loading of riverbed material into tipper truck and tractor trolleys. Drivers for tippers and tractors will be another category of workers. Thus, employment potential is as given below:

Murishi	1
Drivers and JCB operators	9
Unskilled workers	85

	MINING PLAN Malot Khad Quar GM, TM & TP Projects, HPPCI, Mandi.
	Thus, total generation of Employment will be to a tune of 95 both skilled and unskilled workers.
4	USES OF MINERAL The stone, sand and Bajri will be consumed in the dedicated crushing unit of the
	Project and product grit and sand will be used in construction activities of the project.
5	DISASTER MANAGEMENT & RISK ASSESSMENT:
	The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:
	<ul> <li>Inundation / Flooding</li> </ul>
	Drowning
	<ul> <li>Accident during mineral loading, transporting, and dumping</li> </ul>
	<ul> <li>Accident due to vehicular movement</li> </ul>
	<ul> <li>Earthquakes</li> </ul>
	Inundation/Flooding
	The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining
	plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.
	Accident during mineral loading, transporting, and dumping
	The consequences of the scenario are minor which may be taken care with first aid care.
	Accident due to vehicular movement
	The consequences of this scenario are moderate and may result in
	hospitalization and day loss. The likelihood of occurrence is occasionally
	possible.
	Earthquakes
	The area falls in seismic zone IV. The mining operations are open cast pit
	mining. The mining pits will be only of one metre depth. There won't be any
	structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.
6. F	RECOMMENDATION FOR RISK REDUCTION
121122	Measures to prevent Inundation/Flooding/drowning

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

đ

8

8

0

0

6

6

· Being on riverbed there should not be any mining operation during monsoon or rainy day Formation of deep pits should not be allows: Whenever there is any alert of flooding the workers will be moved to safer grea along the banks. Measures to Prevent Accidents during Loading The truck should be brought to a lower level so that the loading operation. suits to the ergonomic condition of the workers. The loading should be done from one side of the truck only. The workers should be provided with ployes and safety shoes during loading · Opening of the side covers would be done carefully and with warning to prevent injury to the loaders. Operations during daylight only. Measures to Prevent Accidents during Transportation Vehicles will be periodically checked and maintained in good condition. Overloading will not be permitted. · To avoid danger of accident roads and ramp near embankment should be property maintained. The truck would be covered and maintained to prevent any spillage. The maximum permissible speed limit should be ensured. The truck drivers with proper driving license would only be employed. Measures to Prevent Accidents during Earthquakes Decesional dtills to create awareness for safety measures during mining. operations and specially the measures to be adopted during earthquakes. etc will be undertaken in consultation with experts. Industries



# Declaration

This is to declare that the Mining Plan of Minor Mineral lease of part of Malot Khad, for Stone, bajri and sand situated in Khasra No. 3185, 3187/1, 4/1 and 108 measuring 7.7259 Hectares, FALLING Mauza/Mohal Tatoli Pardana, Naraingarh & Thathi, Tehsil Dharampur & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs. ...... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

Date Place KOTLI

3

b



The Gen

riveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

# Certificate

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra Nos. 3185, 3187/1, 4/1 & 108, measuring 7.7259 Hectares, Mauza – Tatoli Pardana, Naraingarh & Thathi, Tehsil Dharampur & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

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

Date

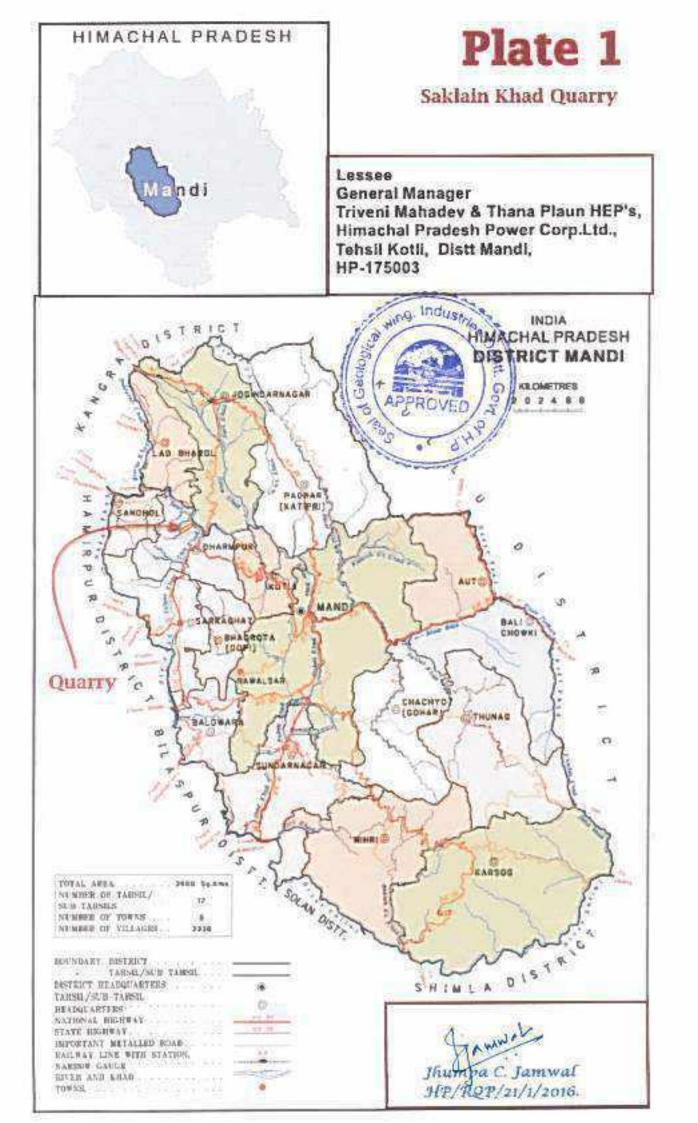
D

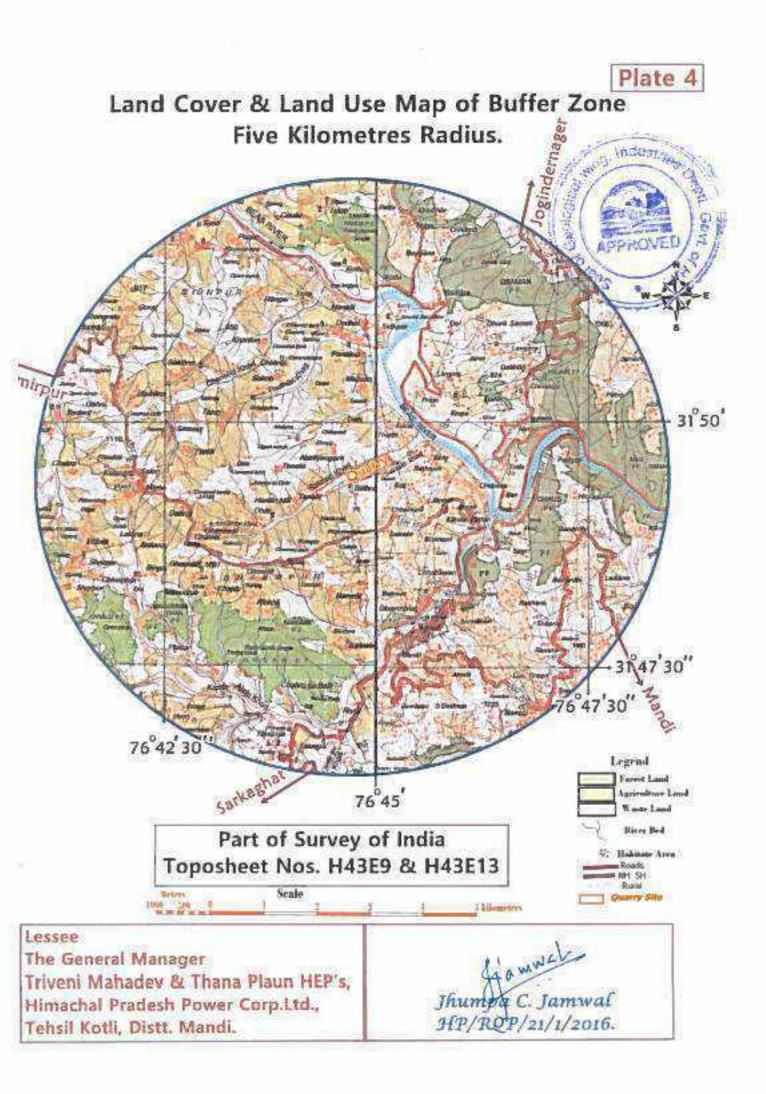
Place: Shimla

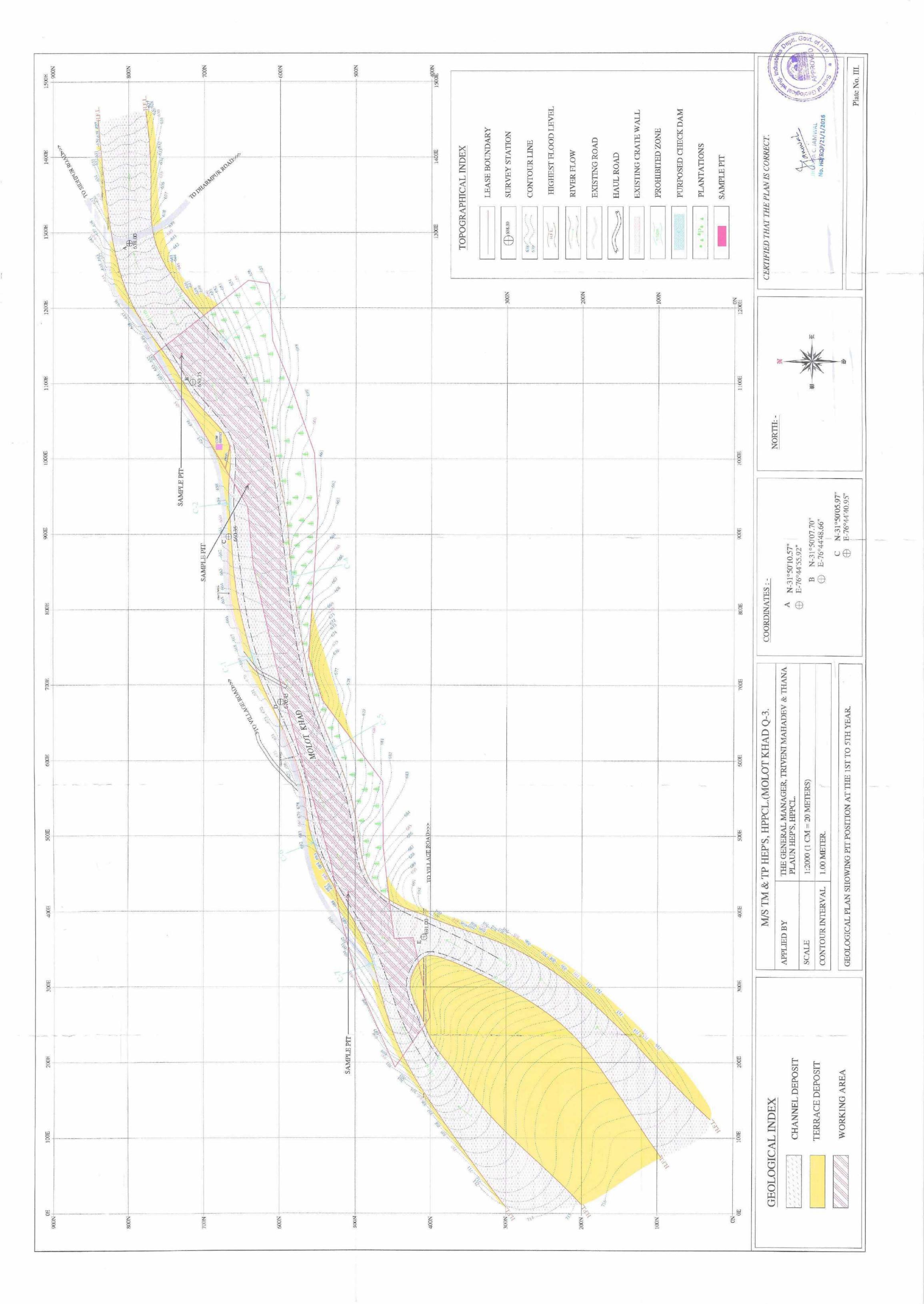
MUBICa,

WWWal

Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016

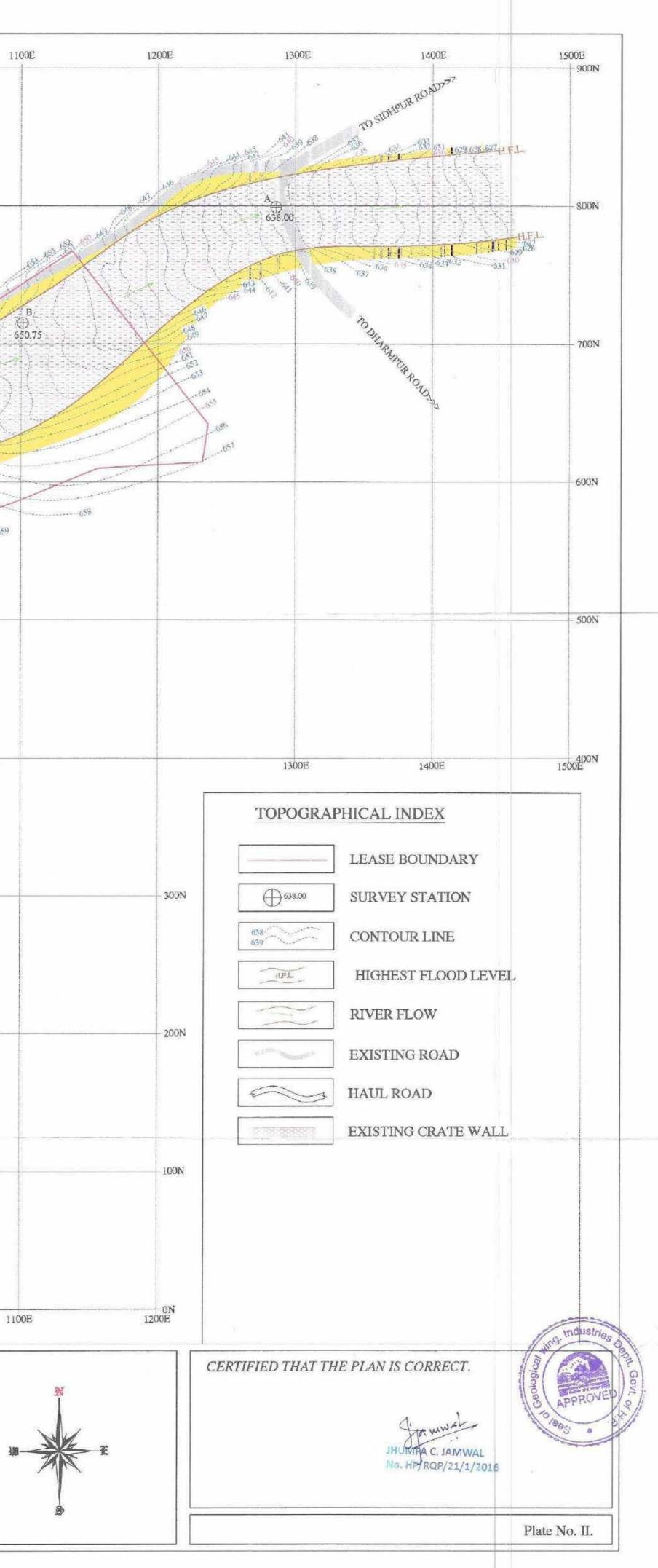






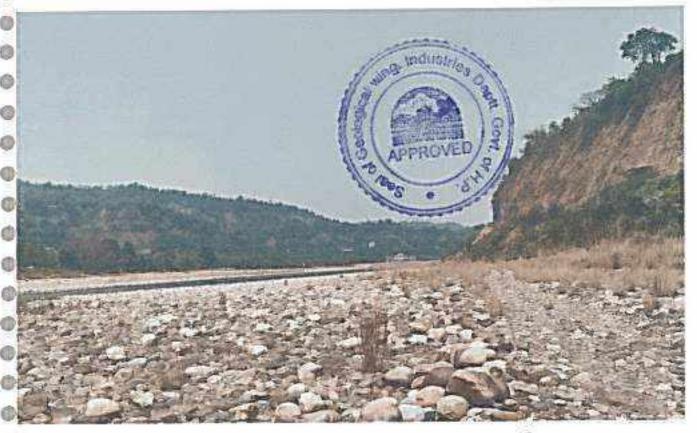


№         №         №         №         №         №           I					
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	500E C	00E 700E	800E	900E	1000E
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx					
NOLOT KIND NOLOT KIND NOLOT KIND Comparison of the second sec					65%
NOLOT KIND NOLOT KIND NOLOT KIND Comparison of the second sec		370 VILLNGE ROAD 370	669 668 661 666 666 665 664 6	0	
IMAGE ROAD         Image: Solution of the second seco	692 981 650 679 678 (517 6 <sup>17</sup>	MOLOT KHAD		662	650 650
ELAGE BOADOS> ELAGE BOADOS> SOB 606 TOB SOB 906 1006 2 HEP'S, HPPCL.(MOLOT KHAD Q-3. E GENERAL MANAGER, TRIVENI MAILADEV & THIANA LUNNIES, HPPCL. 2000 (1 CM = 20 METERS) 00 METER. 2000 (1 CM = 20 METERS) 10 METER. 2000 (1 CM = 20 METERS) 2000 (1		680			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	ILLAGE ROAD>>>				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
HE GENERAL MANAGER, TRIVENI MAHADEV & THANA LAUN HEP'S, HPPCL. 22000 (1  CM = 20  METERS) 00  METER. $C N-31^{\circ}50'05.97"$ $C N-31^{\circ}50'05.97"$ $C N-31^{\circ}50'05.97"$	500E 6	00E 700E	800E	900E	1000E
	HE GENERAL MANAGER, TRU LAUN HEP'S, HPPCL. 2000 (1 CM = 20 METERS) 00 METER.		$ \begin{array}{c}     A  N-31^{\circ} \\     \oplus  E-76^{\circ_2} \\     B \end{array} $	44'55.92" N-31°50'07.70" E-76°44'48.66" C N-31°50'05.97"	NORTH: -



# MINING PLAN

MINOR MINERAL LEASE FOR STONE , SAND & BAJRI, SITUATED IN KHASRA No.2721/1, 4.1207 HECTARES, MAUZA PRAIN, TEHSIL JOGINDERNAGER, DISTRICT MANDI, HIMACHAL PRADESH



LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER TRIVENI MAHADEV & THANA PLAUN HEP'S, HIMACHAL PRADESH POWER CORP. LTD., TEHSIL KOTLI, DISTT. MANDI.

HIMACHAL PRADESH.

2023

Ihumpa C. Jamwal HP/RQP/21/1/2016.



# INDEX

D

Ø

Ø

D

•

.

S.NO	INTRODUCTION	PAGE NO
	PARTI	
	INTRODUCTION	1
1	GENERAL	2
1.1	Name & Address of the applicant	Z
1.2	Status of the Applicant	2
1.3	Mineral which the Applicant intends to Mine	2
1.4	Period for which the mining lease is granted	2
1.5	Name & Address of H.P.R.Q.P preparing the Mining Plan	2
1.6	Name of the Prospecting Agency	2
2	Location and Approach of the Area (Location Map)	3
2.1	Topo-sheet no.	3
2.2	Location of the Area	5
2.3	Address details	5
2.4	Distances from Important places in Kilometers	5
2.5	Approach of the Area	6
3	Physiographical Aspect of the Area	
3.1	General	8
3.2	Altitude of the Area	8
3.3	Climate of the Area	8
3.4	Rainfall	10
3.5	Any other important Physical Feature	11
	PART-1	
1	Description of the area in which mine is situated	12
1.1	General	12
1.2	Name of River/ Stream and its gradient in which the lease is situated Drainage System Type of Drainage Origin of river	14
1.3	Drainage System	Mag
1.4	Type of Drainage	1351
1.5	Origin of river	有一位
1.6	Altitude of Origin	GH /19 /
1.7	Geometry of the Catchment of the river hopacting the replenishment of deposit	
1.8	Annual Deposition of the Place of Mining	4/15
1.9	The Competency of the river/stream at the mining site	16
1.10	The thread of deepest water in meandering.	17



1.11	Altitude of the Area	17
1.12	Description of groundwater table	17
2	Geology	17
2.1	The Regional Geology of the Area	17
2.2	Local Geology of the area	18
2.3	Geology of the lease area	20
2.4	The nature of boulders, cobbles, sand etc	21
2.5	Nature of rock and their Altitude	22
2.6	Description of Annual Deposition w.r.t the Geology of catchment area and other factors	23
3	Reserves	24
3.1	General	24
3.2	Percentage wise distribution of Mineral	24
3.3	Estimate of Geological Reserve	24
3.4	Estimate of Mineable Reserves of each Mineral	25
3.5	Estimate Annual Deposition of Mineral	27
4	Mine development and plan of Progressive Mining, Method of Mining	28
4.1	Development and Production Programme for 5 years	31
4.2 a	Development and Production at the end of 1# year	31
4.2 b	Development and Production at the end of 2nd year	32
4.2 c	Development and Production at the end of 3rd year	33
4.2 d	Development and Production at the end of 4th year	34
4.2 e	Development and Production at the end of 5th year	35
4.3	End use of Mineral	35
4.4	Detail of Road Transport	37
	PART II	1.00
1	Base Line Data (Detail of the Land use and Social aspect of area)	
1.1	Detail of Population Distribution	39
1.2	Socio-Economic of the Village	42
1.3	Land use within 5km radius	AT
1.4	Agriculture	4200
1.5	Horticulture	50 31
1.6	Animal Husbandry	2 181
1.7	Fisheries	53 8
1.8	Socio-Economic of the Village Land use within 5km radius Agriculture Horticulture Animal Husbandry Fisheries Flora & Fauna Climate of the Area	\$40/A
1.9	Climate of the Area	
2	Environment Management Plan	60
2.1	Impact on Land Use Pattern and Topography	-60
2.2	Impact on Climate	60

D

D

ø

Ø

Ø

Ð

₿

D

D

Ô1

(0)

2.3	Impact on air	60
2.4	Impact on Noise Level	61
2.5	Impact on Flora & Fauna	61
2.6	Impact on soil cover	61
2.7	Impact on Hydrology	61
2.8	Waste Disposal Management, if any	62
2.9	Socio-economic Benefits	62
2.10	Transportation of Mined Mineral	62
PAR	T HI PROGRESSIVE MINE CLOSURE PLAN/RECLAMA	TION PLAN
1.1	Reclamation	63
1.2	Mine waste Disposal	63
1.3	Top Soil utilization	63
1.4	Preventive Check Dams	63
1.5	Plantation Work	63
Z	Strategy for Protection Of Point Of Public Utility Etc.	64
3	Manpower Development	64
4	Use of Mineral	64
5	Disaster Management & Risk Assessment	65
6	Recommendation for Risk Reduction	65

D

Ģ

0/

.

•

# MAP INDEX

S. No.	Title	Plate No.
1.	Locational Plan	1
2,	Geological Plan	2
З,	Plan Showing working pit Position at the End of 1* to 5th year.	3
4.	Buffer Zone 5 Kilometer radius Map.	4

Declaration Certificate of RQP



गोनको व माख. 29-05 नहाम विश्वास शिल्ला heatingtical wing toper, of Industries. -himla APPROVED With Condition गर्म वे साथ जन्मविक no ma udy og- Bha (1cham1-4) lagher 538/17-1621 Maleri, an man 23 5/23 Geologi." ne-iky Gm/AGm/DMIEN) Centra e ng Depth of Incustnes Shimla-1 29 25

「「「「「」」

ॉ

-6)

# MINING PLAN OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA No. 2721/1, MEASURING 4-1207 HECTARE MAUZA PRAIN, TEHSIL –JOGINDERNAGER, DISTT – MANDI (H.P.) LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPS, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

## **INTRODUCTION:**

1

0

0

.

0

0

01

0

0

0

0

0

0

0

0

0

0

e

0

.

0

6

0

0

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' for grant of mining lease for mining sand, stone and bajri for a period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-538/2017-11940 dated 86/03/2019 and extended for further period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-538/2017-6730 dated 9/11/2021.

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely Pabber Valley Power Corporation (PVPC) and Kinner Kallash Power Corporation (KKPC), earlier owned by HPSEB, have heen merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31.07.2007.

Thana plaun Hydro Electric Project is located between latitude 76 15F to 77245'E approprietude 31\* 30'N to 32\*30'N in district Mandi. The project has been planned to a most over the storage scheme on the right bank of river Beas with its Dam across the river of a and understand. Powerhouse located on right bank of the river near village Thana. The Stone Harr and S and understand Powerhouse area will be used in the construction of the Project and its infrast of area.

In accordance with Rule 35 of the 'Himachai Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015' the tessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the said Rules

0

0

0

6

6

10

۲

6

6

0

0

0

0

-

Ø2

65

6

62

6

8

6

6

6

0

۲

Ð

69

齒

8

The quarry lease area is located at about 36 Km. from Jogindernager. The area can be approached through a rural road branching from SH 19.

# General:

- 1.1 Name and address of the applicant 1.1. A. Name of the applicant --The General Manager
  - 1.1. B. Address of the applicant The General Manager Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corporation Ltd., Tehsil Kotli, Distt. Mandi.
- 1.2 Status of the applicant

Government undertaking.

1.3 Minerals which the Applicant Intends to mine

The applicants intend to mine stone, Sand and Bajri. The stones, sand and bajri will be used in construction activities of the Projects.

### 1.4 Period for which the mining lease is granted

Five years effective from the date of execution of lease deed agreement.

1.5 Name and address of the RQP preparing the Mining Plan: Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016 Mobile No. 9418909890.

### 1.6. Name and address of the prospecting agency

The base contour map of the leased area was proported by Shri C.P.Negi, Retired Senior Surveyor, Geological Wing, Department of Helpstries, resident of Negi Lodge (West), Indernager, Dalli Shimla, for the Right 2

The detailed prospecting of the area was carned out by the R Q P for preparation of this report. The Secondary data is collected from various Geological reports of the Geological Survey of India, Satlui Jal Vidyut Nigam Ltd., Indian Metrological Department, Department of Economic and Statistics, Himachal Pradesh, and various publications of Government of Himachal Pradesh. The detailed prospecting of the area was carried out by the R Q P for preparation of this report.

MINING PLAN

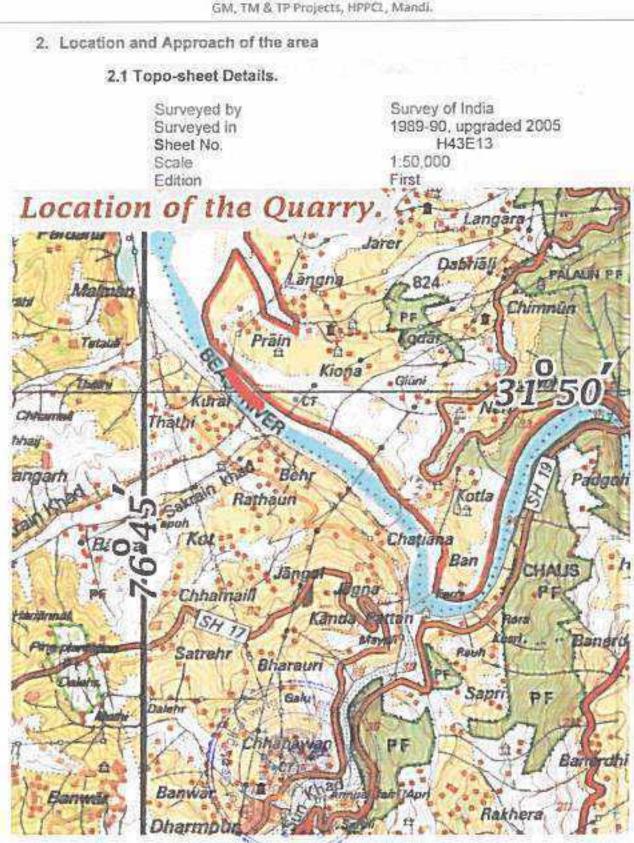


Figure 1:Location of the Mining Lease area. The area lies between the latitude and longitude given below in table 1 and shown in the Figure 2.

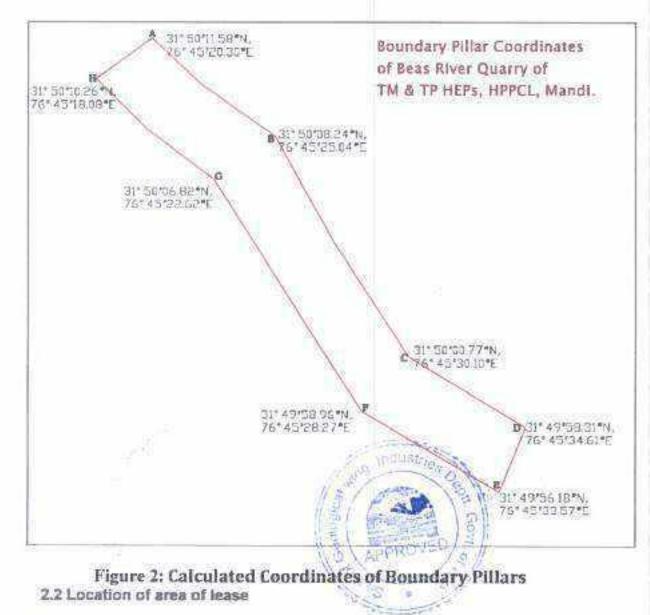
**Beas River Quarry** 

.

.

MINING PLAN	
GM, TM & TP Projects, HPPCL,	Mandi.

	the second state of the second state of the	
A	31* 50' 11.58*	76° 45' 20,30"
2	31° 50' 08.24"	76° 45' 25.04"
G	31° 50' 00.77"	76° 45' 30.10"
1	31° 49' 58.31"	76° 45' 34.61"
	31° 49' 56.18"	76° 45' 33.57"
1	31° 49' 58.96"	76° 45' 28.27"
6	31° 50' 06.82"	76° 45' 22.62"
11	31° 50' 1026"	76° 45' 18.08"



### 2.2a Details of area

The Revenue details of the area are given below in table 2

Page 4

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Table 2. The detail of the lease area

G

•

Khasra Number	Area Hectares	Owner of Land	Kism	Mauza/mohal
2721/1	4,1207	Government	Gair mumkin Darya	Prain
T	OTAL		4.1207 HECT	ARES

### 2.3 Address & Detail of Lease

	18 18 19 19 19	approximation (
	Village: -	Prain
	Patwar circle:	Langna
	Post Office: -	Langna
	Tahsil: -	Jogindernager
	District: -	Mandi
Administrative Office	Sub-Divisional Office (Civil): -	Jogindernager
	Divisional Office (Forest): -	Jogindernager
	Range Office (Forest): -	JogIndenager
	Assistant Engineer (IPH): -	Langna
	Assistant Engineer (PWD): -	Langna
	State	Himachal Pradesh
15-9 E 2 ( 19-1 ) ( 1		

2.4 Distance from Important Places to Quarry site.

S. No.	From	Te	Distance (in K.mt.)
1	Quarry	Roadside NH 3	0.10
2		Joginder Nager	36
3	Roadside	Mandi (District Offices)	APPPDOLISE 0 92
4		Shimla (State Hq)	12 2 17
5		Dharmsala	No Carnoveu/s/
1		Gaggal (Airport)	100 10 90 90
6	A.	Dharampur	23
7		Sarkaghat	36
8		Sujanpur Tira	64

ିଆ

e

凿

### 2.5 Approach to the Area.

The leased site is part of Riverbed and is at 0.1 km from Rural Road leading to SH 19. Joginder Nager via SH 19 is 36 kms from the quarry site. The SH 19 connects to NH 3 near Dharampur leading to Mandi at 74 Km from Quarry site.



Figure 3: Approach to Quarry site



# 3. Physiographical Aspect of the Area

# 3.1 General

17. (3)

3

0

B

B

8

0

B

6

3

0

(B)

0

0

۵

6

0

Ð

ø

0

0

0

0

The area in general is a part of the Lesser Himalaya. The Lesser Himalayas, located in north-western India in the states of Himachal Pradesh and Uttar Pradesh, in north-central India in the state of Sikkim, and in north-eastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height.

The general relief of the Mandi District is as given below in the figure: -3: -

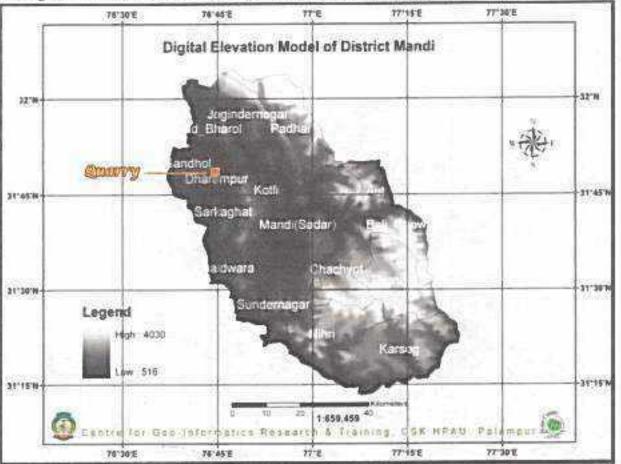


Figure 4: The Digital elevation map of the Mandi district.

The Satellite photograph was taken from the Google is given below (Figure: -4) to depict the general physiography of the area showing that the major ridges/water divides are generally running N-S and all pours are running parallel to the NE-SW line.

APAR

# 3.2 Altitude of the area

- > The highest contour of feesed out area in Beas River is 609 Meters above MSL,
- The lowest contour of the leased-out area in Beas River is 605 Meters above MSL.

-

(1)

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

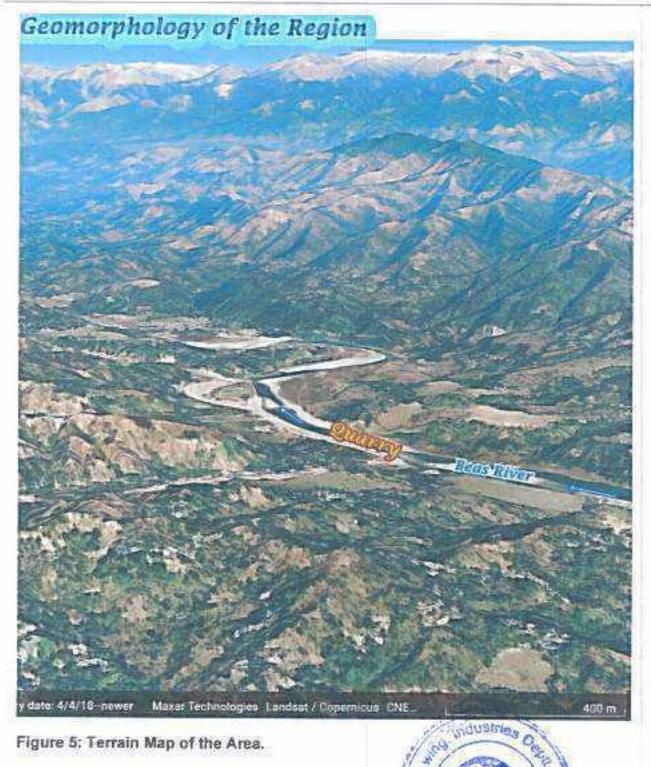
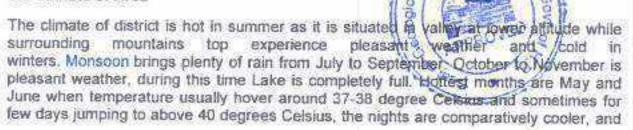


Figure 5: Terrain Map of the Area.

#### 3.3 Climate of Area





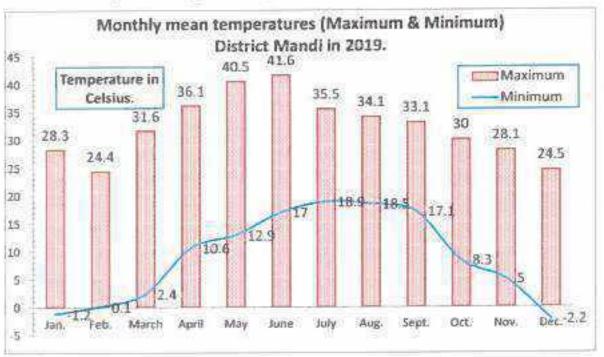


Figure 6: Mean monthly maximum and minimum temperature recorded at IMD station at Sundernagar

# 3.4 Rainfall

0

ø

0

ø

1

0

63

10

D

۵

B

D

0

13

6

0

0

0

0

0

8

0

0

0

6

8

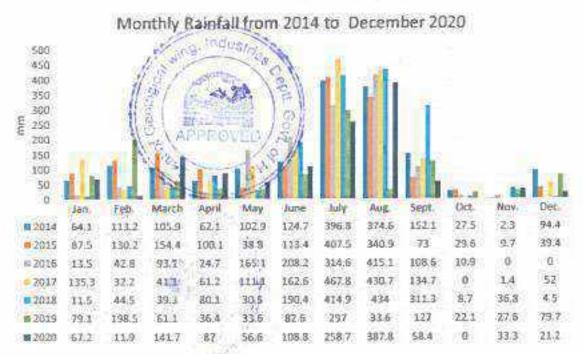
Ö//

00

0

0

Rain fall data of Mandi district is depicted in figure 6.



#### Figure 7: Rainfall of the District.

In addition to District Mandi, the catchment area of Beas River up stream of the

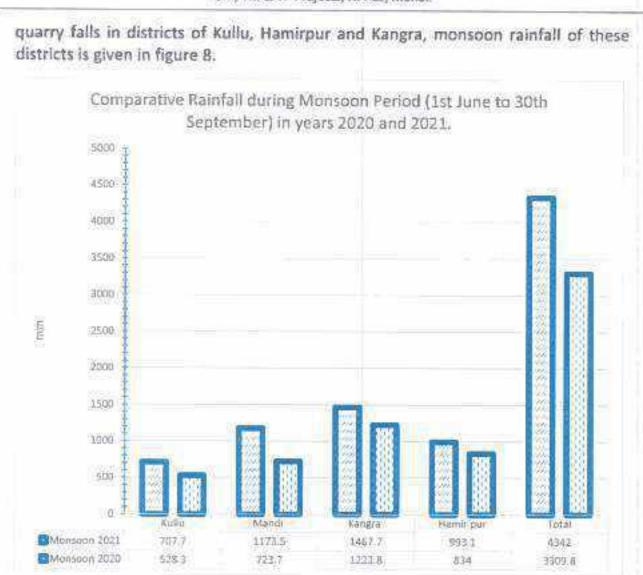
-

ē

쥥

-

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



#### Figure 8: Monsoon rainfall in the catchment districts.

#### 3.5 Any other important feature

The mining lease area falls in riverbed of Beas River and accessibility to the quarry site is through a kutcha road.

# 2.6 Description of mining area.

Mining area falls in river corridor of Beas River. It is richly endowed with river borne material as it falls in the young stage of the river.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

#### PARTI

密節

8

12

03

0

13

ø

0

D

00

13

6

0

0

0

0

(B)

0

0

6

ø

0

0

0

曲

0

0

0

0

Ô

3

# (1) Description of the area in which the mining lease is situated.

#### 1.1 General

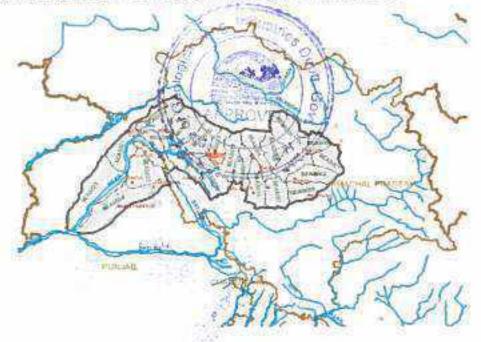
The Lease is situated in the Beas River. Beas River originate at an altitude of 5871 metres above mean sea level at Beas Kund.

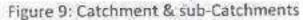
Its main tributaries are the Parbati, the Spin and Malana nala in the East; and the Solang, the Manalsu, the Sujoin, the Phojal and the Sarvati Streams in the West. In Kangra, it is joined by Binwa, Neugal, Banganga, Gaj, Dehr and Chakki from North, and Kunah, Maseh, Khairan and Man from the South.

At Bajaura, it enters Mandi district situated on its left bank. In Mandi district, its own Northern feeders are Hansa, Tirthan, Bakhli, Jiuni, Suketi, Panddi, Son and Bather. The northern and Eastern tributaries of the Beas are perennial, and snow fed, while Southern are seasonal. Its flow is utmost during monsoon months. At Pandoh, in Mandi district, the waters of the Beas have been diverted through a big tunnel to join the Satluj. It flows for 256 km. in Himachal Pradesh.

Beas river enters in the Kangra District just at the confluence of Binu Khad with Beas at an elevation of about 636 metre above mean sea level and it flows along the border of Kangra and Hamirpur district up to Nadaun in Hamirpur and then it flows in the Kangra District. The total length of the Beas River in Kangra district is about 123 Km

The catchments of the Beas River have been divided in sub catchments by the Central Ground water Board as shown in figure 7 and table 3.





-8

.....

-0

10

10

8

8

0

0

63

-

0

0

0

0

8

8

.

0

0

0

8

8

0

0

۲

6

6

G

0

6

0

(B)

60

0

# 1.2 Name of River/ Stream and its gradient in which the Lease is situated

Beas River.

1.3 Drainage System

Beas River

1.4 Type of Drainage

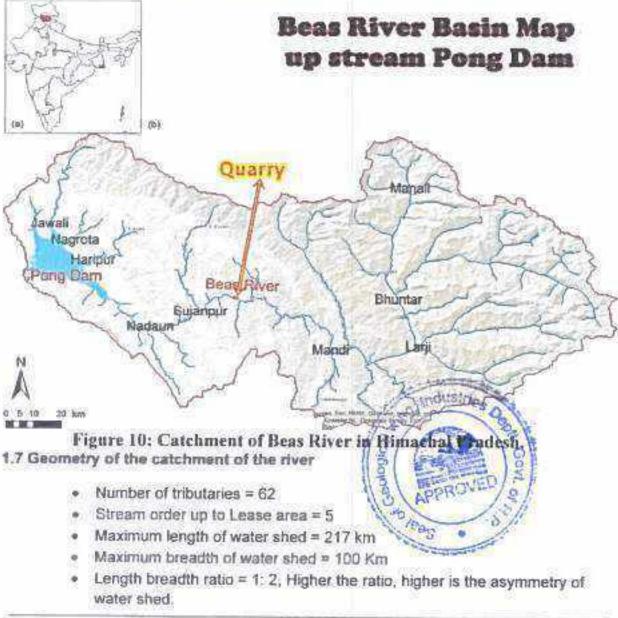
Dendritic

# 1.5 Origin of River/Stream

Beas River originate at an altitude of 5871 meters above mean sea level at Beas Kund.

# 1.6 Altitude at Origin

5871 metres above mean sea level at Beas Kund.



#### Profile of Riverbed

100

ø

B

0

0

123

0

10

13

0

0

0

0

0

0

0

8

۵.

0

0

0

0

0

100

0

0

0

0

0

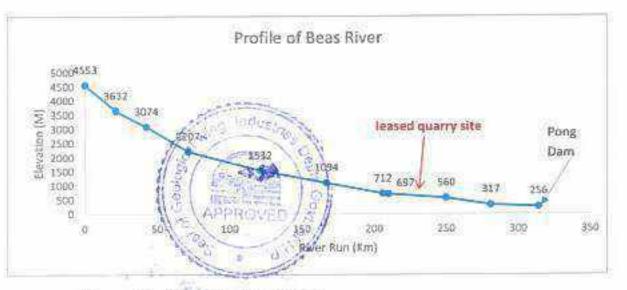
0

3

- Highest point = 6558 M
- Elevation at Lease area = 1609 M
- Total length of River = 315 Km
- Total Elevation Loss = 5408 M
- Average Slope = 14,1 % i.e about 6.3°
- Slope angle at Lease area = about 20".
- Cycle of erosion at Lease area is Mature.

1.8: The annual deposition at the place of mining:

The area being part of the river which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. Though at the mining lease site the river is at young stage but as an abundant precaution, keeping in view the variation in rainfall particularly highest rainfall, which generally causes floods, the factor of eight cm annual replenishment is taken into consideration in general. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. However, it is generally observed that replenishment of more than eight cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.



# Figure 11: River Profile of Beas

1.9 The Competency of the River/ Stream at the mining site

The general competency at the mining area is eight to ten Kg approx. The largest boulders vary 24 to 130 cm X 36 to 120 cm X 30 to 100 cm (length X Width X height). However, the size of the boulders found in the river is more dependent upon the size available in the boulder conglomerate beds in the catchment area than the actual competency of the flow of the river.

Beas River Quarry

8

3

43

60

0

6

0

8

0

6

63

0

0

0

0

6

6

5

.

8

8

6

8

8

0

63

60

6B

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



Photo 1 Competency of the River

### 1.10 The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

# 1.11 Altitude of the area is

- > The highest contour of lease area is 609 Metres above Mean Sea Level,
- The lowest contour of the lease area is 605 Metres above Mean Sea Level.

# 1.12 Description of ground water table:

The mining lease area is part of river course. Beas River is a perennial river; therefore, the water flow remains throughout the year. However, water level of surface water as well as ground water table vary from post monsoon to pre-monsoon period. The ground water table vary from surface to 1.5 metres BGL depending upon, season, elevation, and distance from surface flowing water.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

# 2.0 GEOLOGY

107

ß

0

3

0

10

3

63

00

3

1

10

Ð

0

0

0

0

6

ø

0

O.

0

8

#### 2.1 Regional Geology.

The Himalayan Mountain system roughly surrounds the northern India. The mountain ranges extend for over 2400 km length from west to east. Geology of the Himalayas is extremely complex as it represents a site of continental collision. The collision of the Indian Plate and the Eurasian Plate led to joining of the two continents along a suture zone represented by a lineament. Two rivers – Indus in the west and Tsangpo in the east flow along this lineament which is also known as Indus suture zone. We will study the geology of the terrain between the Indus suture zone in the north and the Indo-Gangetic alluvial plains in the south.

Tectonically the Himalayas can be divided into four roughly parallel zones. From north to south the zones are:

- Tethyan Himalayas
- Central Crystalline Zone
- Lesser Himalayas
- · Errorl Hyperlink reference not valid.

The Central Crystalline Zone is made of Precambrian basement rocks mixed with granitic intrusions of Tertiary age. This zone has the highest mountain ranges of the Himalayas. This zone separates the northern Tethyan Himalayas from the southern Lesser Himalayas. These two zones contain sedimentary rocks of Palaeozoic-Mesozoic ages deposited over Precambrian basement.

Whereas the Tethyan Himalayas consists of a fairly continuous succession rich in fossils, the Lesser Himalayas host rocks with scanty fossil records and with gaps in between. The Outer Himalayas forms a separate geological unit consisting of Quaternary sedimentary rocks originating from the rising Himalayas.

Each of these zones displays a highly complex geology disturbed by the Himalayan Mountain building processes. The geology of the Lesser Himalayas is particularly difficult to decipher because it contains several thrust sheets or nappes and is generally devoid of fossils.

GEOLOGICALLY Himachal Pradesh cao be broadly divided into two major geotectonic zones viz. the Lesser Himachan fectogen in the south and the Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectonic break collectively designated as Main Central Thrust in the sense defined by Srikantia (1988). Mandi District lying within the Lesser Himalaya and the Shiwalik Footbill comprises rocks ranging in age from Proterozoic to Quaternary. The bldest rocks are of undifferentiated Proterozoic age, comprising carbonaceous phyllite, schist, gneiss, quartzite, and marble. The Ghoghar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Meso- Proterozoic age is represented by quartzite with basic flows. The Shali Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at

-8

0

0

63

0

0

63

ð

捌

63

63

3

8

0

0

0

0

6

8

8

0

100

8

8

0

0

0

6

٢

8

6

0

0

105

places stromatolites) slate, & quartzite. The Subathu consists mainly, of olive-green shales and grey shales. At the top, a band of white quartzite is exposed; this band of white quartzite has been taken as the marker, defining the top of the Subathu sequence. The thick sequence of brackish and freshwater sediments immediately succeeding the fossiliferous marine Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Miocene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles, and cobbles occurring along present channels of Middle to Late Pleione and Holocene age. **2.2 Geology of area** 

The local geology & stratigraphy of the area is given in the figure 6. The rocks in the surrounding area belong to the Tertiary formations.

#### 2.3 Local Geology of the leased area

The leased area forms a part of the riverbed covered with bouldars, cobbles, pebbles, river born bajri, and sand and clay deposit of Channel alluvium. The rocks in the catchments of Beas River is of in the upstream side, in the effective catchment belongs mainly to Kullu group, Larji Group, Rampur group, Vaikrita group and tertiary group. The area is comprising predominantly the quartzite Boulders, Sand and river born bajri of catchment rocks. The rock nears the quarry area belong to tertiary formations.

The boulders are white, spotted white, greenish white, pink, purple and dark green in color.

#### 2.4Nature of the Boulder/ Cobble/ Sand

The area lies within the regular course of the Beas River gets flooded in the rainy season.

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit is more than five metres industrial

During the monsoon, the riverbed replenishes by the eroded tocks from the pretertiary Formations. Due to sudden decrease in the carrying capacity and competency of the river after monsoon floods, the arrival deposition of six to eight cm is received.

1905

# 2.5 The Nature of the rock along the bank

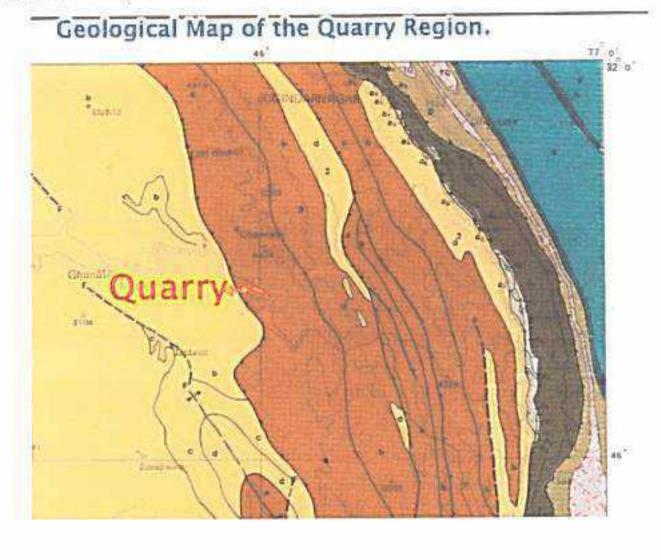
D

D

D

D

The rocks along the bank belong to tertiary formations consisting of claystone, sandstone, and congiomerate.





Beas River Quarry

-63

.

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

#### LEGEND

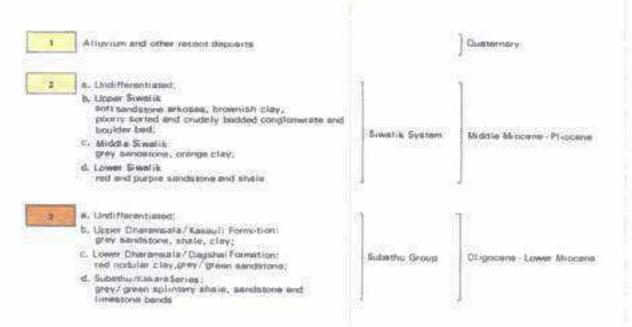


Figure 12: Geological Map of the surrounding lease area.

APPROVED OF

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

B

D

D

D

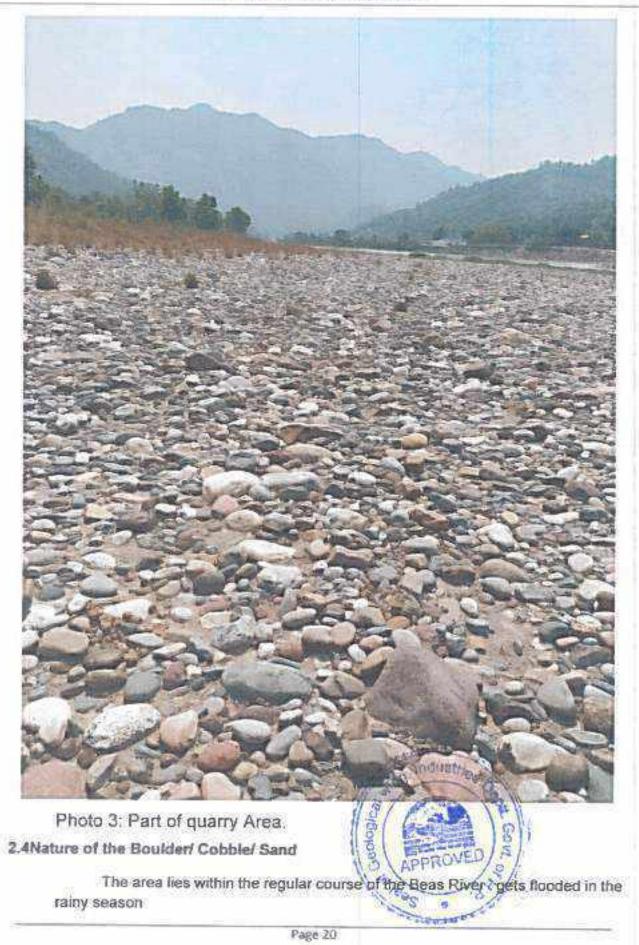
D



Photo 2: Nature of the Boulder/ Cobble/ Sand in the Beas River.



MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit is more than five metres.

During the monsoon, the riverbed replenishes by the eroded rocks from the pretertiary Formations. Due to sudden decrease in the carrying capacity and competency of the river after monsoon floods, the annual deposition of six to eight cm is received.

150

#### 2.5 The Nature of the rock along the bank

18F

9

Э

15

b

10

P

3

8

63

D

B.

Ø.

0

0

13

B

10

0

8

0

0

0

0

0

0

0

Ó

0

Ø

6

8

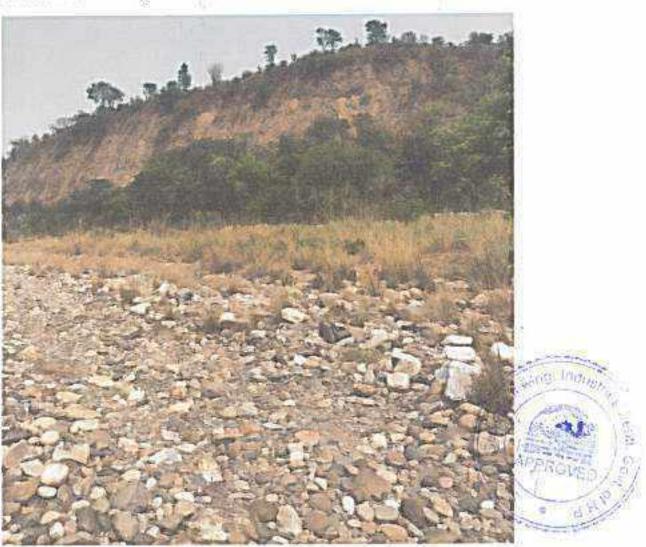
0

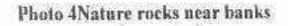
0

0

(1)

The rocks along the bank belong to tertiary formations consisting of claystone, sandstone, and conglomerate.





6

12

0

6

6

6

8

ŵ

0

6

8

۲

0

9

0

60

G

恣

3

0

65

1

60

# 2.6 Estimate Annual Deposition of Mineral

The area being part of the river which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. As abundant precaution, keeping in view the variation in rainfall particularly highest rainfall, which generally causes floods, the factor of eight cm annual replenishment is taken into consideration in general. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. However, it is generally observed that replenishment of more than eight cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.



# 3. RESERVE ESTIMATE

### 3.1 General Consideration

e b

3

0

0

63

0

0

0

13

0

0

0

10

9

0

8

0

0

G)

3

B

0

3

0

0

0

0

Ø9

**@**)/

001

0

The basic requirement of the leased or will be stone, bajrl and sand for construction of Project.

#### 3.2 Percentage wise distribution of Mineral: The table below shows the percentage wise distribution of minerals and figure 9 depicts the pie chart for the same.

Table shows the percentage wise distribution of minor minerals:

Percentage of Minerals/Material in the Mining Lease Area

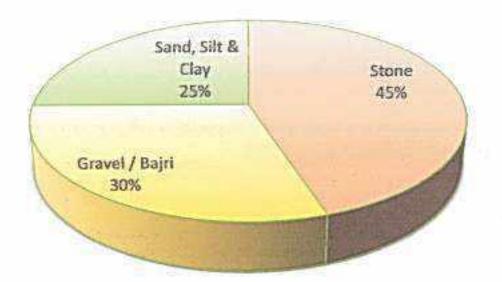


Figure 13: Percentage of each category of mineral present in the leased area.

1 . of .....

1	Stone 5	45%
2	Gravel / Bair Bono	8/30%
3	Sand, silt & day	125%

# 3.3 Estimate of Geological Reserve

The entire block falls within the river corridor. Thus, the mining leased area of 40969 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than 5 metres. However, considering for purpose of

3

0

0

61

63

8

-

-01

0

8

£1

6

8

0

8

0

6

60

0

8

8

0

6

8

ē

0

3

0

60

63

6

estimation of Geological reserves to a depth five metres and specific gravity to be 2.25, the Geological deposits in the area are to a tune of about 463579, metric tons as shown in the chart.

Geological Reserves	Thickness, in metres	leased Area (Square Metres	Heserves Rounded off (In tonnes)
Proved	3	41	207 463530
Specific Gr	neity 2.25	1462	
Formula =	Surface area	X thickness/dep	nth X specific gravity =

3.4 Estimate of Mineable reserves of boulders, Bajri and Sand

The basic requirement of the leased or is sand, stone and bajri. As per the policy guidelines issued by the State Government for Mining of River / Riverbed and to calculate the mineable reserve the following points are taken into consideration: Adequate safe distance has been provided from the points of utilities as per Rules and guidelines.

As per the policy guidelines issued by the State Government for Mining of River / Riverbed,

- In this case only one-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- Mining is not permitted within 1/10<sup>th</sup> of riverbed or 5 meters from the banks (HFL) of the river / River whichever is higher. The width of the river in leased area is 195 to 230 meters; thus, no mining is proposed in the area up to 20 to 23 meters from the banks.
- The water table level will go down as the water recedes after the monsoons.
- The depth of water table will be at lowest in the pre-monsoon season
- A geological map on 1.2000 scale is prepared and main litho units were marked on the plan to know the surface spread of each unit.

The entire width of the river gets flooded during heavy rains in monsoons. The mined area gets replenished in the very early floods in the beginning of the monsoon season.

The total mineable area and deposit is shown in figure 12, table 7 and figures 13.

The part of the area, i.e., 32500 square metres of lease area, is mineable as it falls within the river corridor, leaving out the safety zone provided along the banks.

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

e.

B

þ

D

D

3

3

B

3

D

3

в

B

3

0

D

3

123

D

D

D

13

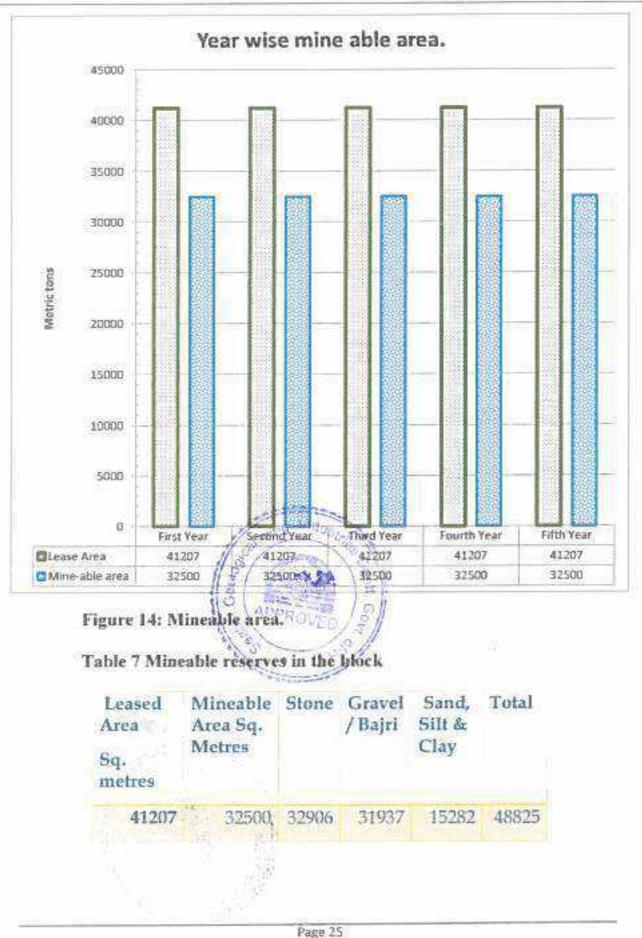
Ð

13

3

0

0



6

6

6

đ

0

0

6

8

0

60

8

8

0

8

0

0

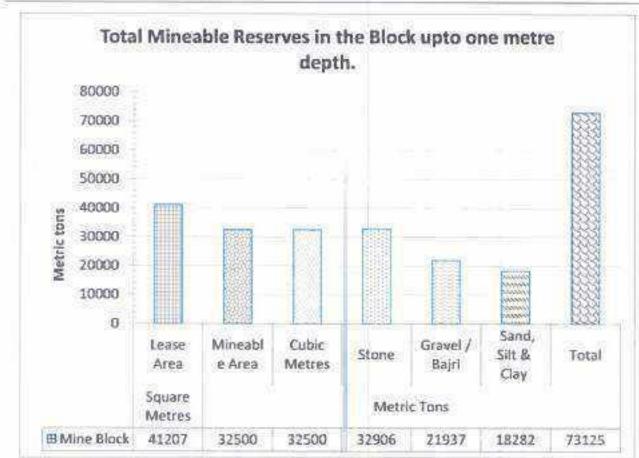
0

6

67

APPROV

MINING PLAN	
GM, TM & TP Projects, HPPCI,	Mandi.



# Figure 15: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 32500 square metres contains 32500 tonnes of mineable material. The entire mine able block will be mined every year.

#### 3.4a Depth of mining

The Rule 34 (IV) of Rules stipulates 'the depth of mining in the riverbed shall not exceed one metre or water level whichever is less'.

One metre maximum depth from the surface is considered for mining of the reserve.

#### 3.4b. Specific Gravity

The specific gravity of Quartzite boulder/stones is 2.65 and of sand is 1.85. Hence average specific gravity of 2.25 is taken for calculation of the deposit

# 3.5. Estimate of Annual deposition

The reserves of all the constituents of leased block have been calculated for the safe mineable area to be 73125 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure16. Depending upon normal rainfall from year to year causing erosion in the catchments

### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

and flooding of Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

Figure 17 shows the proposed production of materials in five years.

in i

3

D.

D.

b

9

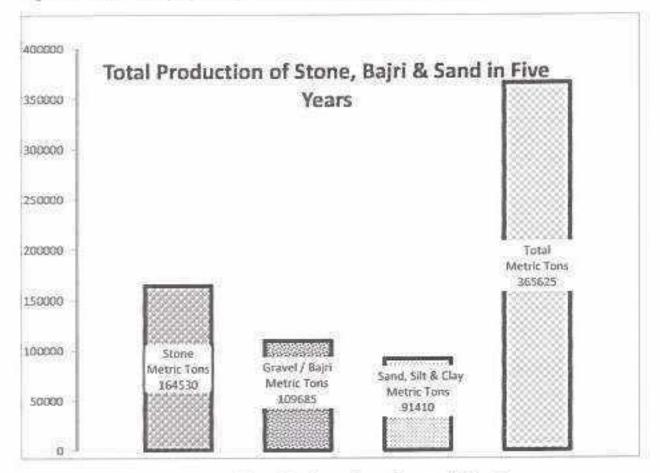
D

D

3

10

3



# Figure 16: Proposed production of total material in five years

# 4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent semi mechanical. Normally it has been observed that a worker can mine/excavate about three to four tonnes of material in a day. To excavate '180 tonnes of material in a day 45/60 workers would be required. Working of so many persons in a small area would cause congestion and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to both manual as well as mechanically. Workers are mainly deployed in riverbed mining for extraction and for loading of extracted material into tipper truck and tractor trolleys loader/ JCB will be operated. Drivers/ Operators for loaders, tippers and tractors will be another category of workers.

# Considerations

- · No blasting is required.
- Only manual/semi mechanically extraction of RBM (River Borne Material) will be undertaken.

d

4

1

đ

đ

đ

8

đ

đ

ŝ

đ

U.

0

đ

1

0

8

8

0

65

0

- Trenches and pits for the mining purposes shall be made in such a way so that these are not deeper than one metre and follow the general / normal channel direction of the river and bottom is above the water table.
- With the replenishment of the pits and trenches during the floods, the process of controlled mining can continue year after year. The erosion and weathering of rocks in the catchments have inexhaustible supply of required minerals.
- Mining activity will be undertaken only during the dry seasons and dry parts of the river.

### 4.1 Development and Production Programme for 5 years

The proposed production for the first five year is as given in the figure 13 and Table 6 below show the production of Minerals in five years.

#### 4.1a Year wise Production

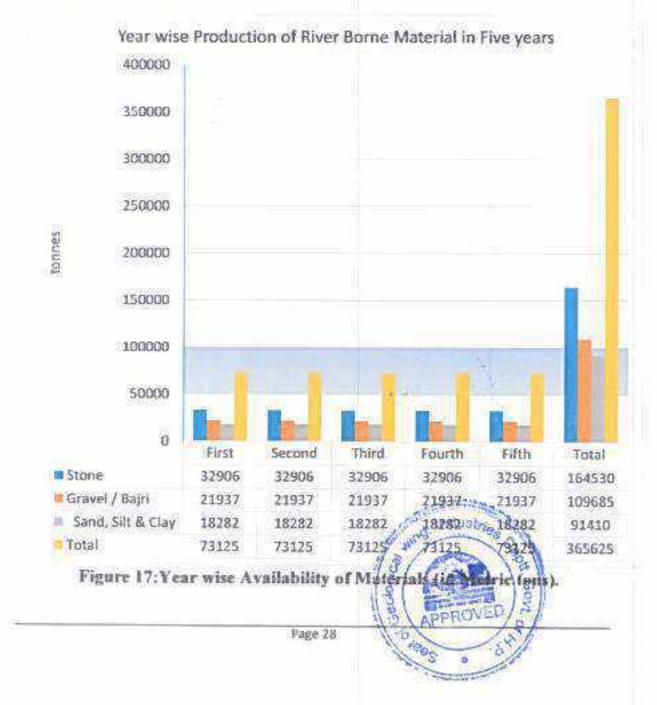


Table 3 Year wise production of materials.

ぼ.

2

D

D

D

13

3

9

B

1

D

D

-

0

3

D

0

0

0

0

0

8

0

0

0

B

8

0

0

0

0

0

Year	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
First	32906	21937	18282	73125
Second	32906	21937	18282	73125
Third	32906	21937	18282	73125
Fourth	32906	21937	18282	73125
Fifth	32906	21937	18282	73125
Total	164530	109685	91410	365625

The proposed production is sufficient to for sustaining a viable mining project. The year wise mine working planned for the Quarry is presented in the map 3. Year wise production of River Borne Material, sand, stone and bajri is given in figures 18, 19, 20, 21, & 22.



0

쇱

司

ਿ

0

0

0

e

6

0

6

0

63

0

8

0

63

0

8

0

63

0

۲

õ

69

6

囱

0

60

0

# 4.2.a Development and Production at end of first Year.

- Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - The entire lease area falls within the river corridor, therefore some retaining walls (C-1 in first year) would be erected outside the lease area near in situ rocks on left bank.

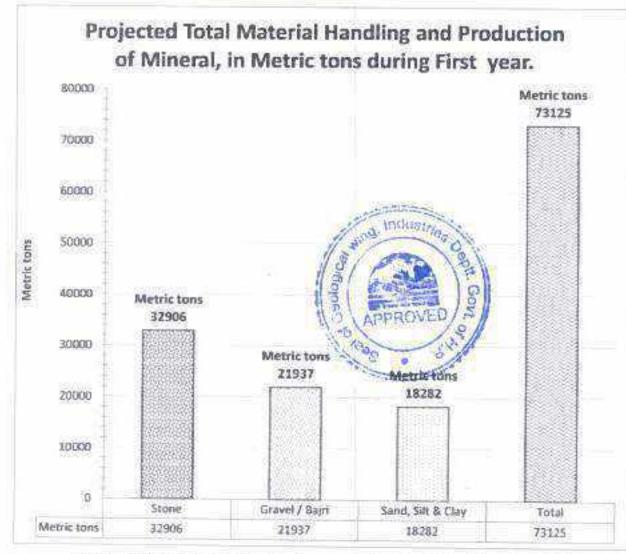
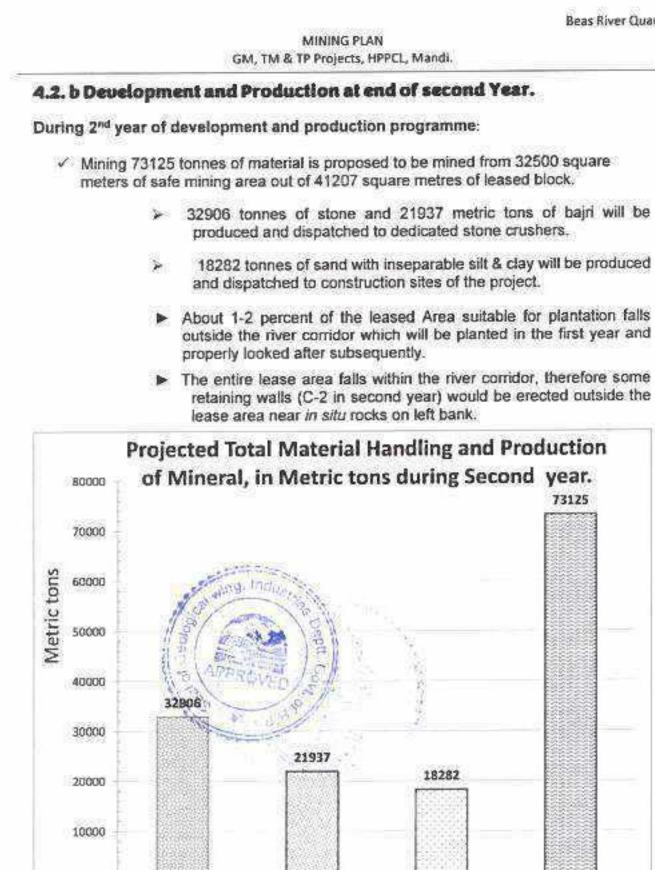


Figure 18- Proposed Production and Material Handling in the First Year of Mining.



D

Þ

21937 18282 32906 Metric tons Figure 19- Proposed Production and Material Handling in the second Year of Mining.

Gravel / Bajri

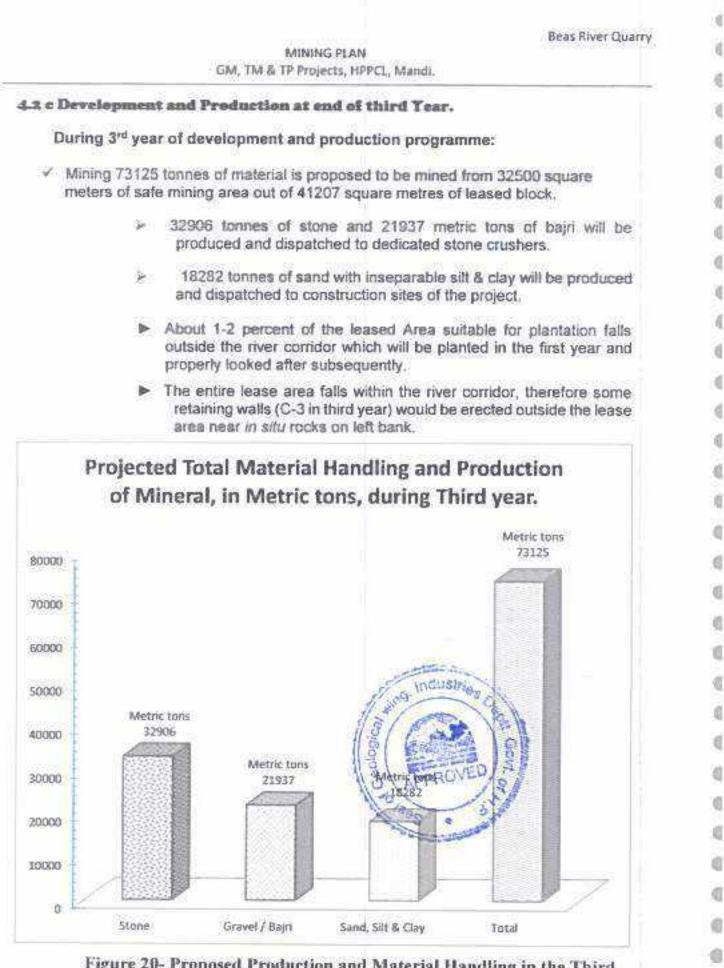
D.

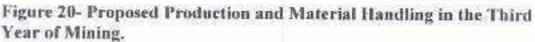
Stone

Sand, Silt & Clay

Total

73125







# 4.2 d Development and Production at end of fourth Year.

# During 4th year of development and production programme:

調

1

Ð

3

D

D

0

3

Ð

85

13

0

0

6

6

ß

尚

0

0

ê

0

0

0

0

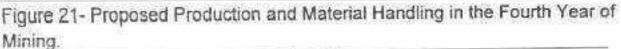
0

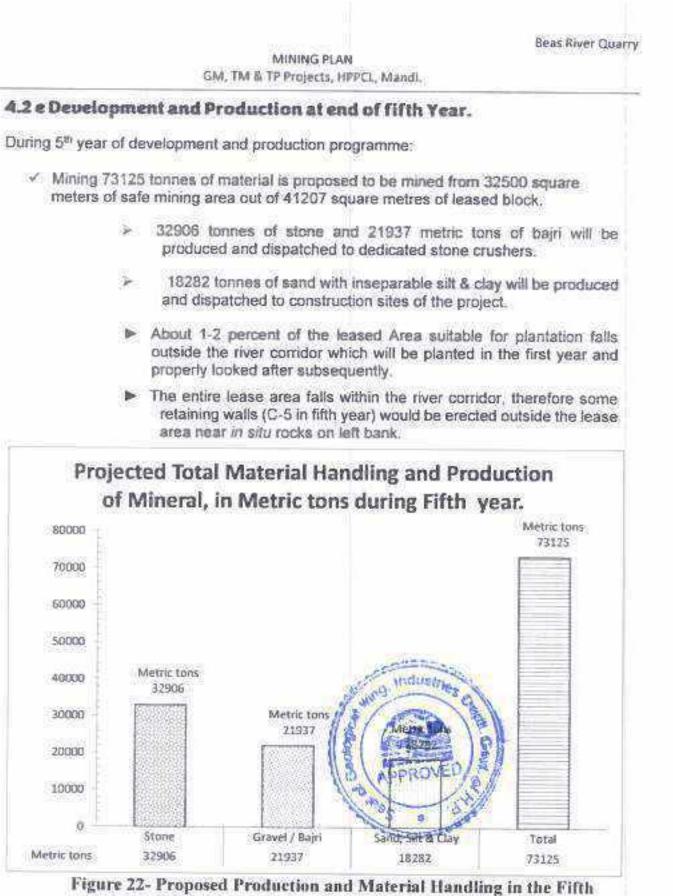
0

0

- Mining 73125 tonnes of material is proposed to be mined from 32500 square meters of safe mining area out of 41207 square metres of leased block.
  - 32906 tonnes of stone and 21937 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - > 18282 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - About 1-2 percent of the leased Area suitable for plantation falls outside the river corridor which will be planted in the first year and properly looked after subsequently.
  - The entire lease area falls within the river corridor, therefore some retaining walls (C-4 in fourth year) would be erected outside the lease area near in situ rocks on left bank.







ø

dð

Year of Mining.

# 4.3 End Use of Mineral

The extracted mineral stone, sand and Bajri for will consumed in the Project construction activities.

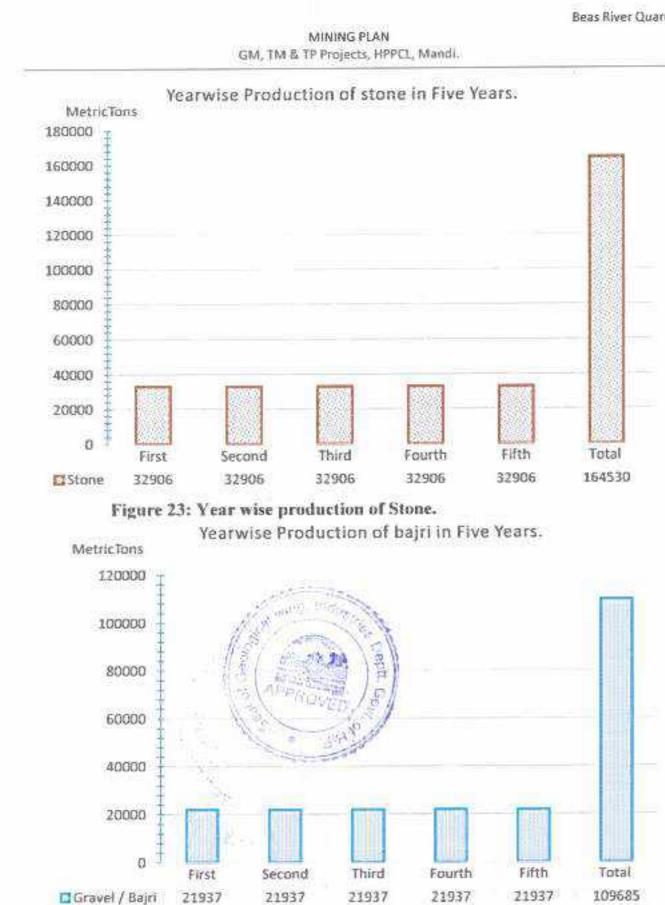


Figure 24: Annual Production of Bajri.

j. ъ

D

D

)

Þ

3

3

B

D

b

ß

В

9

D

D

D

3

В

в

Ð

D

B

B

B

D

D

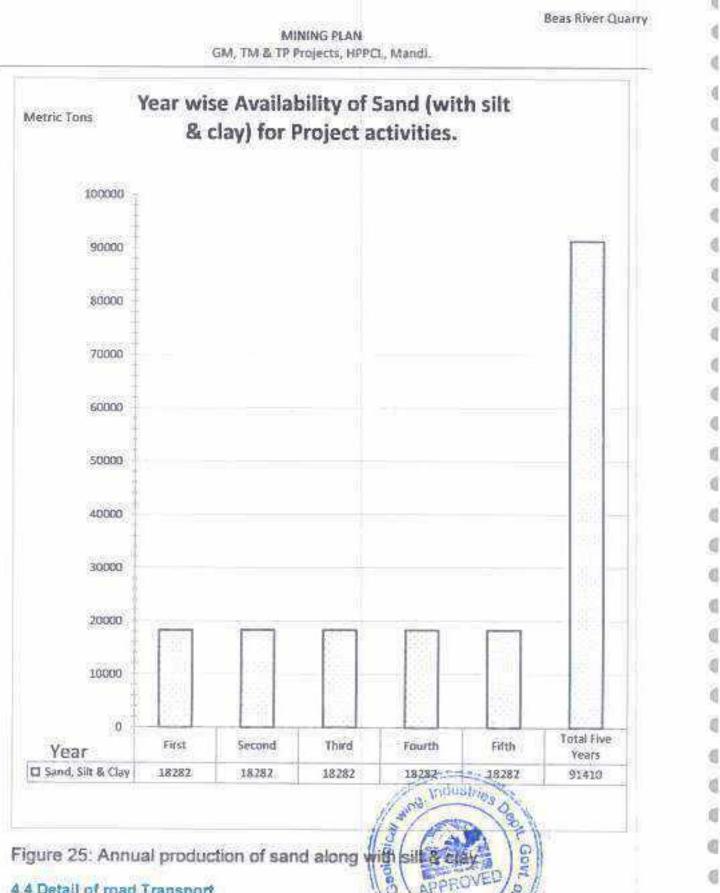
3

3

13

D

Þ



# 4.4 Detail of road Transport

The maximum total extraction of minerals stone, sand and ball for use in the Project would be 73125 tonnes or 271 metric tonnes per day, considering 279 working dry days. Thus, about 30 tipper truck trips would be required to move the material from quarry to crusher /

AP

10

0

đ

6

8

0

1

đ

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

ø

3

Ð

3

D

D

D

10

0

3

Ð

Ø

D

D

0

Ð

ø

D

0

0

0

0

0

D

0

0

B

D

0

6

0

•

0

0

0

.

1

construction sites. The track through River is about 100 metres from the leased area to roadside. The evacuation route is shown in figure 26.



Figure 26. Evacuation route Map



6

8

ŝ

6

6

8

ŝ

0

8

1

63

6

65

63

60

d)

G

# PART II

#### Environment Management Plan

#### 1.0 Base Line Data

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate Temperature
  - Rainfall
    - Wind Speed
- Air Quality
- Noise level
- Visual Impact
- Socio- economic Impact

Accumulation of Scree - Mine Waste.

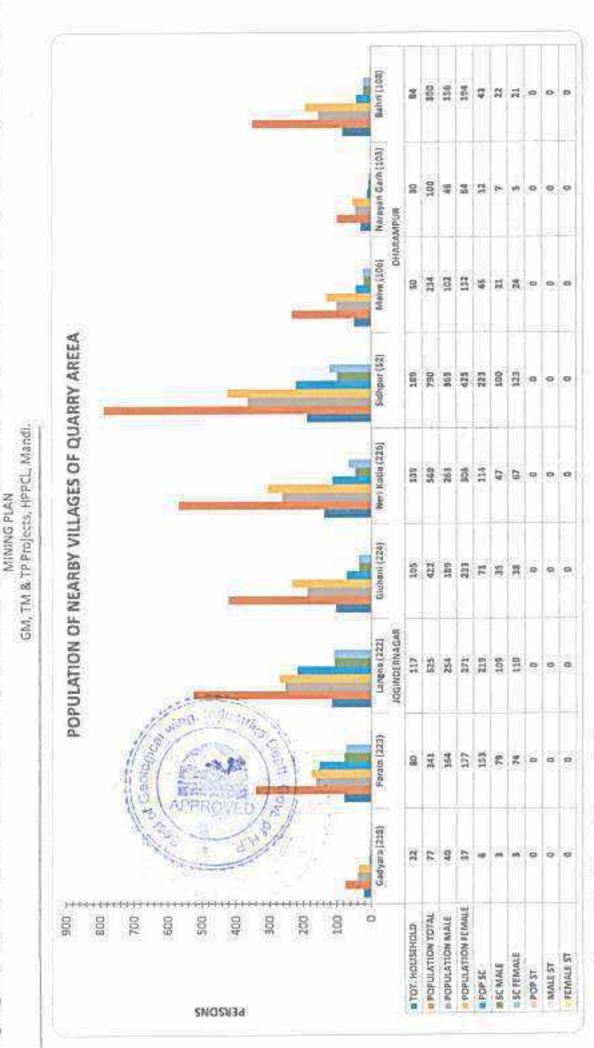
The base line information of the existing environment was collected from various sources such as

- ✓ Census Department, Government of India.
- Department of Economics and Statistics, Government of Himachal Pradesh.
- Directorate of Land Records, Government of Himachal Pradesh
- Directorate of Horticulture. Government of Himachal Pradesh
- Fishery Department, Government of Himachal Pradesh
- Forest Department Government of Himachal Pradesh
- Animal Husbandry Department, Government of Himachal Pradesh
- Survey of India, Government of India
- Metrological Department Government of India

to have in depth understanding of the existing environment and to assess the likely impact of mining activity in the Area

#### 1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Census is given below in the figure 27 Education wise and employment wise break of population in surrounding villages is given in figure 28. The population details of Mandi District and sub tensil Legindernager is given in figure 29.



9. 9

b

þ

2 1 2

9

9

þ

b

b

3

6

b

Mind real and

þ

D

D

3

Þ

3

p

D.

Ð

敳

19

D

10

Þ

1

Figure 27. Population of the villages of the zone of influence.

-

Beas River Quarry MINING PLAN GM, TM & TP Projects, HPPCL Mandi.

600	WOR	ING CATE	GORIZATIO	N OF POPUI	LATION OF S	URROUND	ING VILLAG	WORKING CATEGORIZATION OF POPULATION OF SURROUNDING VILLAGES OF LEASE AREA	E AREA
500 400									
300				1.2		_			
200	<u></u>			i.			1		
100								Ĵ	P
3	(St2) anopen.	Parain (223)	Langna (222).	(Sulhant (224)	Neti Kotta (225)	Stahpur (52)	Mariya (105)	Narayon Garh (103)	(101) Junes
Contraction of the second s	1	1.420	IDGINDERWARA®				DHAR.	DHARGHAPUR	
a PGP LITERATE	3	257	413	ECE	385	509	181	9	236
IN MALE LITERATE	ŝ	E¢I.	516	150	156	301	87	12	3
FEMALE 4/TERATE	53	214	195	153	123	181	15	-16	픾
D POP MUTERATE	a	3	110	511	180	202	13	31	114
m W_UL	ele.	10	똶	R	63	2	ž,	14	19
	THE	1	2	8	EUI	SEI	22	23	E.
I MAIWACRAGE	eclopita.	11	64	35	ą	139	66	17	T.
275	1	30	85	47	腐	101	2	15	51
6	A Lane	11 11	9	6	9	AT .	ŝ	4	19
~	子教	3 1.128	239	17	1928	685	101	15	226
-			10	13	132	131	96	14	25
MARDWARC	1	82.	158	158	102	257	85	37	151
NDWWDHER	1 4 1 1 1 1	Ge 1 172	222	302	182	262	74	31	101
OPT 61 Jay Management	Der El	A 184	411	-69	8	621	32	11	37
NON WICHKER FEMALE	TANGG TO	88	in	100	8	122	1000	100	

Figure 28: Break up of literacy and employment of Population in Surrounding Villages (Census 2011).

Page 40

0 ø 0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

107 5

D

ß

55

B

0

3

0

0

0

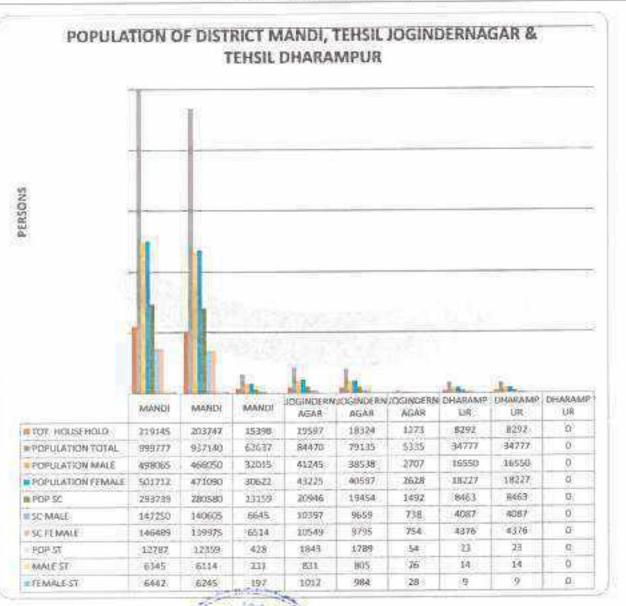


Figure 29: Population break up of District Mandi & Tehsils Jogindernager & Dharampur Ept.

G

1.2 Socio Economy of the Village/Population

00100

No adverse impact on the socio-economic condition of the area is envisaged.

The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 26 there is moderately high percentage of unemployed (35.71%) and underemployed is quite high (51.41%) people in the area despite moderately high level of literacy, (73.30% literates, figure 31) of literacy.

Beas River Quarry

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi. EMPLOYEMNET PERCENTAGE IN ADJOINING VILLAGES MAINWORKER, 439, 13% NONWORKER, 1217, 36% MARGWORKER, 1752, 51% Figure 30: Employment percentage in adjoining villages. LITERACY RATE IN VILLAGES AROUND MINING AREA 11 POP ILLITERATE, 910, 27% -utilopte. 1469 Figure 31: showing Percentage of literate and illuterate **POPULATION** in the Surrounding mine area Page 42

0

6

1

6

63

6

0

0

-3

8

0

0

0

0

1

8

8

0

0

0

ø

0

6

0

0

0

10

0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi,

#### 1.3. Land Use Pattern

107 3

13

10

3

5

3

3

0

8

0

6

0

**0**0

0

0

0

Primarily the land of the district can be classified in following 7 categories as shown in figure 32.

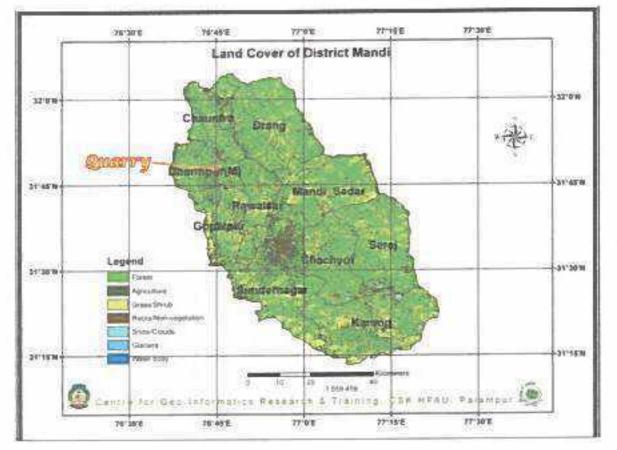


Figure 32: Showing General Land Use Pattern of the District Mandi.

The below figures show the land use pattern of nearby villages and tehsil Joginder Nager and Dharampur respectively.

The District Census 2011 classified the land available in surrounding villages into following nine categories? ept.

0

- 1. Land under Miscellaneous tree crops
- 2: Culturable waste land
- 3. Fallows Land other than Current Fallows OV
- 4. Current Fallows net area sown
- 5. Area under non-agricultural uses
- 6. Barren and Un-cultivable land
- 7. Barren & Un-cultivable Land.
- 8. Permanent Pastures and Other Grazing Land
- 9. Forest

-8

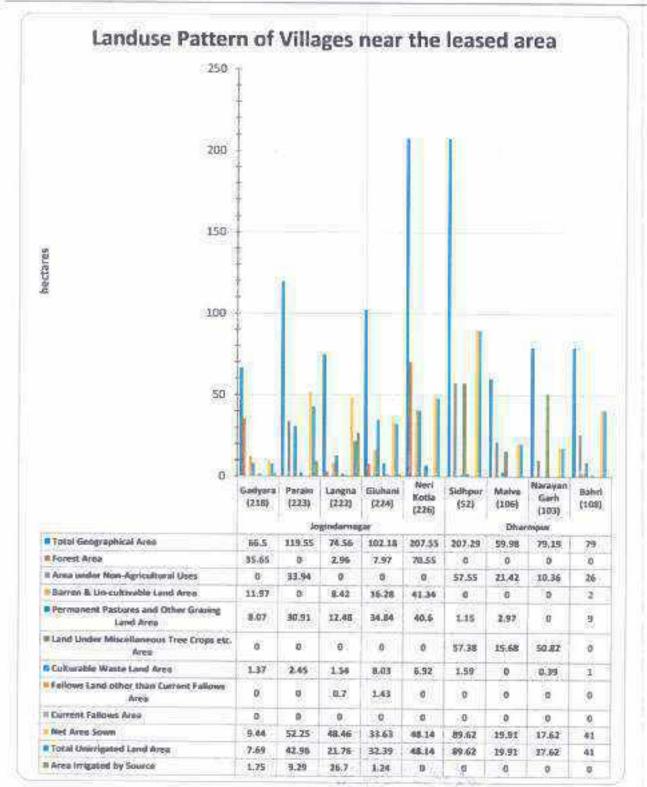
卤

C

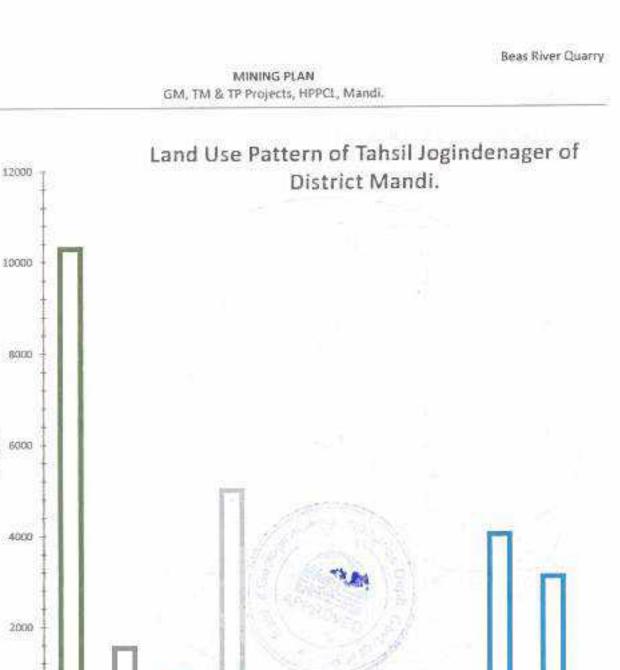
-

-0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



# Figure 33: Showing Land Use Pattern of villages around the mining lease area.



D

э

D

D

D

B

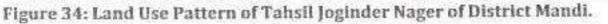
D

B

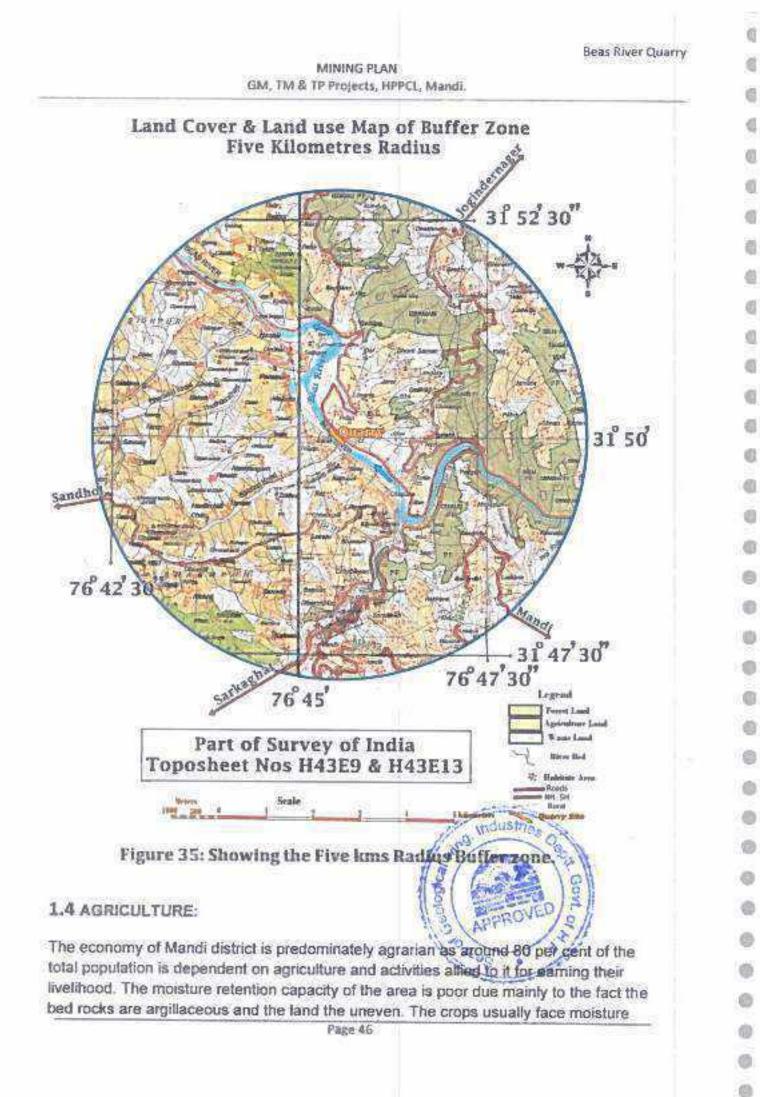
Ö

Hectares





iliga ...



	MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.
The irrigation	the remaining period of the year due to inadequate and irregular rainfall, facilities are provided by lifting water from steams, shallow dug wells and sep tube wells in the valley area.
The source o classes	f water and irrigation in district Mandi can be classified into following five
> Lift Ind	gation Scheme,
<ul> <li>Kuhls,</li> <li>Well u</li> </ul>	sed for domestic purposes,
≻ Well u	sed for irrigation,
> Tube	wells/ d crops are grouped into three categories:
0.0455380000000	
<ul> <li>Cerea</li> <li>Pulses</li> </ul>	
> Other	food crops like Chilies, ginger, sugarcane and turmeric.
<ul> <li>Non- f</li> <li>Oil sei</li> </ul>	ood crop area is of two kinds:
A 000 000	
> Other	non-food crops such as cotton, tobacco and fodder crop.
<ul> <li>Other</li> <li>The area und</li> </ul>	non-food crops such as cotton, tobacco and fodder crop. der each category of the crop is given below in figure: -36.
The area und	non-food crops such as cotton, tobacco and fodder crop.
The area und Figure: -37 s	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36.
The area und Figure: -37 s	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38.
The area und Figure: -37 s	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major
The area und Figure: -37 s vegetables a	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a	non-food crops such as cotton, tobacco and fodder crop. der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000 60000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000 60000	non-food crops such as cotton, tobacco and fodder crop. der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000 60000 60000 40000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000 60000 50000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figure: -37 s vegetables a 70000 60000 60000 40000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figura: -37 s vegetables a 70000 60000 60000 30000 30000 20000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.
The area und Figura: -37 s vegetables a 70000 60000 60000 80000 30000	non-food crops such as cotton, tobacco and fodder crop, der each category of the crop is given below in figure: -36. how production of agriculture produces in district Mandi. The area under nd their production is given in the figure: -38. Agriculture: Area (in Hectares) under Major Crops, District Mandi, 2019-20.

1

B.

3

D

D

B

3

D

B

Þ

3

D

3

Þ

þ

D

3

0

13

10

D

13

B

10

Ð

0

3

0

D

0

D

0

0

07

3

## Figure 36: : Showing area under different crops in Mandi District

Beas River Quarry

đ

ġ

đ

đ

ē

쉲

-

ð

ø

-

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

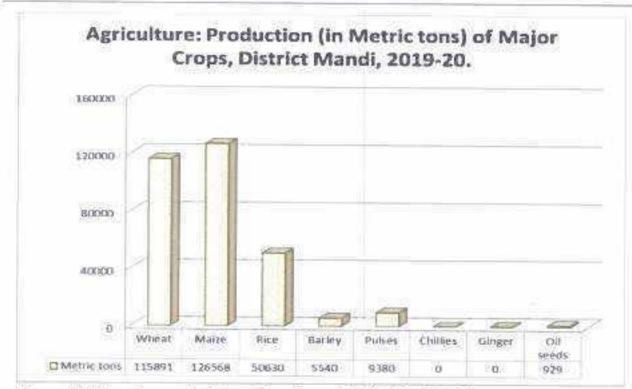
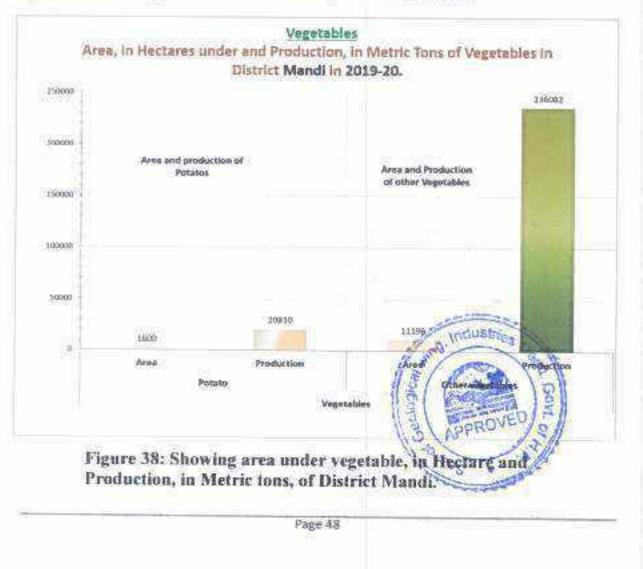


Figure 37 Showing production of each crop in District Mandi.



### 1.5 HORTICULTURE

医肠

0

D

3

B

3

1

D

D

3

Ð

10

D

10

0

ø

1

0

0

8

B

D

B

3

0

0

10

0

0

0

0

0

0

The topography and the agro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categories namely high hill areas located at a higher elevation, mid hill areas and low-lying valley areas. Fruits of various kinds depending upon the terrain, climatic condition and soil are grown in the district.

The main horticulture produce of the area can be classified into following five categories:

- 1, Apple
- 2. Other temperate fruits
- 3. Subtropical fruits
- 4. Nuts and dry fruits
- 5. Citrus fruits

The area under each fruit as well as the production of each fruit in district Mandi are shown in Table 6.

## Table 4; Area under each fruit and their production in District Mandi.

Status of Horticulture District Mandi.2019-20		
Fruit	Area (In Hectares)	Production (In Metric Tons)
Apple	3. Indusing 16748	57158
Plum Peach Apricet	2856	827
Peach (		443
Apricet 100 AP	PROVED 297	326
Pear 1	1772	1216
Cherry	24	8
Green Almonds	0	0
Peralmosos	252	68
Oilve	298	
Kiwi	29	22

Beas River Quarry

đ

¢

Ċ

đ

伯

Ū.

-0

-

ø

e

 $\odot$ 

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Strawberry	2	1
OTF	6313	2930
Almonds	1502	280
Walnut	1055	137
Piccanut	392	23
Nats & Dry Fruits	2949	441
Drange	730	255
Halta	196	
K. Lime	2999	245
Galgal	538	345
Others	3	C
Câtrens	4466	845
Hango	4964	2683
liteitei	590	701
Saawa	693	317
Рарауа	24	32
Loquat	.4	0
lonala	154	70
Grapes	2	industries 0 7
grnate	473	84 202
ackfruit	2 473 215 8 7127	
Ithers	8 8	APPROVED 9 15
DSTF	7127	Pes • 4059

Page 50

### 1.6 ANIMAL HUSBANDRY

e B

D

13

9

B

6

3

3

B

D

3

0

3

10

6

0

B

0

0

3

D

1

0

6

0

0

0

0

03

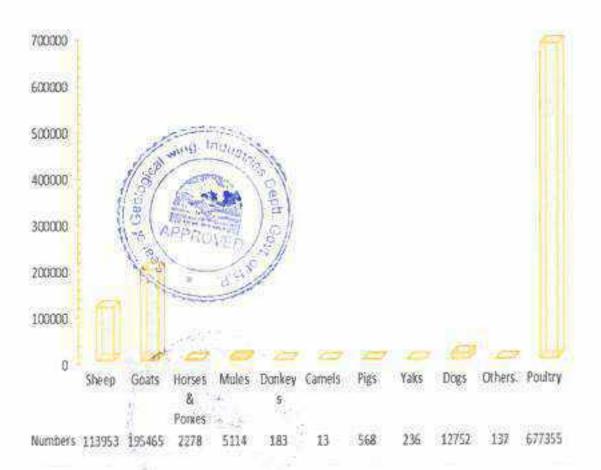
6

0

0

Economy of the district is predominantly agrarian, but role of Animal Husbandry is equally important as the farmers must keep the cattle for the purpose of ploughing the land and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family. The total population of the livestock in District Mandi is given in the figure: -39. The population of the Buffaloes and Cattle in District Mandi is given in the figure: -40.

## Animal Husbandary: Population of Livestock, District Mandi, 2019-20.



## Figure 39: Livestock population of District Mandi.

Beas River Quarry

应

6

đ

0

đ

卤

0

ð

6

8

8

0

6

õ

8

63

0

8

8

6

6

0

0

60

63

尚

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

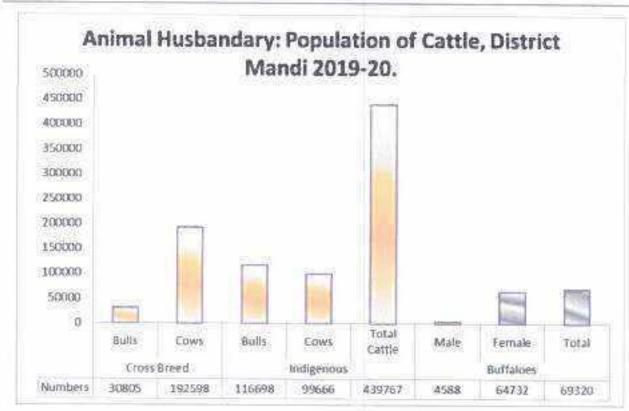


Figure 40: Showing Population of Cattle Buffaloes in District Mandi.

## **1.7 FISHERIES**

There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi district:

Trout

Mahasir

Gid Seviyon

Dise Gugli and

Mirror Carps

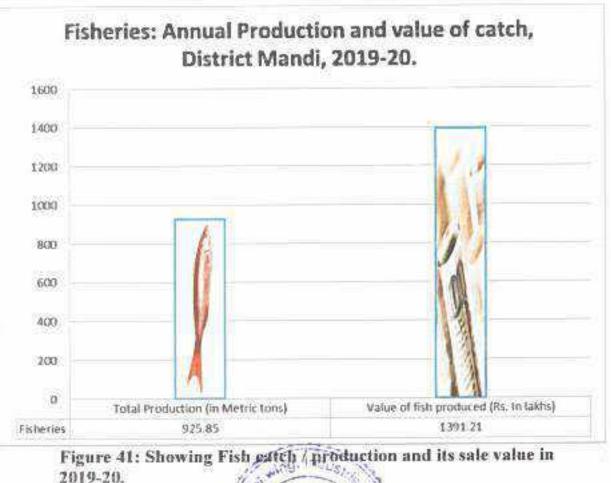


The exotic trought fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himalayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trought fishing.

No perennial stream passes through the area under consideration.

Page 52

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.





## 1.8 FLORA AND FAUNA

#### 1.8.1 Flora

阿爾

D

B

0

£

100

The Chil is considered the prevailing conifer up to about 1950 meter when it gives place to the Deodar and the blue pines. In Mandi district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is 427 meter above sea level and highest range of is at an elevation of 2658 meters in the north. The forests grown between these two extremes vary as the elevation itself.

.

The most prominent varieties of trees found in the district are

Simbal (Bombex malabaricum), Mango (Magniferaindica) Tun (Cedrela toana) Several species of acacia and albizia

⑮

6

0

0

1

6

6

-

0

61

61

6

6

0

0

6

6

8

63

0

0

63

0

63

0

0

0

0

63

6

65

0

60

63

6

Salambra (Odina wodier) Termnalia Jamun ( Engenia jambolana Larger tour Bamboo

The common fruit trees are banana, apple, ber, jamun, mango, mulberry, almond, peach etc

#### Shrubs

The most common shrub at the higher elevation is Barberis, indigopera and Desmodium and following other shrubs are also found

- 1. Vitex
- 2. Munj
- 3 Ber
- 4. Ipomea
- 5. Dodonea &
- 6. Bamboo.

The common fruit trees are banana, apple, ber, jamun, mango, pear, mulberry, apple, almond, cherry, peach etc

#### 1.8.2 Fauna

#### Animals

Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in the district. Common Mammals & Birds in the Mandi District is given in the Table :-7

Industria

Table 7: Common mammals and birds in the Mandi District

Table 5		13 00 32
Birds		S APPROVED
Zoological Name	English Name	Common Name
Milvus migrants	Vulture	Cheel, Gitth, Eell
Eudynamys scolopacca	Koel	Koel
Columbia Ilvia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

Page 54

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Colums livia	Hawk	Baj
Francolius francolinus	Black partridge	Kala Tittar
Francolius pondicerians	Grey partridge	Safed Tittar
Paya crisslatus	Peacock	Mor
Coturnix colurnix	Common quail	Bater
Alectoris graeca	Chakor	Chakor
Crovus splendens	Crow	Kanwa
Prottocula Karneri	Parrot	Totta
Tragopan melanacephalus	Western horned Tragopan	Phulgar/Jujurana
Picoides macel	Fulvourbreasted Pled Woodpecker	Kathfowra
Streptopelia decaacta	Ring dove	Gughi
Streptopelia chinesis	Spotted dove	Gughi
Accipiter badius	Shikra	
Aquila rapax vindhian	Tawny eagle	
Ducula bicolor	Green Pigeon	
Parus rufonuchalis	Tits Black napped Weodpecker	
Picus canus	1/ Qt / 20 \ O \	Woodpecker
Drycocopus jovensis	Woodpecker and B	
Muscicapa subrubra	Himalayan Fly Catcher ROVED	ł
Acidotheres tristis	Common Myna 2	Ghatari
Terpsiphone paradisi	Paradise flycatcher	Choti- Pinja
Passer domesticus	House sparrow	
Carduelis spinoides	Himalayan Green Finch	Chiria

Table 6

и Ю

9

D

D

0

0

1

茴

0

D

Ð

0

D

D

0

0

0

0

0

0

0

0

0

13

Ð

D

0

0

0

8

۵

0 0 0

0

0

## Mammals in Mandi

Zoological Name	English Name	Common Name
Felis bengalensis	Leapard Cat	Mirag, Bagh
Felis Chane	Jungle Cat	Jangli Billi

Beas River Quarry

륑

đ

đ

ü

.0

artridge (Safed Titar)

ONED

Grey

Veadoecke

Muntucus muntisk	Barking Dear	Kakkar
Vaulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sus sacrafa	Boar	Suar
Hystrix indica	Porcupine	Sehal
Lepus nigricoilis	Hare	Khargosh, Sherru, farru
Maschus maschifarus	Musk deer	Kastura
Capra lbex lbex	ibex	
Hemitragus jemlahicus	Himalayan Thar	Than
Selenarctas thebatanus	Black Bear	
Ursus arctos	Brown Bear	
Panthera unica	Snow leopard	
Sus scrofa	Wild Boar	
Axis axis	Spotted deer	Chital
Cervus unicolor	Samber	
Hylopetes fimbriatus	Flying squirrel	
Panthera pardus	Leopard	Cheetah
Felis chaus	Jungle cat	
Paradoxurus hermaphroditus	Indian Civet	Sakralu
Hipposideros ormiger	The great Himalayan leafnosed Bat	Sakralu MUNSINDS Chamgad tr

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

In the area surrounding the mining lease following are the common birds: -

- Chakor
- · Crow
- Red Jungle Fowl (Jangli Murga)

Black Partridge (Kala Titar)

Page 56

#### In the leased-out area and surrounding hills following are the common animals: -

- Leopard (Bagher)
- Hare
- Wild Bore (Jangli Soor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- · Pig.

## 1.9 CLIMATE

IF.

13

3

D

3

1

3

83

5

13

The climate of district is hot in summer as it is situated in valley at lower attitude while surrounding mountains top experience pleasant weather and cold in winters. <u>Monsoon</u> brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 6.

The area enjoys monsoon rainfall from third week of June to mid-September.

50

Pickani,

5

The rainfall records available with the District Collectors office from 2004 to 2014 are depicted in the figure 7.

The climatic information given is based on the data obtained from Revenue Department of Himachal Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D.C office Mandi, and at Sundernager. All information available indicates following seasons in the district

Winter

Summer/Pre-monsoon

Monsoon

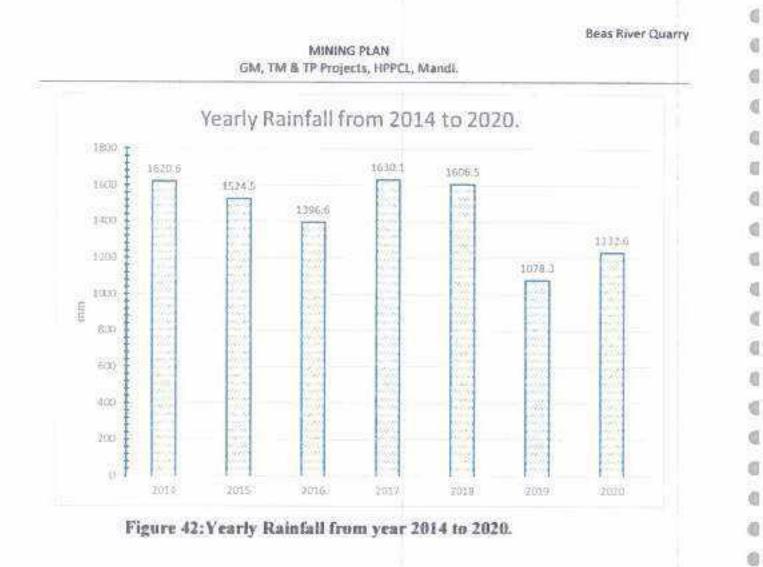
Post Monsoon/ Autumn

Dec. - March

April- May

June-September

October-November





Ċ

Ċ.

Page 58

#### 2.0 ENVIRONMENT MANAGEMENT PLAN

100

53

3

10

3

0

0

Ö)

0

#### The impact on environment due to mining operation is generally: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate
- Air Pollution
- Noise Pollution
- Visual Impact
- Socio- economic Impact
- Accumulation of Scree,

#### 2.1 CHANGE IN TOPOGRAPHY.

#### No affect.

- The area is riverbed and mined out pit will be filled during rainy season hence there would be no change. It is part of a Riverbed.
- The highest point of the Lease area is at 609 metre above mean sea level.
- The lowest point is at 605 m above MSL.
- Mine Area is proposed in the entire safe area.
- The block would be completely replenished during monsoons floods.
- The mining shall be confined to well within the riverbed corridor.
- Mining shall be undertaken to a depth of one metre or water level whichever is less.
- · The Lease area is and shall remain riverbed.
- . Thus, the topography or landform of the Riverbed per se will not be changed.
- The land use of the mining Lease area is defined in the Revenue record as 'Gair Mumkin Darya's and logo to the logo to th
- Mumkin Darya
   The land under active mining would always remain riverbed, during as well as post mining

#### 2.2 Effect on Climate

- The mining Lease area is small.
- Mining will be confined to 32500 square metres safe area.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed.
- The mining will be confined from within the riverbanks.
- Some micro level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed
  - The impact will need no mitigating measures.

#### 2.3 Impact on Air

No blasting material is to be used.

胞

遺

6

Ø.

1

0

6

0

6

0

8

8

0

.0

100

0

10

63

10

0

- 60

10

6

8

0

۲

0

00

63

6

- The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).
- The mining activity will be limited to excavation of about 180 metric tons of stone, Bajri and sand with silt-clay per day.
- 30 tipper truck trips will be able to move the required material from mine to crusher / Project sites.
- · This activity would generate very limited disturbance to air quality.

### 2.4 Impact on Noise Level and Mitigation Measures

- The mining area represents calm surroundings.
- The mining shall be manual causing hardly any noise:
- The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.
- About 30 trucks trips would be required for transporting mined material per working day from mining area to destination.
- The dedicated tipper truck would be property and regularly undergoing maintenance to create minimum noise.
- · Care would be taken to properly maintain the silencers of the vehicles.
- No use of horn shall be allowed in or near the mining area.
- A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of River to screen the noise, if permitted by the private land holders.

#### 2.5 Effect on Flora & Fauna

- The mining Lease area is riverbed.
- There is hardly any flora or fauna on the riverbed to attract any protective or mitigating measures

#### 2.6 Soil Cover

- The mining will be confine to Riverbed.
- · It has no soil cover as the area gets frequently flooded during monsoons
- Thus, there shall be no impact on any natural soil cover

#### 2.7 Impact on Hydrology

- · The mining area is part of riverbed.
- The mining depth will be up to one metre or up to water tevel which even is less, thus water regime will not be disturbed
- The mining will be confine to central part of riverbed, away from banks.
- Thus, mining would be dredging the riverbed and reducing the silt burden downstream.



 The ground water (undercurrent of the river) will not be disturbed as mining will be undertaken above Water table.

#### 2.8 Waste disposal Management

H. D

D

63

0

1

3

0

3

B

3

B

0

3

0

6

08

0

63

13

Eb

13

0

0

63

0

۲

õ

The area is in a regular course of the river and silt clay is the only waste likely to be produced. The waste generated if any will be used as backfill where separable.

#### 2.9 Socio- Economic Impact

- No adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 30 persons directly and indirectly, in mining, transportation, and crushing unit.

## 2.10 Transport of Mineral

From Quarry to Road heads towards Rural Road is about 100m through the river track. The mined material is transported through tracks made in the river. About 270 metric tonnes of material shall be transported per day with an average of 30 tipper truck trips. The movement of 30 tipper truck tips would have hardly any impact on traffic on Rural Road leading to SH 19 and would cause negligible environmental impact

0

8

0

0

61

0

đ

6

6

0

e

8

0

0

0

0

18

0

0

0

0

100

8

0

0

0

0

0

0

8

6

0

0

100

6

## PART III

## 1.Progressive Mine Closure Plan/Reclamation Plan

#### 1.1 Reclamation

- · The mined area being part of the river course cannot be reclaimed for any other purpose.
- The land under active mining would always remain riverbed, during as well as post. mining.
- The highest point of the Lease area is at 609 metre above mean sea level.
- The lowest point is at 605 m above MSL.
- . The mining shall be confined to well within the riverbed corridor.
- No mining near the banks up to 1/10" of its width is to be undertaken as per guidelines. i.e., 20 to 23 metres, from banks.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed.
- The entire guarried area will be replenished and reclaimed by the river during monsoon floods.
- The Lease area is and shall remain riverbed.
- Thus, the topography or land use of the Riverbed per se will not be changed.
- As such no reclamation work of mined area is required to be undertaken.

#### 1.2 Mine Waste Disposal:

a) Year wise generation of mine waste and soll cover.

As explained earlier the following category of the waste is generated during riverbed mining.

Silt/ Clay Mixture

The silt and clay are generally being inseparable from sand and extracted along with it. As such no waste will be generated during the mining of stone, sand and

#### bairi.

1.3 The arrangements made for topsoil utilization, if any topsoil cover As the mining area is part of mended, having so tapsoil cover therefore, no topsoil is required to be removed, or disposed of.

#### 1.4. Preventive Check dams

Considering the rocky condition of riverbanks, na Effect walls are required to be constructed.

#### 1.5 Plantation work

As far as the order of Apex court in writ petition(s)No(s) 114/2014 titled as Common Cause Vs Union of India & others is concerned, the riverbed which suffer frequent foods during monsoon period and where no grass growth is possible, as such mining area cannot be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance
First	100	15	5000
Second	0	0	2000
Third	0	Ō	2000
Fourth	0	0	2000
Fifth	0	0	2000
Total	100	15	13000

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

#### Year wise survival rate.

19 10

5

0

۵

e

100

Ð

Ð

3

6

8

© ..

000

0

The survival rate is about 30 percent in the area because of the sandy nature of the site. However, after yearly review it will be ensuring that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured to be at least 100 percent.

## 2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is no point of utility within radius of 100 metres of the mining lease periphery, which thay need any wild of protection.

#### 3 MANPOWER DEVELORMENT PROVE

The mining activity will be mainly manual. Worker are mainly required in riverbed mining for extraction and loading of riverbed material into tipper truck and tractor trolleys. Drivers for tippers and tractors will be another category of workers. Thus, employment potential is as given below:

1 3

17

Munshi

Drivers

Unskilled workers

Thus, total generation of Employment will be to a tune of 21 both skilled and unskilled workers.

#### 4 USES OF MINERAL

The stone, sand and Bajri will be consumed in the dedicated crushing unit of the Project and product grit and sand will be used in construction activities of the project.

5

创

6

61

61

0

6

61

63

6

8

0

۲

63

8

8

0

0

0

10

6

8

8

۲

-

0

8

6

6

6

d)

00

63

#### 5 DISASTER MANAGEMENT & RISK ASSESSMENT:

The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:

- Inundation / Flooding
- Drowning
- Accident during mineral loading, transporting, and dumping
- Accident due to vehicular movement
- Earthquakes

#### Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

#### Accident during mineral loading, transporting and dumping

The consequences of this scenario are minor which may be taken care with first aid care.

#### Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

#### Earthquakes

The area falls in seismic zone IV. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.

### 6. RECOMMENDATION FOR RISK REDUCTION

## Measures to prevent inundation/Blooding/drownings

- Being on riverbed there should not be any mining operation during monsoon or rainy day.
- Formation of deep pits should not be allowed.
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

#### Measures to Prevent Accidents during Loading

Dane	Divisi	Quarry
D-6.92	UNAGE.	croanty

MINING PLAN		
GM, TM & TP Proj	ects, HPPCL, Mandi.	

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders.
- · Operations during daylight only.

(F) (新)

3

D

3

0

3

0

0

0

0

8

0

•

Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted.
- To avoid danger of accident roads and ramp near embankment should be properly maintained.
- The truck would be covered and maintained to prevent any spillage.
- The maximum permissible speed limit should be ensured.
- The truck drivers with proper driving license would only be employed.

#### Measures to Prevent Accidents during Earthquakes

 Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes etc will be undertaken in consultation with experts.



×.

1.5

## Declaration

e

3

Ð

1

B

Ð

8

5

0

D

0

0

This is to declare that the Mining Plan of Minor Mineral lease of part of Son Khad, for Stone, bajri and sand situated in Khasra No. 2721/1, measuring 4.1207 Hectares, Mauza/Mohal Prain Tehsil Jogindernager & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs...... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

Date Place KOTLL



The General Manager

Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.



## Certificate

8

106

6

1

3

B

0

0

1

B

6

13

6

000

0

**Eb** 

(D)

10

0

1

(B)

0

10

éh.

6

0

0

6

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra No. 2721/1, measuring 4.1207 Hectares, Mauza - Prain, Tehsil Jogindernager & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

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

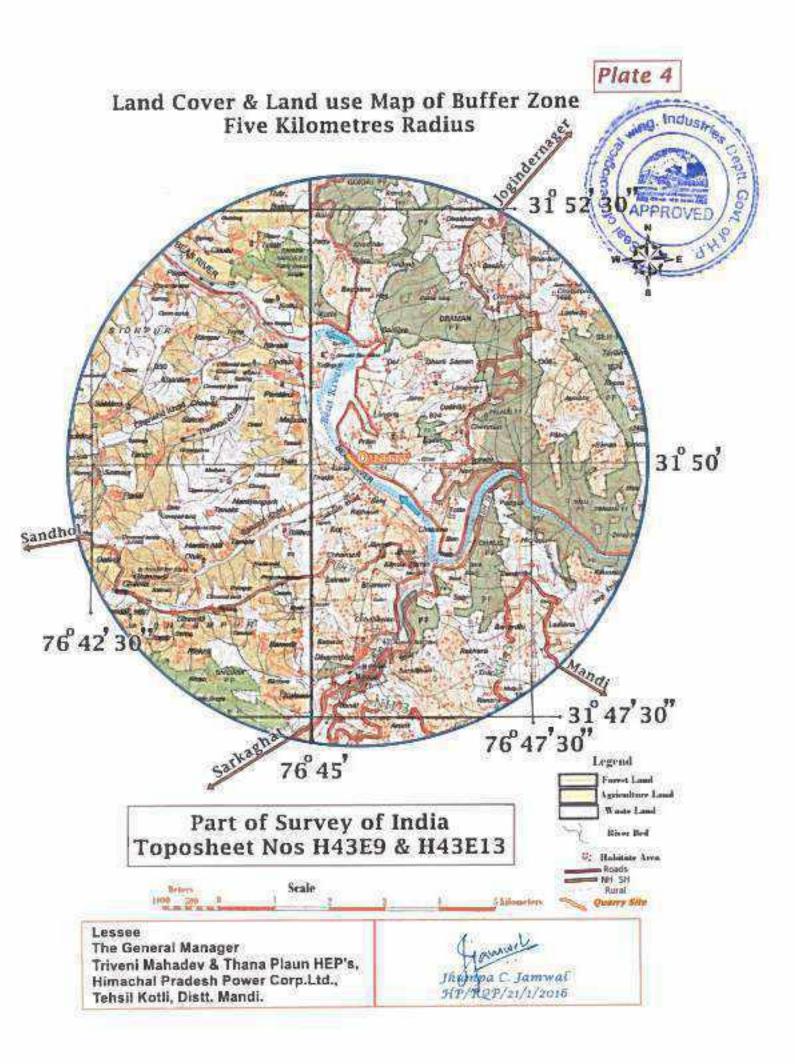
Date Place: Shimla

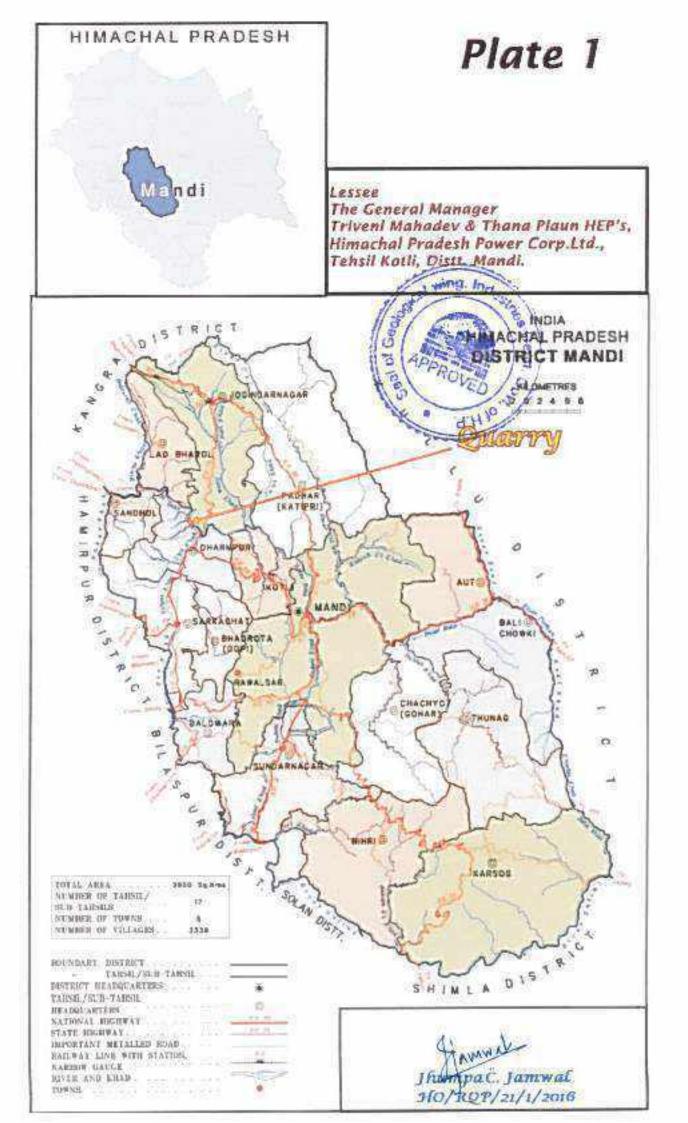


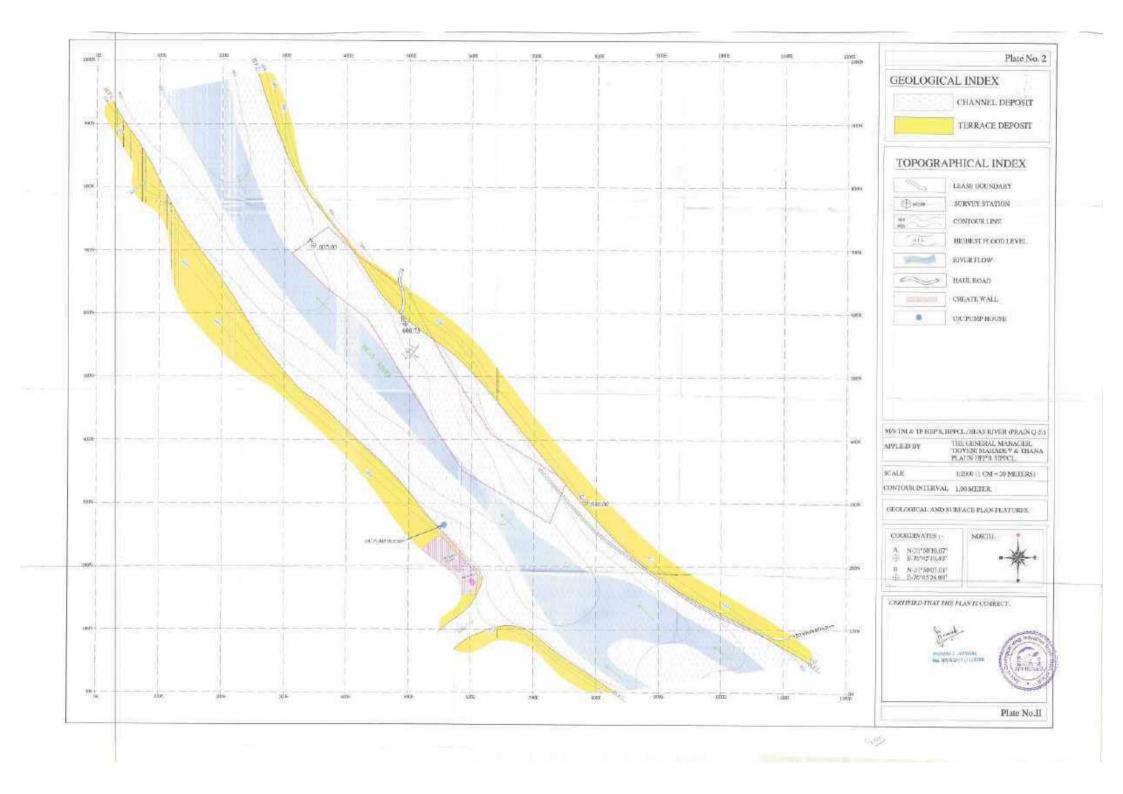
HAWWeb

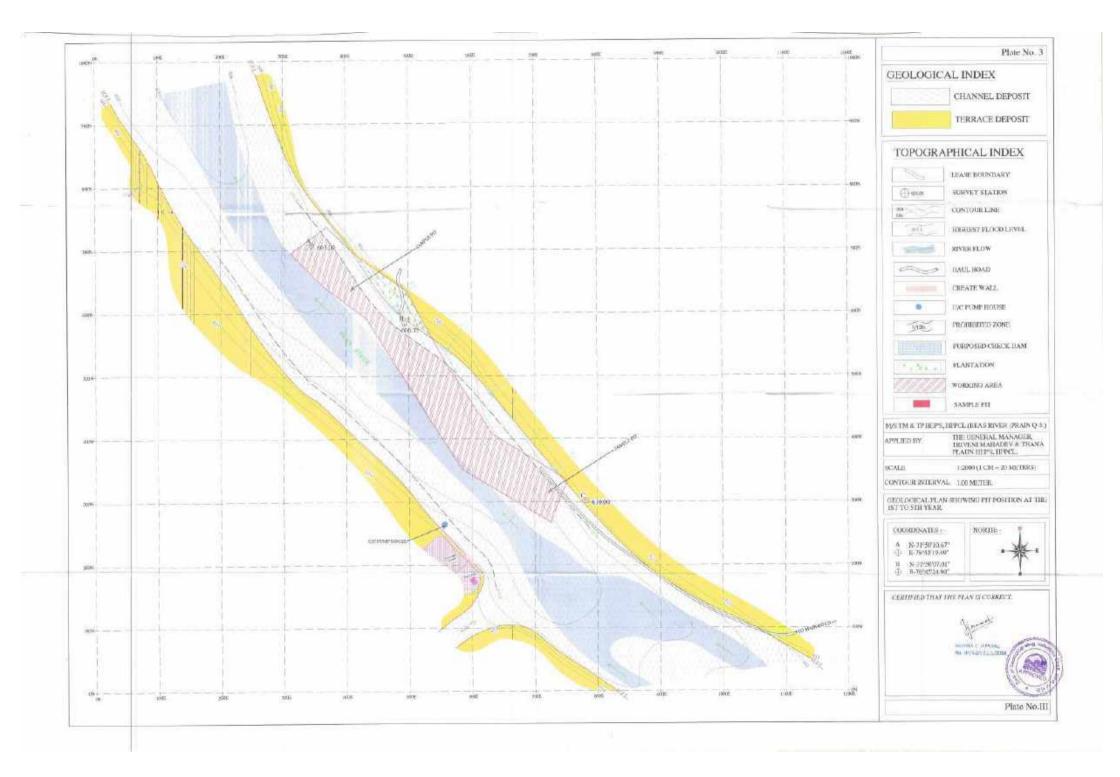
Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016











# MINING PLAN

0

8

8

0

0

C)

0

0

0

0

.

0

0

0

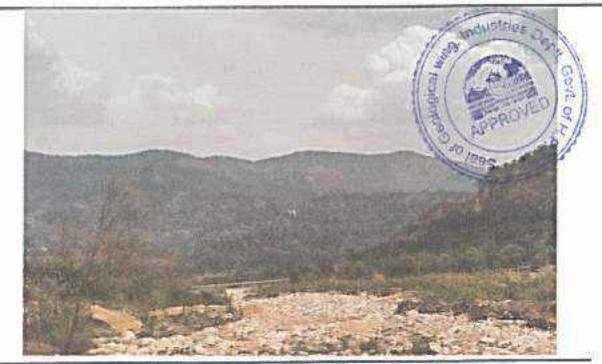
0

Ø

8

2023

OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI KHASRA NO.1401, 1402, 1798, 974, 1409/222 & 681, MEASURING 20.4956 HECTARE MAUZA BALDA, THATHI, TANEHAD & KOT, TEHSIL –DHARAMPUR, DISTT – MANDI (H.P.)



## LETTER OF INTENT ISSUED IN FAVOUR of THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPs, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

Jhumpa C. Jamwal J(P/ROT/21/1/2016.

ş

## INDEX

.

.

.

.

.

.

.

.

.

S.NO	INTRODUCTION	PAGE NO
	PARTI	
	INTRODUCTION	1
1	GENERAL.	2
1.1	Name & Address of the applicant	2
1,2	Status of the Applicant	2
1.3	Mineral which the Applicant intends to Mine	2
1.4	Period for which the mining lease is granted	2
1.5	Name & Address of H.P.R.Q.P preparing the Mining Plan	2
1.6	Name of the Prospecting Agency	2
2	Location and Approach of the Area (Location Map)	3
2.1	Topo-sheet no.	3
2.2	Location of the Area	5
2,3	Address details	5
Z.4	Distances from Important places in Kilometers	5
2.5	Approach of the Area	6
3	Physiographical Aspect of the Area	
3.1	General	6
3.2	Altitude of the Area	7
3.3	Climate of the Area	8
3.4	Rainfall	9
3.5	Any other important Physical Feature	9
	PART -I Industries	10
1	Description of the area in which mine is situated	°e. \10
1.1	General	1540
1.2	Name of River/ Stream and its gradients which the	
1.3	Icase is situated 8 Drainage System	1912
1.4	Type of Drainage Origin of river	8 /12
1.5	Origin of river	12
1.6	Altitude of Origin	12
1.7	Geometry of the Catchment of the river impacting the replenishment of deposit	12
1.8	Annual Deposition of the Place of Mining	12
1.9	The Competency of the river/stream at the mining site	12
.10a	The level of HFL	13

1.10b	The thread of deepest water in meandering.	13		
1.11	Altitude of the Area	13		
1.12	Description of groundwater table	13		
2	Geology	14_		
2.1	The Regional Geology of the Area	14		
2.2	Local Geology of the area	14		
2.3	Geology of the lease area	18		
2.4	The nature of boulders, cobbles, sand etc	19		
2.5	Nature of rock and their Altitude	20		
2.6	Description of Annual Deposition w.r.t the Geology of catchment area and other factors	20		
3	Reserves	21		
3.1	General	21		
3.2	Percentage wise distribution of Mineral	21		
3.3	Estimate of Geological Reserve	21		
3.4	Estimate of Mineable Reserves of each Mineral	22		
3.5	Estimate Annual Deposition of Mineral	24		
4	Mine development and plan of Progressive Mining, Method of Mining			
4.1	Bevelopment and Production Programme for 5 years	26		
4.2 a	Development and Production at the end of 1# year	28		
4.2 b	Development and Production at the end of 2nd year	29		
4.2 c	Development and Production at the end of 3 <sup>rd</sup> year	30		
4.2 d	Development and Production at the end of 4th year	31		
4.2 e	Development and Production at the end of 5th year	31		
4.3	End use of Mineral	32		
4.4	Detail of Road Transport	34		
- AFF-	PARTI			
1	Base Line Data (Detail of the Land use and Social aspect of area)	36		
1.1	Detail of Pepulation Distribution	16		
1.2	Socio-Economic of the Village	39		
1.3	Land use within 5km radius	31		
1.4	Socio-Economic of the Village Land use within 5km radius Agriculture Norticulture Animal Husbandry Fisheries	43		
1.5	Horticulture 1/2 APPR	EV/		
1.6	Animal Husbandry	48		
1.7	Fisheries	49		
1.8	Flora & Fauna	50		
1.9	Climate of the Area	54		
Z	Environment Management Plan	56		
2.1	Impact on Land Use Pattern and Topography	56		

÷1

D

.

Ð

ß

.

.



2.2	Impact on Climate	56
2.3	Impact on air	56
2.4	Impact on Noise Level	57
2,5	Impact on Flora & Fauna	57
2.6	Impact on soil cover	57
2.7	Impact on Hydrology	57
2.8	Waste Disposal Management, if any	58
2.9	Socio-economic Benefits	58
2.10	Transportation of Mined Mineral	58
PAR	IT HI PROGRESSIVE MINE CLOSURE PLAN/RECLAMA	TION PLAN
1.1	Reclamation	59
1.2	Mine waste Disposal	59
1.3	Top Soil utilization	59
1.4	Preventive Check Dams	59
1.5	Plantation Work	59
2	Strategy for Protection Of Point Of Public Utility Etc.	60
3	Manpower Development	60
4	Use of Mineral	60
5	Disaster Management & Risk Assessment	63
6	Recommendation for Risk Reduction	61

# MAP INDEX

S. No.	Title	Plate No.
1.	Locational Plan	1
2.	Geological Plan	2
3.	Plan Showing working pit Position at the End of 1 <sup>st</sup> to 5 <sup>th</sup> year.	3
4.	Buffer Zone 5 Kilometer radius Map.	.4

Declaration Certificate of RQP



Ð

D

G

Ó.

291 5-23 गामकाच शाख, रद्यांग विभाग हिल्लाए kervingted wing Yopti, of Industria himle. PPROVER With Constitute Bhu (chan-4) lagher- 540/17-1647 नायों से सामग्र आपक Us Ade Latter He .beied. 22/5/23 Cim/Asin/DMrsw) 29/05/23 Geologia Zant nyi Geater 1 - 10 Dept. or he allies Shimle-1

0

0

0

.

0

0

0

0

0

0

0

0

0

0

۲

0

0

0

0

0

0

8

0

0

0

۲

0

0

0

0

0

6

0

0

-00

# MINING PLAN OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA NO. 1401, 1402, 1798, 974, 1409/222 & 681, MEASURING 20.4956 HECTARE MAUZA THATHI, BALDA, TANEHAD & KOT, TEHSIL –DHARAMPUR, DISTT – MANDI (H.P.)

# LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPs, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

# **INTRODUCTION:**

(**196**)

0

0

6

0

0

0

6

6

6

0

Ø.

(C)

0

8

0

0

0

0

0

0

0

0

0

0

0

0 0

0

0

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' valid for one year for grant of mining lease for mining sand, stone and bajri vide letter No. Udyog-Bhu(Khani-4) Laghu-540/2017-6599 dated 10/11/2021.

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely. Pabber Valley Power Corporation (PVPC) and Kinner Kailash Power Corporation (KKPC), corporated by HPSEB, have been merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31.07.2007.

Thana plaun Hydro Electric Project is located between latitude 70° 15/E to 7° 45 E and longitude 31° 30'N to 32° 30'N in district Mandi. The project has been planned as a random percumstorage scheme on the right bank of river Beas with its Dam across the river Beas and underground Powerhouse located on right bank of the river near village Thana. The Stone, Bairi and Stand Quartied from lease area will be used in the construction of the Project and its infrastructure.

In accordance with Rule 35 of the 'Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015' the lessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the said Rules

6

8

8

6

10

6

8

6

0

0

8

0

10

60

0

8

6

0

6

8

6

63

60

0

63

Saklain khad lease area is situated in Dharmpur Tahsil of Mandi District, Himachal Pradesh. The climate of the area is tropical with well-marked statutes, winter, and tainy search. The material available in the lease area shall be mined (raised) by opencast method of mining. The output lease area is located at about 5.4 Km from Discourses on Discourse Search.

The quarry lease area is located at about 5.4 Km. from Dhrampur on Dharmpur Seog Road,

# General:

- 1.1 Name and address of the applicant
  - 1.1. A. Name of the applicant --
  - The General Manager
  - B. Address of the applicant The General Manager Triveni Mahadev & Thana Plaun HEP's: Himachal Pradesh Power Corp Ltd., Tehsil Kotil, Distt. Mandi.

#### 1.2 Status of the applicant

Government undertaking.

- 1.3 Minerals which the Applicant intends to mine. The applicants intend to mine stone, Sand and Bajri. The stones, sand and bajri will be used in construction activities of the Projects.
- 1.4 Period for which the mining lease is granted. Five years effective from the date of execution of lease deed agreement.
- 1.5 Name and address of the RQP preparing the Mining Plan: Jhumpa C. Jamwal Cuttage No. 21, Type IV, HP Government Officers Residence CEVVD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016 Mobile No. 9418909890.

### 1.6. Name and address of the prospecting agency.

The base contour map of the leased area was prepared by Shrt C.P.Negh Retired Senior Surveyor, Geological Wing, Department of Industries, resident of Negi Lodge (West), Indernager, Dalli Shimia, for the RQP.

The detailed prospecting of the area was carried out by the R Q P for preparation of this report. The Secondary data is collected from various Geological reports of the Geological Survey of India, Satluj Jal Vidyut Nigam Ltd., Indian Metrological Department, Department of Economic and Statistics, Himachal Pradesh, and various publications of Government of Himachal Pradesh. The detailed prospecting of the area was carried out by the R Q P for preparation of this report.

#### 2. Location and Approach of the area 2.1 Topo-sheet Details.

Surveyed by	Survey of India
 Surveyed in	1989-90, upgraded 2005.
	the second se



CHIER

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

G

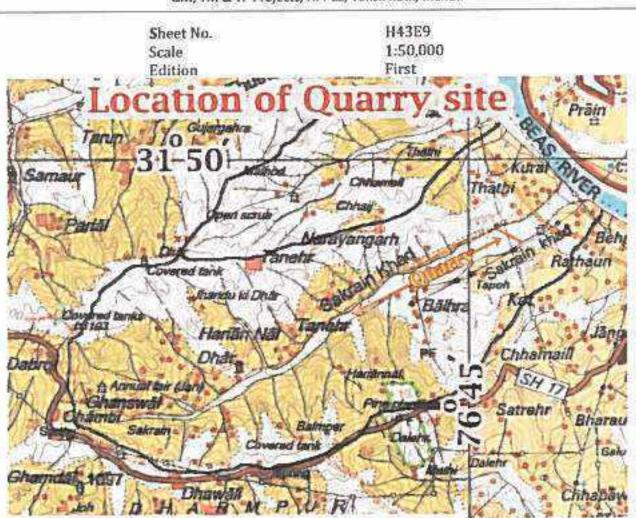


Figure 1:Location of the Mining Lease area. The area lies between the latitude and longitude given below in table 1 and shown in the Figure 2.

Table 1Showing latitude and longitude of the boundary pillars (calculated).

 Antitathe North	and a second second bill the second
 31° 49' 15.84"	dustries 076° 44' 13.43"
31° 49' 24.33"	76" 44' 28.27"
31° 49' 25.89"	PROVED 76" 44' 34.83"
31* 49' 28.09"	76 44 36.71"
 31° 49' 30.04"	76° 44' 40.98"
 31° 49' 31.80"	76° 44' 56.48"
31" 49' 42.38"	76° 45' 12.07"
31° 49' 41.12"	76° 45' 17.33"

Seklain Khad Quarry

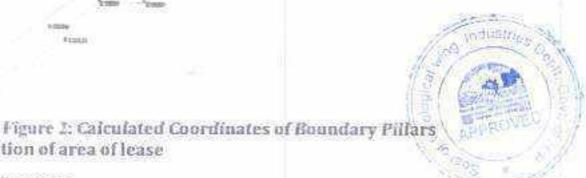
ø

1	31° 49' 34.08"	76* 45' 12.39"
ř.	31º 49' 32.62"	76* 45' 09.94*
R	31*49'27.41*	76°44′56.83*
10	31° 49' 26.22*	76° 44' 42,45*
M	31° 49' 24.61"	76" 44' 37.47"
N	31° 49' 22.29*	76° 44' 33.71"
0	31° 49' 22,58"	76° 44' 28.62"
8	31° 49° 20.12*	76° 44' 24.98"
9	31° 49' 18.77"	76° 44' 24.85"
R	31° 49' 14.12"	76° 44' 14.65"

MINING PLAN GAR, THA & TP Projects, HPPCL, Tehsil Kotli, Mandi.







Same G

### 2.2a Details of area

A

miline)

The Revenue details of the area are given below in table 2. Table 2 The detail of the lease area

# Execution

2.2 Location of area of lease

-			10000-12			
2.3 5. No	Address & Khasra Numbe	ban abarabara		Owner of Land	Kism	Mauza/moh:
1	1401	1.68	313	Government	Gair	Thathi
2	1402	5.48	888		mumki	
3	1409/ 2	22 3.01	81		n khad	Balda
1	681	1.68	313			
5	1798	3.13	372			Tanehad
6	974	5.48	89			Kot
	TOT	CAL		20.495	56 HECT	ARES
Adı	ministrativ	e Office	Pos Tah Dis Sut	war circle: st Office: - trict: - s-Divisional Office ( isional Office (Fore	Civil): -	Bahri Thathi Dharampur Mandi Dharmpur Jooindernager
		rom Importa	Pos Taf Dis Sut Div Rar Ass Sta Sta ant Pla	st Office: - Isil: - Divisional Office ( Isional Office (Fore Inge Office (Forest): Istant Engineer (IP Istant Engineer (P) Istant Engineer (P) Istant Engineer (P)	Civil): - st): - H): - ND): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Pradas
	Distance fi	rom Importa	Pos Taf Dis Sut Div Rar Ass Sta Sta ant Pla	st Office: - Isil: - Divisional Office ( Isional Office (Fore Inge Office (Forest): Istant Engineer (IP Istant Engineer (P) Istant Engineer (P) Istant Engineer (P)	Civil): - st): - H): - ND): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Pradas
		rom Importa	Pos Taf Dis Sut Div Rar Ass Sta Sta ant Pla	st Office: - Isil: - Divisional Office ( Isional Office (Fore Inge Office (Forest): Istant Engineer (IP Istant Engineer (P) Istant Engineer (P) Istant Engineer (P)	Civil): - st): - H): - ND): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur
	Distance fi	rom Importa	Pos Taf Dis Sut Div Rar Ass Sta Sta ant Pla	st Office: - Isil: - Divisional Office ( Isional Office (Fore Inge Office (Forest): Istant Engineer (IP Istant Engineer (P) Istant Engineer (P) Istant Engineer (P)	Civil): - st): - H): - ND): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades
	Distance fi 8. No.	rom Importa	Pos Taf Dis Sut Div Ran Ass Sta ant Pla ces f	st Office: - Isil: - Irict: - Isional Office (Fore Inge Office (Forest): Istant Engineer (IP Istant Engineer (P)	Civil): - st): - H): - MD): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades
	Distance fi 8. No.	rom Importa	Pos Taf Dis Sut Div Ran Ass Sta ant Pla ces f	st Office: - isil: - trict: - b-Divisional Office ( isional Office (Fore inge Office (Forest): istant Engineer (IP) istant Engineer (P) te ces to Quarry site. From the Qua badside NH 3	Civil): - st): - H): - ND): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades
	Distance fi 8. No. 1 2	rom Importa	Pos Taf Dis Sut Div Ran Ass Sta ant Pla ces f	st Office: - isil: - trict: - b-Divisional Office ( isional Office (Fore inge Office (Forest): istant Engineer (IP) istant Engineer (P) te ces to Quarry site. From the Qua baadside NH 3 Dharampur	Civil): - st): - H): - MD): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades
	Distance fi 8. No. 1 2 3	rom Importa Distan From Quarry	Pos Taf Dis Sut Div Ran Ass Sta ant Pla ces f	at Office: - trict: - b-Divisional Office ( isional Office (Fore trige Office (Forest): istant Engineer (IP) istant Engineer (P) te ces to Quarry site. From the Qua badside NH 3 harampur totli fandi (District Office himla (State capital)	Civil): - st): - H): - MD): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades
	Distance fi 8. No. 1 2 3 4	rom Importa Distan From Quarry	Pos Taf Dis Sut Div Ran Ass Sta ant Pla ces f	at Office: - trict: - b-Divisional Office ( isional Office (Fore inge Office (Forest): istant Engineer (IP) istant Engineer (P) te ces to Quarry site. From the Qua badside NH 3 harampur Cotli fandi (District Office	Civil): - st): - H): - MD): -	Thathi Dharampur Mandi Dharmpur Jogindernager Sarkaghat Dharampur Dharampur Himachal Prades

D

.

•

Saklain Khad Quarry

¢3

ē

8	Sarhaghat	26
0	Dharamsala	94
2 10	Gaggal Airport	100

#### MINING PLAN GAR, TRI & TP Projects, HPPCL, Tehsil Koth, Mandi,

#### 2.5 Approach to the Area.

The leased site is part of Riverbed and is at 5.5 km from Dharampur via Dharampur-Seog-Ruad, which is approx. 100 in from the quarry site by a fiaher - Saklain-Sandhol link road. Figure below shows the approach map of the area.

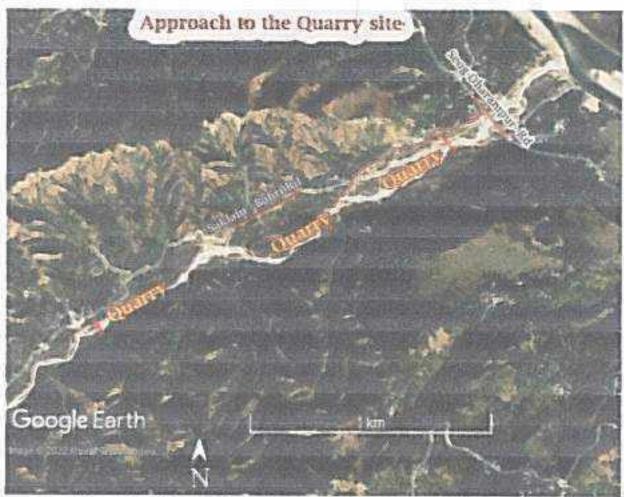


Figure 3: Approach to the Centre of Quarry site Contraction of the second

- 3. Physiographical Aspect of the Area
- 3.1 General

The area in general is a part of the Lesser Himales. malayas. located in north-western India in the states of Himachan Fredesh and Up (Pradesh) 19es

Industries

Ŋ

.

.

.

in north-central India in the state of Sikkim, and in north-eastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height.

The general relief of the Saklain Khad region is as given below in the figure: -4: -

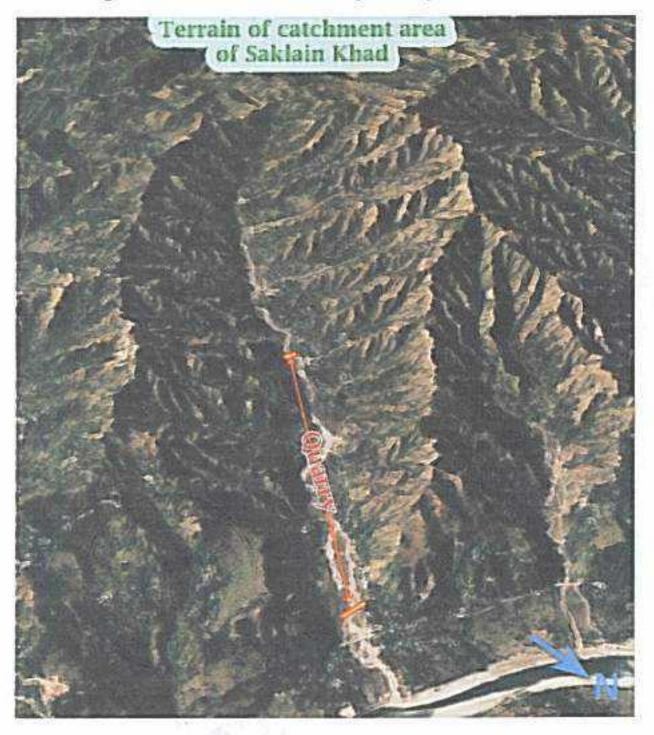


Figure 4: The terrain map of the Saklain Khad region.

The Satellite photograph was taken from the Google is given Figure : -4 to depict the general physiography of the area showing that the major ridges, water divides are generally running N-S and all spurs are running parallel to the NE-SW line.

#### 3.2 Altitude of the area

- The highest contour of leased out area in Saklain Khad is 695 Meters above MSL,
- The lowest-contour of the leased-out area in Saklain Khad is 647 Meters above MSL.

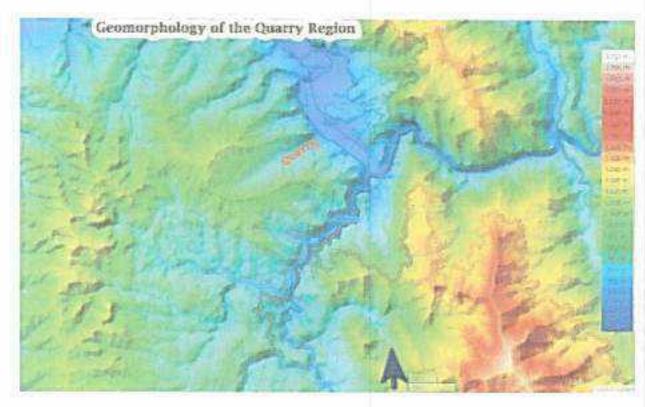
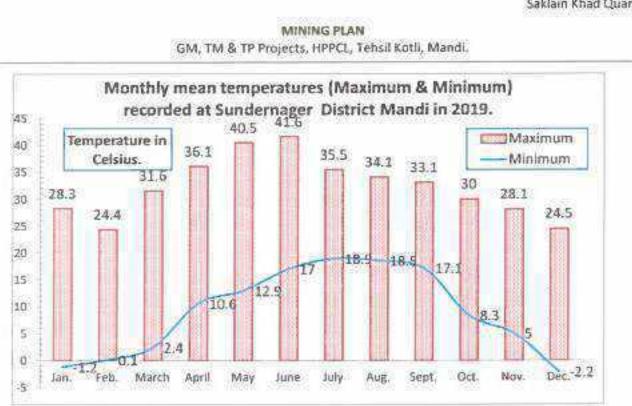


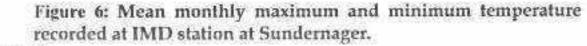
Figure 5: Terrain Map of the Area.

#### 3.3 Climate of Area

The climate of district is hot in summer as it is situated in valley at lower attitude while surrounding mountains top experience pleasant weather and cold in writters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Cetsius and sometimes for few days jumping to above 40 degrees Cetsius, the nights are comparatively cooler, and month wise temperature is given in figure 7.









(D)

D

(i)

劭

Ø

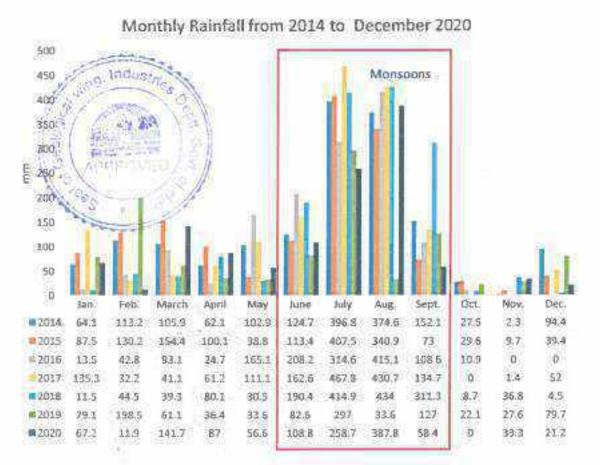


Figure 7: Rainfall of the District.

ø

.

ē

# 3.5 Any other important feature

The mining leased area falls in bed of Saklain Khad tributary of Beas River and accessibility to the quarry site is through a kutcha road from Dharmpur-Seog Roral Road.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

## PARTI

10

6

10

0

6

ø

B

3

æ

0

٥Ŀ

6

ß

0

62

6

0

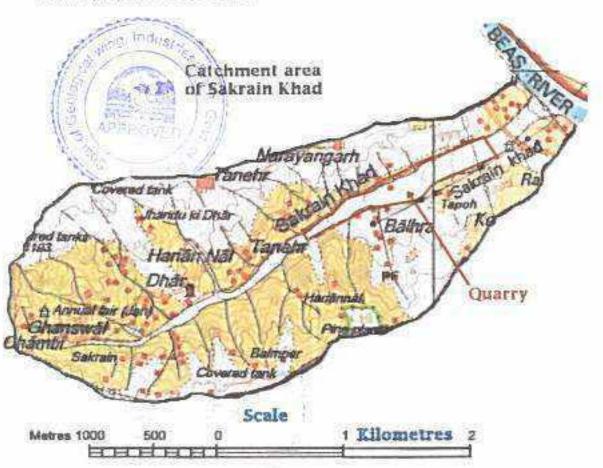
# 1. DESCRIPTION OF RIVER/STREAM BED IN WHICH THE LEASED IS SITUATED

## 4.1 General

The leased area is situated in the Saklain Khad, a primary tributary of Beas River. Saklain Khad originates at a height of 1175 meter above mean sea level, from a peak west of Chambi village (origin lies in the Survey of India, topo-sheet NoH43E9). The general flow is SW to NE.

The attitude at confluence with Beas River is 609 Metres above MSL (lies in the Survey of India, toposheet No H43E13). The total length is about 5.32 Km. (The catchment of the Saklain Khad lies on survey of India Topo-sheet Nos H43E9 & H43E13.

The general analysis of the drainage system of Saklain Khad is given below in table 5 (as per 1: 50000 scale)



### Figure 8: Catchment of Saklain Khad.

There is no uniformity/ equational order of average length in each order suggesting that river has not attained proper age and valley is in process of expansion i.e erosion

0

-0

6

6

鹵

0

8

1

0

6

6

0

8

0

80

6

6

63

酿

60

倣

MINING PLAN GM, TM & TP Projects, HPPCL, Tohoil Koth, Manda

In upper reach will be unavoidable. Bifurcation ratio also suggest that it has not attained maturity particularly 1<sup>st</sup> and 2<sup>nd</sup> order hence regular erosion in the upper reaches. The low bifurcation ratio of the 3<sup>rd</sup> order stream is indicative that the valley is in the stage of further expansion. The average length of 2<sup>nd</sup> order is less than 1<sup>st</sup> order is indicative of structural control of the valley.

## Basic Geometry of the catchment is as: -

Area of the Catchment = 6.4 Sq. Km Perimeter of the Catchment = 23.4 Km Length of the over 5.32 Km Average width of valley 1.35 Km V4dth of the catchment et maximum 1.85 km From various analysis of the drainage the Saklain Khad can be divided into two parts

- From origin to the 800 meter above mean sea level The zone of active erosion—Young stage
- From 800-meter contour to confluence with Beas River The zone of erosion during very high flood otherwise deposition – Maturity stage.

## The leased area is situated in the zone of Maturity.

1.2 Name of River/ Stream in which the leased is situated

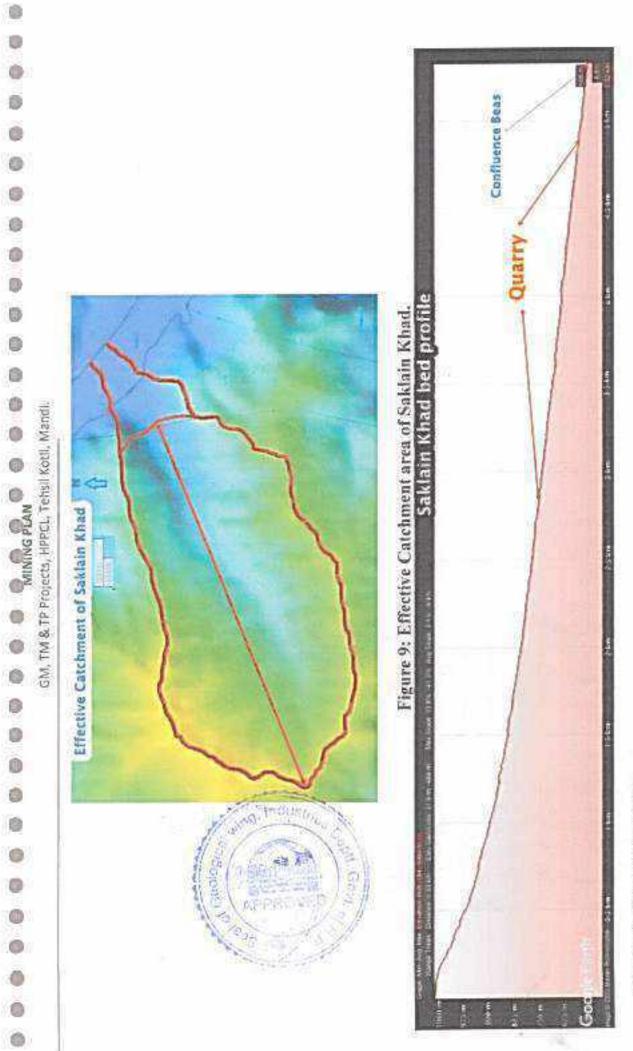
Saktain Khad - Primary tributary of Beas River

## 1.3 Drainage System

Beas River

The effective catchment of the Saklain Khad is given below in the figure 8.





- Rife

0

Figure 10 Khad bed profile.

# 1.4 Type of Drainage

Decidritic (Figure 8)

## 1.5 Origin of River/Stream

Saklain Khad originates at a height of 1175 meter above mean sea level, near Chambi village (origin lies in the Survey of India, toposheet No H43E9). The general flow is SW to NE

The attitude at confluence with Beas River is 609 Metres above MSL (lies in the Survey of India, toposheet No H43E13.

## 1.6 Attitude at Origin

1175 metres above MSL.

# 1.7 Width of River at the place of Mining

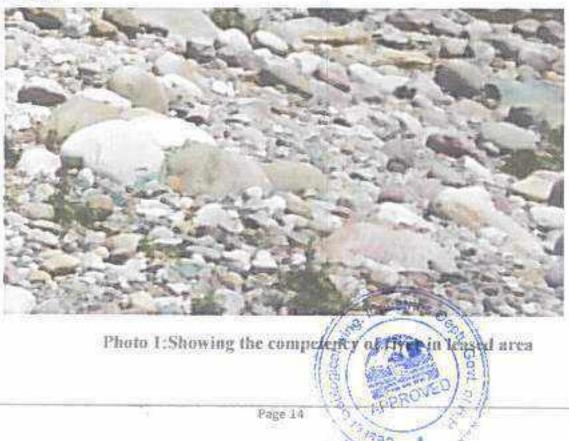
85 to 177 Metres

# 1.8 The annual deposition at the place of mining

6 to 8 Cm. et different location, in the Saklain Khad.

### 1.9 The Competency of the River/ Stream at the mining site

The general competency at the mining area is 6 to 10 Kg approx. The largest boulder varies 20 to 34 cm X 16 to 34 cm X 16 to 30 cm (length X breath X height) (Photo1)



MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

### 1.10 The level of HFL

ø

B

During monsoon floods the water level rises by about one metre, at times for short spells:

### 1.11 The level of LFL

Khad is seasonal.

### 1.12 The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

### 1.13 Groundwater table.

The depth of groundwater level varies in the area according to season and distance from water current. It lowest in the pre-monsoon period and highest in the post monsoon period. Thus, depth of groundwater table may vary from few centimetres in post monsoon period and more than a metre in the pre-monsoon period depending upon distance from flow.



0

0

0

0

6

8

8

0

01

0

8

8

0

1

1

0

0

0

6

6

6

3

2

6

0

0

6

60

60

0

6

6

# 2. Geology

## 2.1 Regional Geology

GEOLOG/CALLY Himachal Pradesh can be broadly divided into two major geo-tectonic zones viz. the Lesser Himalayan tectogen in the south and the Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectoric break collectively designated as Main Central Thrust in the sense defined by Srikantia (1988) Mandi District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterdzoic to Quaternary. The oldest rocks are of undifferentiated Proterozoic age, comprising carrbonaceous phyllite, schist, gneiss, quartzite and marble. The Ghophar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Meso- Proterozoic age is represented by quartzite with basic flows. The Shall Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at places stromatolytic) state, & quartzite. The Subathu consists mainly, of clive-green shales and grey shales. At the top, a band of white quartzite is exposed, this band of white quartzite has been taken as the marker, defining the top of the Subathu sequence. The thick sequence of brackish and treshwater sediments immediately succeeding the fossiliferous manne Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon... these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Miccene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Oldar Alluvium and Newer Alluvium) along prominent channels consisting of sand, sill, clay, pebbles and cobbles occurring along present channels of Middle to Late Pleistocene and Holocene and Volustries

## 5.2 Local Geology

The local geological sequence in the area is given in the stratigraphy of the area is given in the table WP-5

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

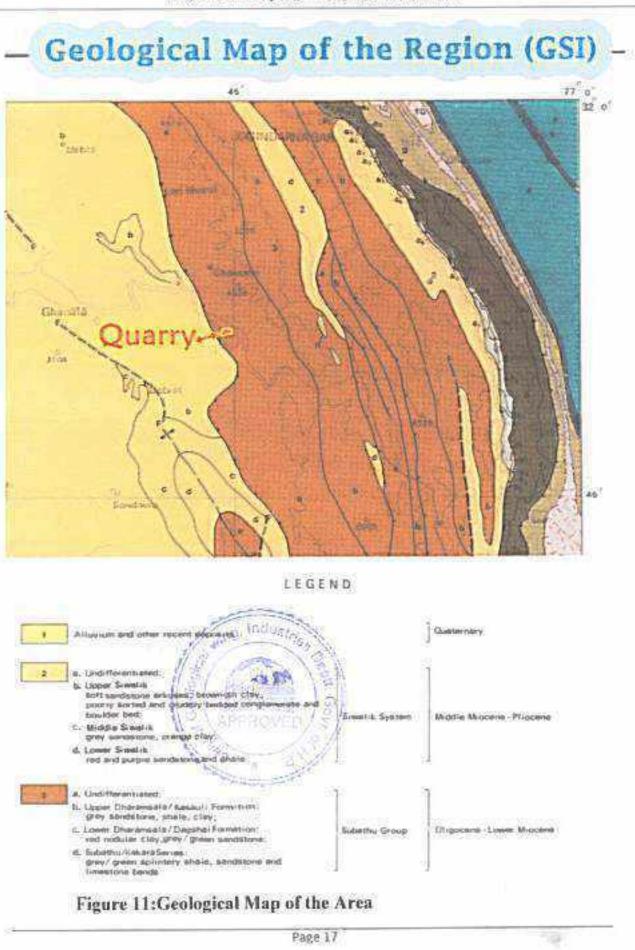
er Ø

(3)

ð

D

ê



 $\otimes$ 

### Table: Stratigraphy of the Saklain Khad and surrounding region Area

Sr. No	Formation	Rocks
1	Newer Alluvium Channel Alluvium	Grey micaceous, fine to coarse grained sand, silt, clay, boulders, cobbles and pebbles of sandstone and quartzite
2	Upper Siwalik	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown claystone
3	Middle Siwalik	Massive Sandstone with minor conglomerate and local variegated claystone
4	Lower Siwalik	Alternation of fine to medium- grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium marcon claystone in the middle part
5	Upper Dharamshala	Medium to fine grained, hard, bluish grey and massive Sandstone, green clay and siltstone
6	Lower Dharamshala	Hard, grey, well bedded, and high mica content sandstone

## 2.2.1 Dharamshala Group

The thick sequence of brackish and freshwater sediments with the basanshala formation, succeeding the fossilferous marine Subathu Formation is the Dioxamshala formation. The Dheramshala Formation are widely exposed in the Mandi paralitochthon, forther west in the autochthon, these rocks are exposed, in the core of the Satagnat anticine.

This highly folded and faulted sequence of Dharamshala aggregating to about 4000 meter displays a contrasting topography with that of younger and softer Siwalik rocks. The thick, hard, and highly competent Dharamshala rocks stand out as prominent ridges with higher relief.

Dharamshala Group is divided into two Formations:

Upper Dharamshala

#### Lower Dharamshala

#### 2.2.1. a: Upper Dharamshala Formation

Upper Dharamshala consists of thick sequence of sandstones, siltstones, and clays. The Sandstones are medium to fine grained, hard, bluish grey and massive while the clays and siltstone are usually green.

#### 2.2.1. B: Lower Dharamshala Formation

Lower Dharamshala formation consists of very bright and red and mauve coloured clay and shales with thin bands of sandstone which are steel grey in colour, highly micaceous and well bedded.

#### 2. 2.2 Siwalik Group

Ø

6

ø

0

D

10

s

Ð

13

3

8

ø

0

0

0

0

0

0

0

0

8

0

0

0

0

0000

0

0

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They comprise mudstones, sandstones, and coarsely bedded conglomerates laid down when the region was a vast basin during Middle Miocene, to Upper Pleistocene times. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive multiordered drainage systems. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times), subsequently resulting in a unique topographical entity - the Siwalik Hills. The Siwaliks are divided stratigraphically into three major Subgroups -Lower, Middle, and Upper. These Subgroups are further divided into individual Formations that are all laterally and vertically exposed today in varying finear and random patterns.

Ongoing erosion and tectonic activity have greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), and earthpillars, filled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and Choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage density, and rapid erosion rates.

The conglomerates in general are poorly cemented but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite. The stray pebbles of granite, limestone, sandstone, breccias and lumps of claystone are also observed at places. Often the size of pebbles is large enough to be called as Boulders. The conglomerates not only occur as regular band but also as lenticular bands alternative with micaceous sandstone and clay-beds. The sediments were bought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly Rising Mountain mass of the Himalaya, in the north.

6

8

2

8

0

63

0

6

0

63

0

0

6

0

63

۲

0

8

6

0

¢

6

-

8

60

6

0

63

٢

8

0

0

6

63

The Siwalik Group is divisible into three sub-groups respectively the Lower, Middle and Upper on the basis of the lithostratigraphy as given in the table (Table -4)

> 2. 2.2.a: Lower Siwalik: - The lower Siwalik consists essentially of a sandstone-clay alternation. In district Kangra the lower sequence of the lower Siwalik consists of medium grained sub-graywacke interbedded with thick red clay, but higher up in sequence, sandstones are coarser, and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartzite possible derived from the Shali. The total thickness is 1600 metres.

> 2. 2.2.b: Middle Siwalik: - The Middle Siwalik Subgroup comprises of large thickness of coarse micaceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 metres.

> 2. 2.2.c: Upper Siwalik: -The Upper Siwalik is mainly represented by sandstone inter-bedded with sit and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clay's intercalations. The general thickness in the district is 2300 metres.

#### 2.2.3 Newer Alluvium

Newer Alluvium is composed of cyclic sequence of grey, micaceous, fine to coarse grained sand, silt, boulders, cobble, pebble and clays. Newer alluvium exposed as point bar/channel bars within the active channels.

industries

2:09

## 2.3 Geology of the leased area

The guarry out area forms a part of the stream bed covered with aboutders loobbles, pabbles, over born bajri, and sand and clay deposit of Channel allegum. The rocks in the catchments of Saidam Khad is of Upper Seval Channel allegum, the area is comprising predominantly the quartizite Boulders. Said and over born bajri of Sandstone. The boulders are white, spotted white, greened while, plot, purple and dark green in colour.

### 2.4 Nature of the Boulder/ Cobble/ Sand

The area lies with in the regular course of the Saklain Khad gets flooded in the rainy season

All the deposit comprises quartzite, sand and fraction of granits, imestone and breccias- fragments. The boulders are white, spotted white, greenish white,

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit varies from one to three meter.

0

0

0

0

6

0

1

0

0

0

1

0

0

0

0

0

0

O.

0

3

D

0

0

0

0

0

0

•

0

0

During the monsoon this bed replenishes to a large extend from the Upper Siwalik Formation rocks due to erosion by heavy flow from higher reaches. Due to sudden decrease in the carrying capacity and competency of the river the annual deposition of one to three cm is received.

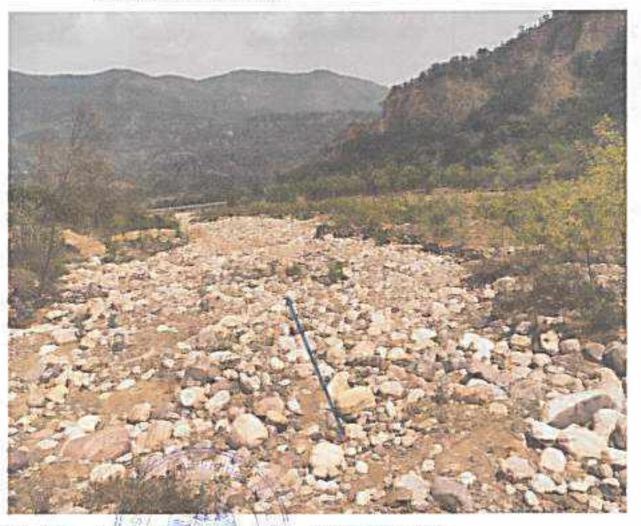


Photo 2. Showing the nature of the Lease area in the Saklain Khad.

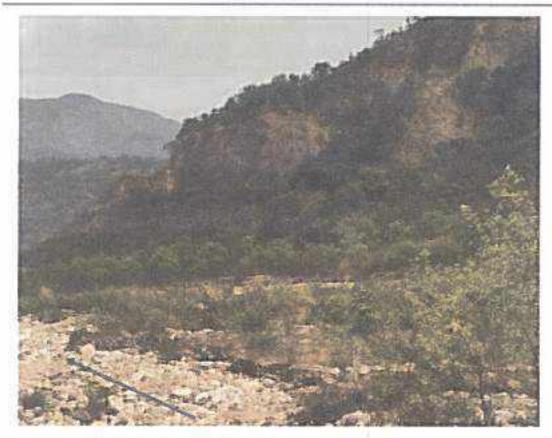
# 2.5 The Nature of the rock along the bank

The rocks along the left bank belong to Terrace Deposition of the Quatemary Formation consisting of boulders, cobbles, pebbles, river born bajri, and sand and clay deposits and tertiary formations consisting of sandstone, claystone, and boulder beds.

倍

dillo

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.



#### Photo 3:Nature of Banks. 2.6 Estimate Annual Deposition of Mineral

The area being part of the river/Khad which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. As abundant precaution, keeping in view the variation in rainfall particularly highest per day rainfall, which generally causes floods, the factor of five cm annual replenishment is taken into consideration. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. The rocks of the catchment area are formed of tertiary boulder bed formations are very much prone to weathering as the rains easily erode the cementing clay, thus loosening the boulders, which are caried down during the floods. Thus, it is generally observed that replenishment of more than five cm occurs in a year as all the old pits get filled with RBM during the very few early floods of the monsport. Hence mined out area of the pre-monsoon will be filled with mineral during monsport and even during winter rains.

### 3. RESERVE ESTIMATE

### 3.1 General Consideration

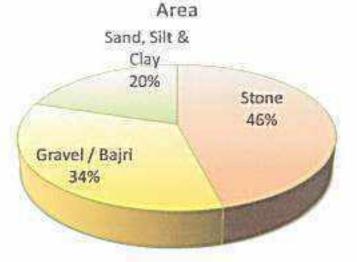
The basic requirement of the lessee will be stone, bajd and sand for construction of Project.

### 3.2 Percentage wise distribution of Mineral:

The table below shows the percentage wise distribution of minerals and figure 12 depicts the pie chart for the same.

Table shows the percentage wise distribution of minor minerals:

# Percentage of Minerals/Material in the Mining Lease



### Figure 12: Percentage of each category of mineral present in the leased area.

1	Stone Stone Indian	46%	
2	Gravel / Bajri	34%	
3	Sand, silt & clay and	20%	

#### 3.3 Estimate of Geological Reserve

Q.

D

ø

The entire block falls within the river corridor. Thus, the mining leased area of 204956 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than 5 metres. However, considering its depth for purpose of estimation of Geological reserves to a depth five metres and specific gravity to be 2.25, the proven Geological deposits in the area are to a tune of about 2305755, metric tons as shown in the chart.

Geological Reserves	Thickness, in metres	Lease Area (Square Metres)	Reserves Rounded off (in tonnes)
Proved	5	204956	23,05,750
Probable	10	204956	46,11,500
nferred	20	204956	92,23,000
Specific Grau		thickness/depth	X specific

Page 23

63

6

S

8

8

曲

10

13

0

8

2

0

6

63

0

s

MINING PLAN G&A, TM & TP Projects, HPPCL, Tehsil Kouli, Mandi

#### 3.4 Estimate of Mineable reserves of boulders, Bairi and Sand

The basic requirement of the leased or is sand, stone and bays. As per the policy guidelines issued by the State Government for Mining of River / Riverbed and to calculate the mineable reserve the following points are taken into consideration: Adequate safe distance has been provided from the points of utilities as per Rules and guidelines:

As per the policy guidelines issued by the State Government for Mining of River / Riverbed;

- In this case only one-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- Mining is not permitted within 1/10<sup>th</sup> of riverbed or 5 meters from the banks (HFL) of the river / River whichever is higher. The width of the river in leased area is 85 to 177 meters, thus, no mining is proposed in the area up to 8.5 to 18 meters from the banks.
- The water table level will go down as the water recedes after the monscons.
- The depth of water table will be at lowest in the pre-monadon season
- A geological map on 1 3000 scale is prepared and main litho units were marked on the plan to know the surface spread of each unit.

The entire width of the river gets flooded during heavy rains in monsoons. The mined area gets replenished in the very early floods in the beginning of the monsoon season.

The total mineable area and deposit is shown in figure 13, table 3 and figures 14.

The part of the area, i.e., 126800 square metres of lease area, is mineable as it falls within the river corridor, leaving out the safety zone provided along the banks.

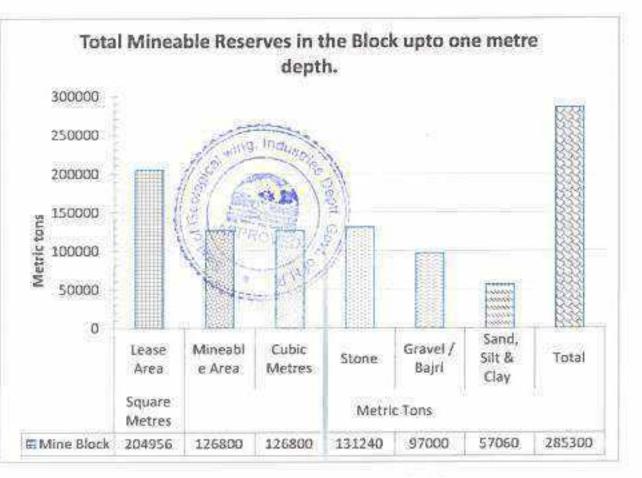


MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Table 3 Mineable reserves in the block

Ô

Leased Area Sq. metres	Mineable Area Sq. Metres	Stone		Sand, Silt & Clay	Total
204956	126800	131240	97000	57060	285300



### Figure 14: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 126800 square metres contains 285300 tonnes of mineable material. The entire mine able block will be mined every year.

3.4a Depth of mining

The Rule 34 (IV) of Rules stipulates 'the depth of mining in the riverbed shall not exceed one metre or water level whichever is less'.

One metre maximum depth from the surface is considered for mining of the reserve.

e

#### 3.4b. Specific Gravity

The specific gravity of Quartzite is 2.55 and of sand is 1.85. Hence average specific gravity of 2.25 is taken for calculation of the deposit.

#### 3.5. Estimate of Annual deposition

The reserves of all the constituents of leased block have been calculated for the safe mineable area to be 126800 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure 13. Depending upon normal rainfall from year to year causing erosion in the catchments and flooding of Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

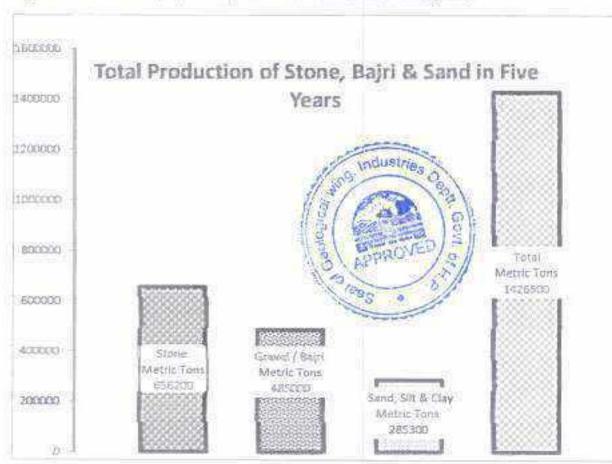


Figure 15 shows the proposed production of materials in five years.

## Figure 15:Proposed production of total material in five years

### 4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent semi-mechanical. Normally it has been observed that a worker can mine/excavate about three to four tonnes of material in a day. To excavate 1056 tonnes of material in a day 255 to 300 workers.

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

would be required. Working of so many persons in a small area would cause congestion and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to by both manual as well as mechanically. Workers are mainly deployed in riverbed mining for extraction and for loading of extracted material into tipper truck and tractor trolleys in addition loader/ JCB will be deployed. Drivers/ Operators for loaders, tippers and tractors will be another category of workers.

#### Considerations

0

韵

0

10

ß

63

10

n)

6

0

0

0

ß

63

8

6

0

63

8

- No blasting is required.
- Only manual/semi mechanically extraction of RBM (River Borne Material) will be undertaken.
- Trenches and pits for the mining purposes shall be made in such a way so
  that these are not deeper than one metre and follow the general / normal
  channel direction of the river and bottom is above the water table.
- With the replenishment of the pits and trenches during the floods, the process of controlled mining can continue year after year. The erosion and weathering of rocks in the catchments have inexhaustible supply of required minerals.
- Mining activity will be undertaken only during the dry seasons and dry parts
  of the river.

#### 4.1 Development and Production Programme for 5 years

The proposed production for the first five year is as given in the figure 16 and Table 5 show the production of Minerals in five years.

#### 4.1a Year wise Production

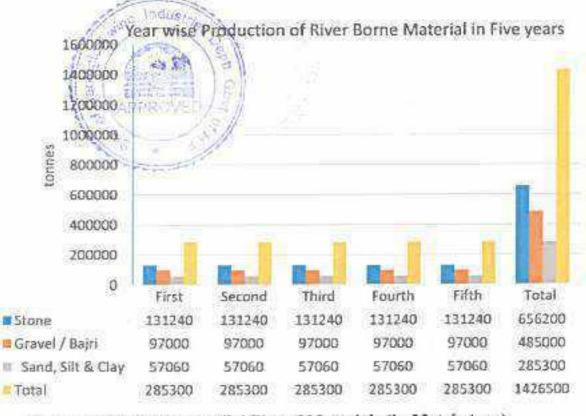


Figure 16:Year wise Availability of Materials (in Metric tons).

ŝ

Table 4	Year	WISE	production	0	materials.	
---------	------	------	------------	---	------------	--

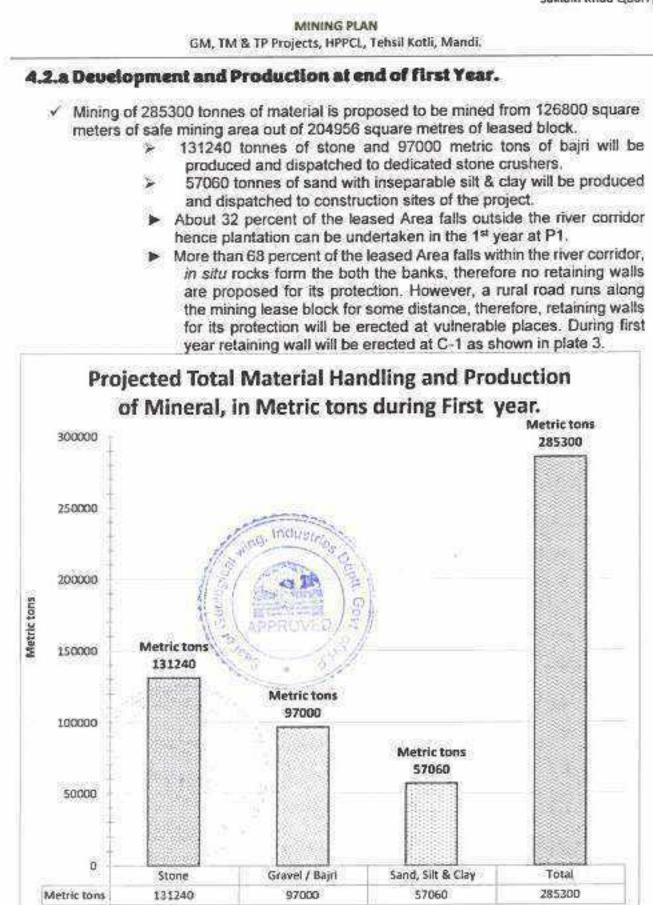
Year	Stone	Gravel / Bajri	Sand, Slit & Clay	Total
First	131240	97000	57060	285300
Second	131240	97000	57060	285300
Third	131240	97000	57060	285300
Fourth	131240	97000	57060	285300
Fifth	131240	97000	57060	285300
Tetal	656200	485000	285300	1426500

The proposed production is sufficient to for sustaining a viable mining project.

The year wise mine working planned for the Quarry is presented in the map 3.

Year wise production of River Borne Material, sand, stone and bajri is given in figures 17, 18, 19, 20 & 21.





商

ß

Figure 17- Proposed Production and Material Handling in the First Year of Mining.

0

0

63

63

0

-

0

6

8

8

0

6

0

0

0

0

100

e

0

0

00

ŝ

3

### 4.2. b Development and Production at end of second Year.

During 2<sup>nd</sup> year of development and production programme:

- Mining of 265300 tonnes of material is proposed to be mined from 126800 square meters of safe mining area out of 204956 square metres of leased block.
  - 131240 tonnes of stone and 97000 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - 57060 tonnes of sand with inseparable slif & day will be produced and dispatched to construction sites of the project.
  - About 32 percent of the leased Area falls outside the river corridor hence plantation can be undertaken in the 2nd year at P2.
  - More than 68 percent of the leased Area falls within the river corridor, in situ rocks form the both the banks, therefore no retaining walls are proposed for its protection. However, a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During first year retaining wall will be erected at C-2 as shown in plate 3.

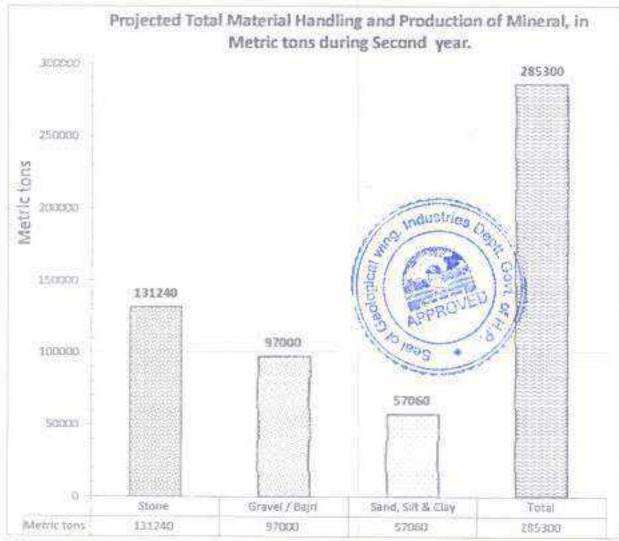
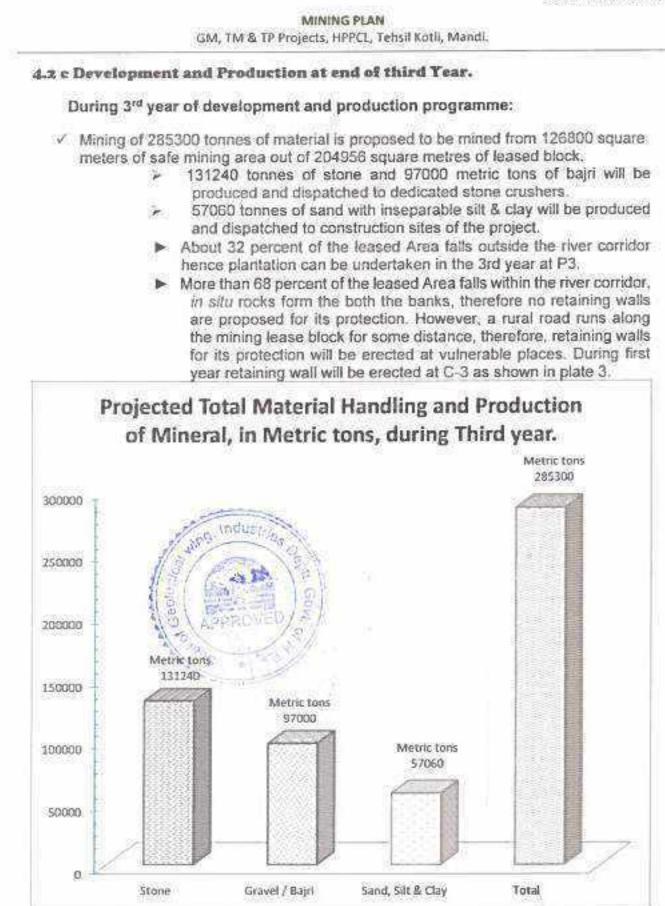


Figure 18-Proposed Production and Material Handling in the second Year of Mining.



70b

60

3

3

ED)

6

Figure 19- Proposed Production and Material Handling in the Third Year of Mining.

Page 31

-

0

0

0

6

6

6

8

0

8

Ø

0

6

0

8

:0

-63

8

23

胞

0

0

۲

0

6

63

## 4.2 d Development and Production at end of fourth Year.

During 4<sup>th</sup> year of development and production programme:

- Mining of 285300 tonnes of material is proposed to be mined from 126800 square meters of safe mining area out of 204956 square metres of leased block.
  - 131240 tonnes of stone and 97000 metric tons of bajri will be produced and dispatched to dedicated stone crushers.
  - 57060 tonnes of sand with inseparable silt & clay will be produced and dispatched to construction sites of the project.
  - About 32 percent of the leased Area falls outside the river corridor hence plantation can be undertaken in the 4th year at P4.
  - More than 68 percent of the leased Area falls within the over comdor, in situ rocks form the both the banks, therefore no retaining walls are proposed for its protection. However, a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During first year retaining wall will be erected at C-4 as shown in plate 3.

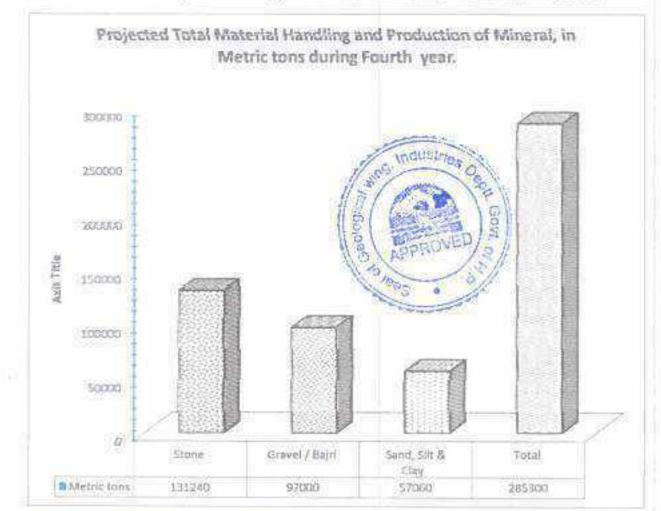


Figure 20- Proposed Production and Material Handling in the Fourth Year of Mining.

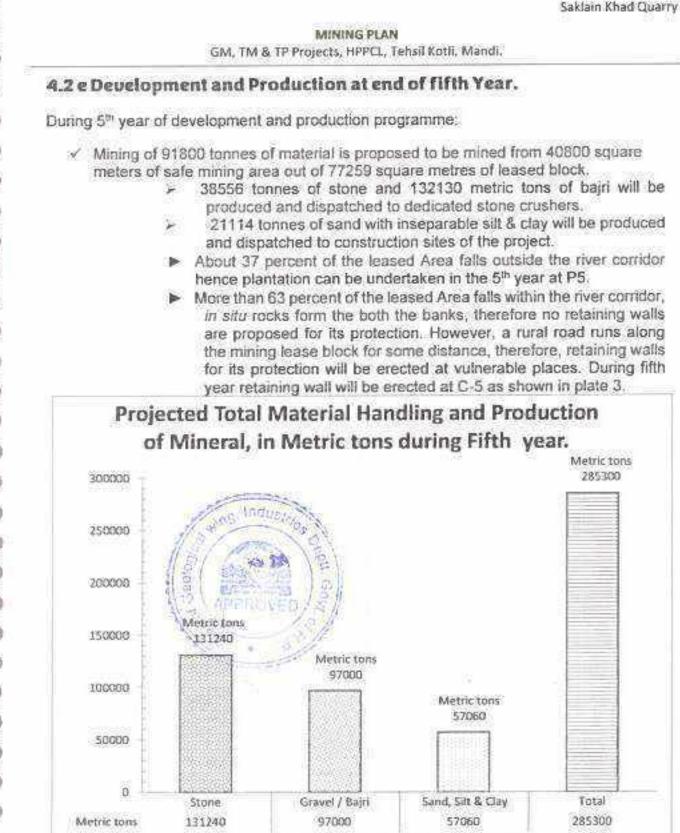


Figure 21- Proposed Production and Material Handling in the Fifth Year of Mining.

4.3 End Use of Mineral

0

0

0

157 B

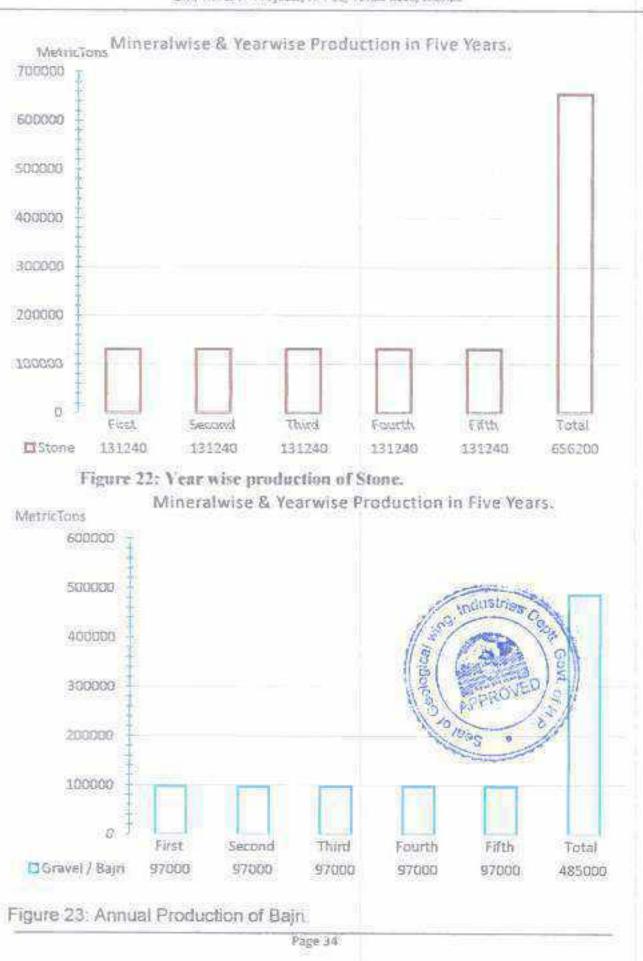
> The extracted mineral stone, sand and Bajri for will consumed in the Project construction activities. Annual production of stone, bairi and sand is shown in figures 22, 23, & 24.

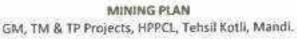


-8

iß

MINING PLAN GMA THA & TP Projects, HPPCI, Tchoil Kotli, Mandi





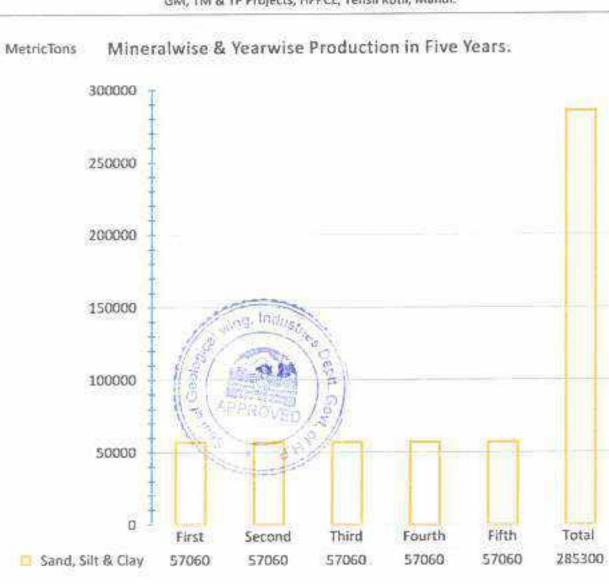


Figure 24: Annual production of sand along with silt & clay.

### 4.4 Detail of road Transport

D

D.

B

ø

•

The maximum total extraction of minerals stone, sand and bajri for use in the Project would be 285300 tonnes or 1056 metric tonnes per day, considering 270 working dry days. Thus, about 118 tipper truck trips would be required to move the material from quarry to crusher / construction sites. The track through River is about 50 metres along the leased area to rural roadside. The evacuation route is shown in figure 25.

Ø

ŝ

ŝ

ġ

¢,

Ø

ŏ

ŝ

MINING PLAN GM\_TM & TP Projects, HPPC2, Tebsil Koth, Manda

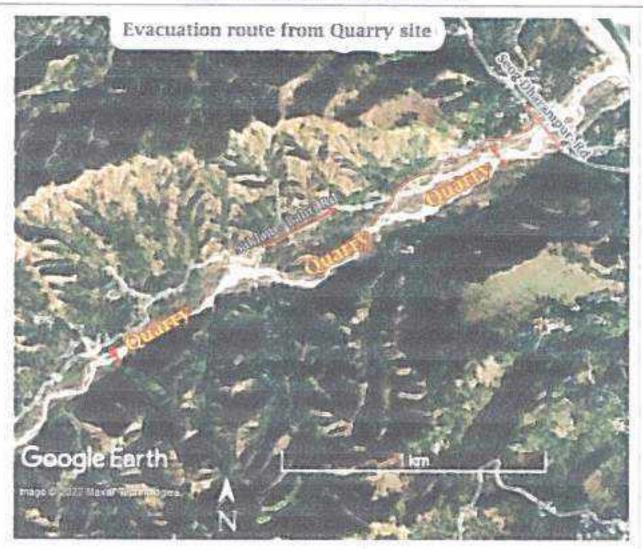


Figure 25. Evacuation route Map



#### PARTII

# Environment Management Plan

#### 1.0 Base Line Data

107

0

۵

Ð

0

8

0

0

0

0

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below: -

- Change in Topography& land use pattern.
- ➢ Effect on Flora & Fauna
- ➢ Ground Vibrations and Fly Rocks.
- ➢ Effect on Hydrology
- Effect on Climate
- Temperature Rainfall Wind Speed
- > Air Quality
- ➢ Noise level
- ➢ Visual Impact
- ➢ Socio- economic Impact

Accumulation of Scree - Mine Waste.

The base line information of the existing environment was collected from various sources such as

- ✓ Census Department, Government of India.
- ✓ Department of Economics and Statistics, Government of Himachal Pradesh.
- ✓ Directorate of Land Records, Government of Himachal Pradesh.
- ✓ Directorate of Horricolture, Government of Himachal Pradesh
- ✓ Fishery Department, Government of Himachal Pradesh
- ✓ Forest Department Government of Himachal Pradesh
- Animal Husbandry Department, Government, of Hillings Pradesh
- Survey of India, Government of India 1/28
- ✓ Metrological Department Government of Judia

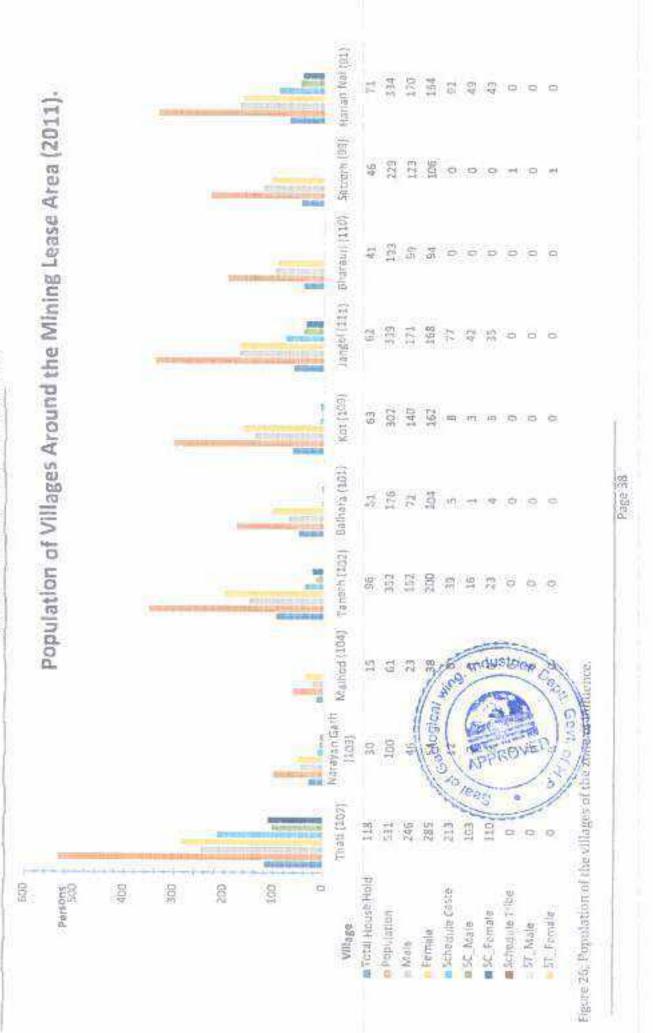
to have in depth understanding of the existing environment and to assess the likely impact of mining activity in the Area

### 1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Census is given below in the figure 26. Education wise and employment wise break of population in surrounding villages is given in figure 27. The population details of Mandi District and sub tensil Dharampur is given in figure 28.

The state of the s





ģ

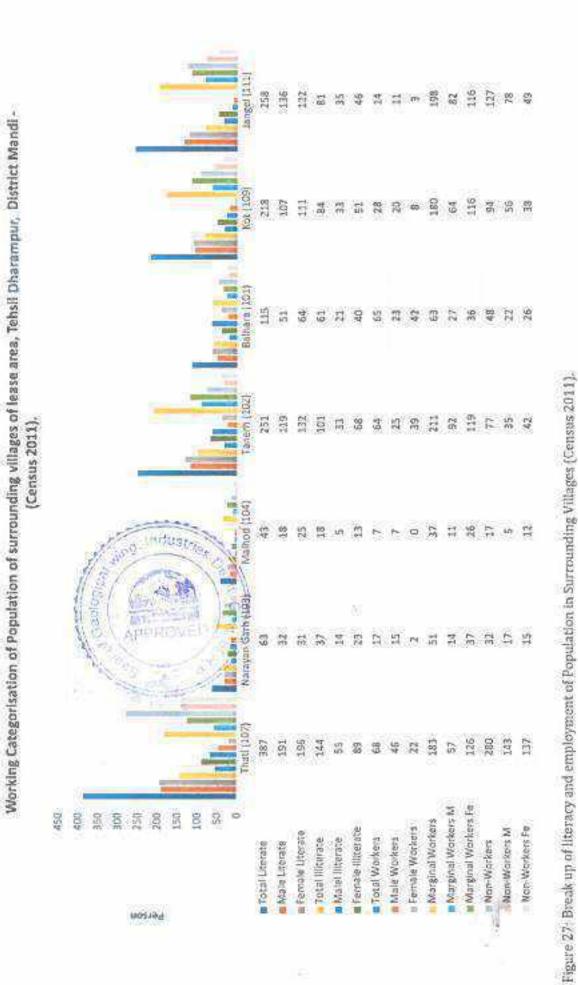
ē

e

.

ò



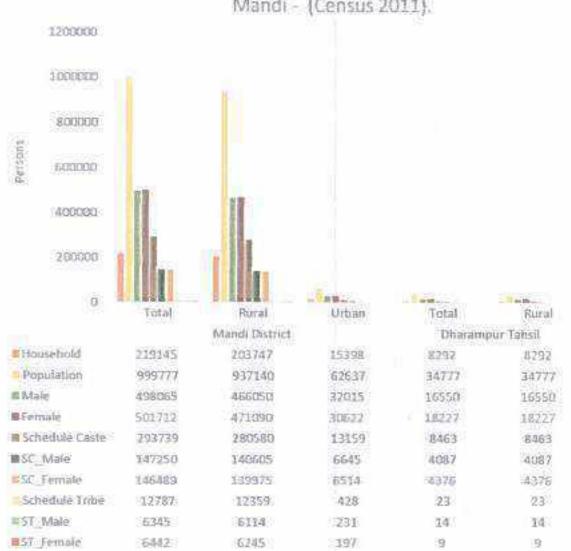


Page 39

-

-0

#### MINING PLAN GM, TM & TP Projects, HPPCI, Tehsil Kotli, Mandi,



# Population Break up of Tahsil Dharampur & District Mandi - (Census 2011).

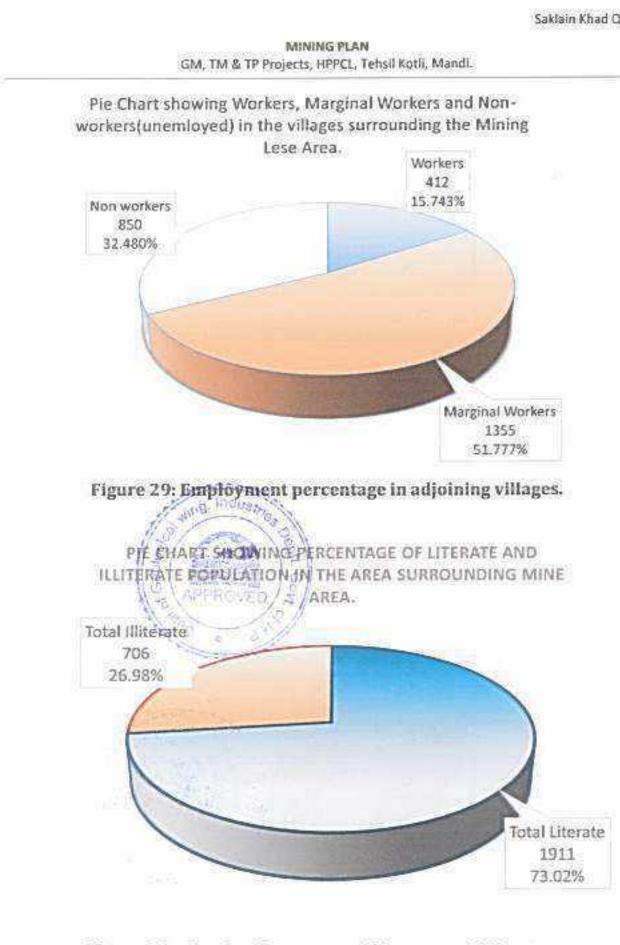
#### Figure 28: Population break up of District Mandi & Teastroharampur,

#### 1.2 Socio Economy of the Village/Population.



No adverse impact on the socio-economic condition of the area is divis

The induction of mining sector development in and around predominantly fore inductal area is bound to create its impact on the socio-economic life of the local inhabitants. The Impact is generally positive. As can be seen in figure 29 there is moderately high percentage of *imemployed* (32.400%) and *underemployed* (31.777%) people in the area despite moderately high level of literacy, (73.02%) literates, figure 30) of literacy.



kπ. Ð

0

D

Э

Ð

3

3

10

D

3

3

B

D

5

3

0

Ð

100

100

C

3

9

D

0

8

65

0

0

۲

0

8

Figure 30: showing Percentage of literate and illiterate **POPULATION** in the Surrounding mine area

43

0

0

6

63

0

0

6

01

6

æ

6

6

8

6

8

8

0

0

63

8

63

43

0

0

8

3

63

8

6

0

Ø

60

Ó

# 1.3. Land Use Pattern

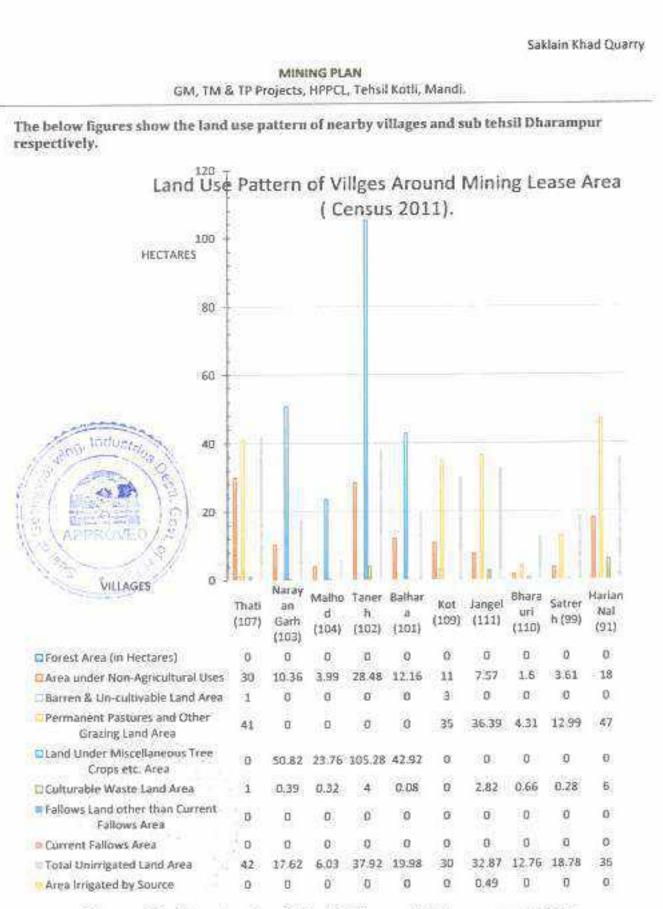
Primarily the land of the district can be classified in following 6 categories as shown in figure 31.

- i Ecrest
- ii. Grass and Scrub Land (partially agriculture)
- in. Water Bodies (Stream and comdor)
- iv. Agriculture land
- v. Waste land
- vi. Urban Settlement
- The District Census 2011 classified the land available in surrounding villages into following nine categories
  - 1. Land under Miscellaneous tree crops
  - 2. Culturable waste land
  - 3 Fallows Land other than Current Fallows
  - 4. Current Fallows net area sown
  - 5. Area under non-agricultural uses
  - 6 Barren and Un-cultivable land
  - 7 Barren & Un-cultivable Land,
  - 8. Permanent Pastures and Other Grazing Land
  - 9 Forest





Page 42



認

B

D

D

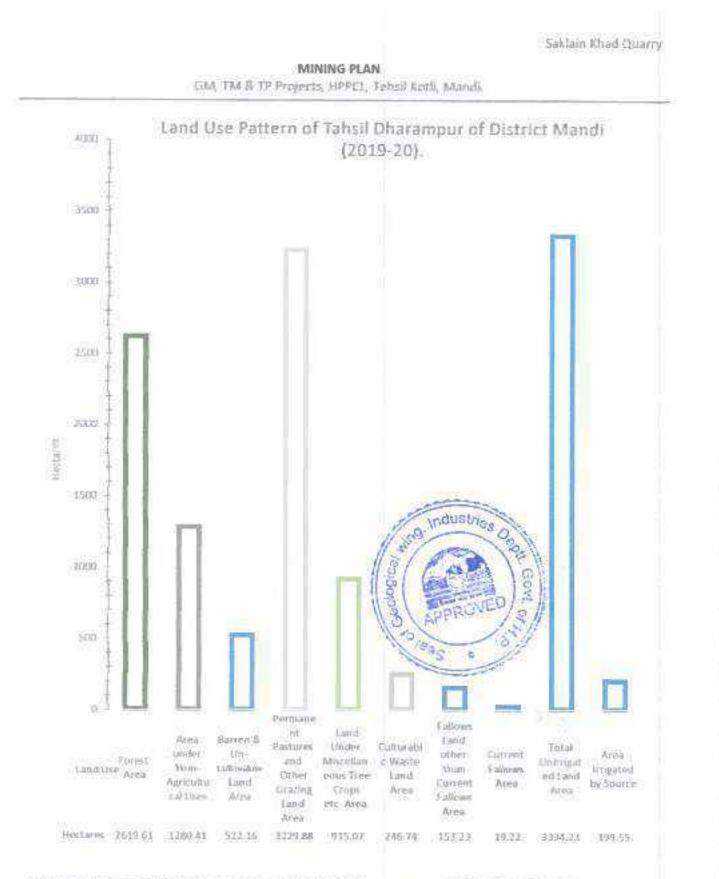
D

D

(b

ē

Figure 32: Showing Land Use Pattern of villages around the mining lease area.



-63

Ø

Figure 33: Land Use Pattern of Tahsil Dharmpur of District Mandi.

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi. Land Cover & Land Use Map of Buffer Zone Five Kilometres Radius. Hamir 31'50' 7 30" 47 30 42 30 Legend industria 76°45 Sal Part of Survey of India Toposheet Nos. H43E9 & H43E13

Figure 34: Showing the Five kms Radius Buffer zone.

# **1.4 AGRICULTURE:**

102

Ø

1

8

D

8

13

D

D

B

0

D

D

0

0

63

8

0

國

B

100

123

3

G

0

0

0

0

The economy of Mandi district is predominately agrarian as around 80 per cent of the total population is dependent on agriculture and activities allied to it for earning their livelihood. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the uneven. The crops usually face moisture stress during the remaining period of the year due to

				AINING PLAI	N		Saklain Rhad
		GM, TM	S. TP Proje	ets, HPPC1,	Tehsil Katli,	Mandi.	
lequate an	dirregulari	rainfall. Th	e irrigation	n facilities ar	e provided	by lifting wate	er from steams,
				ests in the se		5 6	
source of v	water and in	rigation in	district M	landi can be	classified in	to following f	lve classes
<ul> <li>Kufils,</li> </ul>	gation Sche	ense,					
	sed for dan	nestic wive	ING PR				
	sed for img		and and				
- Tube w		POINTPLY					
Major food	(crops are)	grouped in	to three c	ategories:			
- Cerean							
- Pulses							
> Other	food crops	like Chilies	ginger, si	ugarcane, ar	d turmeric.		
e Non ra	ood o tip ar	eaisoftw	a kinds:				
P Ωil see	COST		and and a second	ENDING SHOW	L		
				iobaccin, and			
ated sinues	Carls Carle	gory or the	erop n go	ren belaw in	agure: 455;	÷	
	Agricu	iture:	Area (	in Hect ict Man		nder Ma 9-20.	jor
7(3000							
60000	1000						
SOCIOD						1	
						Indus	wies a
40080						1.3	ales Ogga
					1	12100	
3(8100					il il	3/ 64	
	111111				1	8	220151
- 200000					1	181, 181	10 / S / S
20000	11		Errore.			Controller	151
						1000	
200000		-			-	and the second	Total Contraction
					1 Street	-	
0							
	Wheat.	Atisize	Rice	Barkey	Puises	Chillies 6	Singer Oil seeds

Ċ.

G

ΞŪ

.

ΞÜ

-8

.

.

# Figure 35:: Showing area under different crops in Mandi District

DHectares

Page 46

Û,

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

D

ø

Ö

Ô

ø

m

B

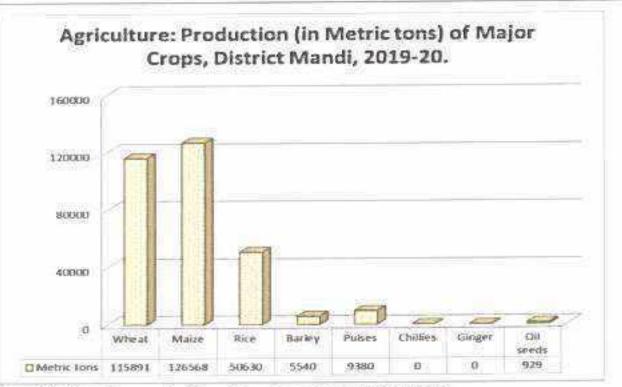


Figure 36 Showing production of each crop in District Mandi.

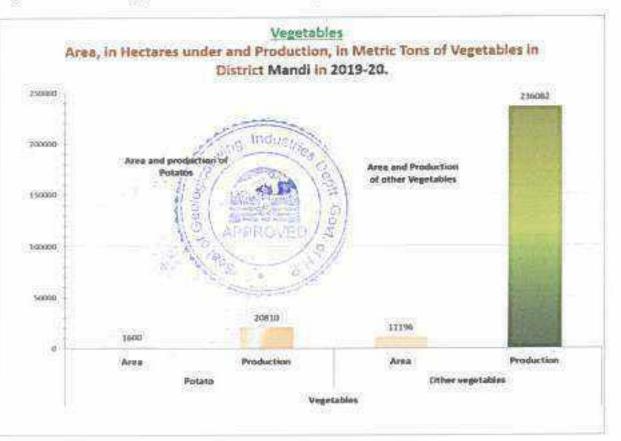


Figure 37: Showing area under vegetable, in Hectare and Production, in Metric tons, of District Mandi.

e

3

0

8

0

-63

0

100

6

6

8

61

10

63

0

8

-0

ð

6

8

8

0

0

6

0

0

0

۲

65

0

6

8

0

6

0

0

#### 1.5 HORTICULTURE

The topography and the agro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categories namely high hill areas located at a higher elevation mid-hill areas and low-lying valley areas. Fruits of various kinds depending upon the terrain, climatic condition and soll are grown in the district.

The main horriculture produce of the area can be classified into following five categories.

- 1. Apple
- 2. Other temperate fruits
- 3. Subtropical fruits
- 4. Nuts and dry fruits
- 5 Citrus fruits

The area under each truit as well as the production of each truit in district Mandi are shown in Table 6.

Table 5; Area under each fruit and their production in District Mandi.

Fruit	Area (In Hectares)	Production (In Metric Tons)
Apple	16748	57158
Plum	2855	827
Peach	783	industries of 413
Apricot	297	1 6 8 20
Pear	1772	APPROVED OF
Cherry	24	to leas . 5 8
Green Almonds		0
Persimmon	252	88
Olive	295	6
Kiwi	29	22

# District Mandi.2019-20

Status of Borticulture.

Page 48

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

D

D

D

D

D

D

D

D

Ð

Strawberry	2	0
OTF	6313	2930
Almonds	1502	288
Wahut	1055	137
Piccanut	392	22
Nuts & Dry Fruits	2949	447
Orange	730	255
Malta	196	0
K, Lime	2999	245
Galgal	538	345
Others	3	0
Citrus	4466	845
Mango	4964	2683
Litchi Gauva	16 tring 590	701
Gauva	693	317
Papaya	24	32
Loquat	12/ 1	.0
Aonala	154	70
Grapes	2	7
p-grnate	473	202
Jackfruit	215	32
Others	8	15
OSTF	7127	4059

Page 49

-8

0

-63

6

0

8

0

10

6

63

8

0

0

0

6

65

0

0

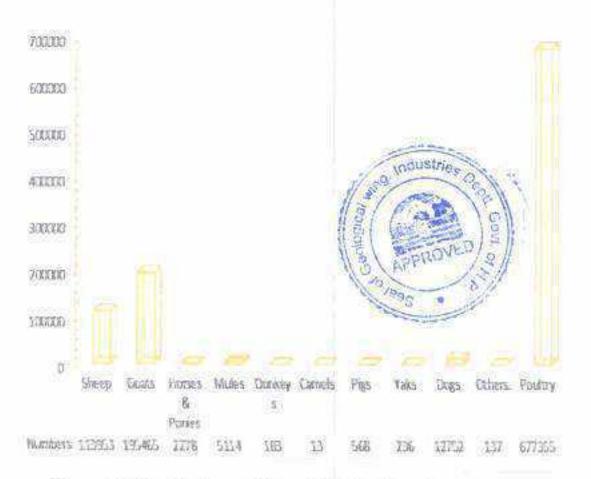
6

0

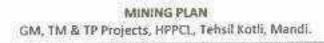
## **1.6 ANIMAL HUSBANDRY**

Economy of the district is predominantly agranan, but role of Animal Husbandry is equally important as the farmers must keep the cattle for the purpose of ploughing the land and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family. The total population of the livestock in District Mandi is given in the figure: -38. The population of the Buffeloes and Cattle in District Mandi is given in the figure: -39.

# Animal Husbandary: Population of Livestock, District Mandi, 2019-20.



# Figure 38: Livestock population of District Mandi.



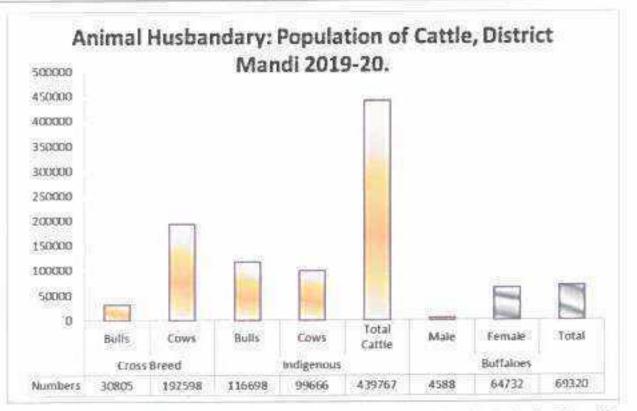


Figure 39: Showing Population of Cattle Buffaloes in District Mandi.

# 1.7 FISHERIES

0

0

0

D

Đ,

63

B

e

8

0

B

Ð

0

13

Э

3

73

13

3

D

0

10

0

There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi district:

Trout

Mahasir

Gid Seviyon

Dise Gugli and

Mirror Carps



The exotic trought fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himalayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trought fishing.

No perennial stream passes through the area under consideration.

8

40

6

÷0

63

0

83

63

6

8

0

0

63

60

8

卣

0

8

8

8

63

ð

0

6

ø

6

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Koth, Mandi

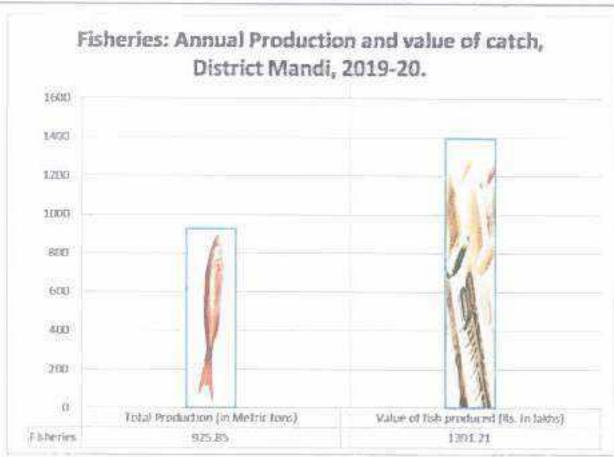


Figure 40: Showing Fish catch / production and its sale value in 2016-17.

#### Andustrieg Oscille Andust

### 1.8 FLORA AND FAUNA

#### 1.B.1 Fibra

The Chill is considered the prevailing conifer up to about 1950 meter when it gives place to the Decdar and the blue pines. In Mandi district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is 427 meter above sea level and highest range of is at an elevation of 2658 meters in the north. The forests grown between these two extremes vary as the elevation itself.

The most prominent varieties of trees found in the district are

Simbal (Bombex malabaricum), Mango (Magniferaindica) Tun (Cedrela toana) Several species of acada and albizia

Page 52

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Salambra (Odina wodier) Termnalia Jamun ( Engenia jambolana Larger tour Bamboo

The common fruit trees are banana, apple, ber, jamun, mango, mulberry, almond, peach etc

#### Shrubs

The most common shrub at the higher elevation is Barberis, indigopera and Desmodium and following other shrubs are also found

- 1. Vitex
- 2. Munj
- 3. Ber
- 4. Ipomea
- 5. Dodonea &
- 6. Bamboo

The common fruit trees are banana, apple, ber, jamun, mango, pear, mulberry, apple, almond, cherry, peach etc.

65

#### 1.8.2 Fauna

19. 10.

20

1

130

3

3

13

6

3

B

8

œ

675

3

3

10

1

3

0

3

83

3

0

0

Animals

Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in the district. Common Mammals & Birds in the Mandi District is given in the Table :-7

Table 7: Common mammals and birds in the Mandi District.

43.44

Birds		
Zoological Name	English Name	Common Name
Milvus migrants	Vulture	Cheel, Gidh, Eell
Eudynamys scolapacca	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

#### Table 6

Saktain Khad Quarry

卣

6

6

0

0

đ

0

ġ

0

đ

đ

0

ġ

6

Ū.

.

8

0

8

0

0

.

.0

0

-3

0

0

6

0

0

0

0

٥

0

0

0

Colums livia	Hawk	Bəj
Françolius françolinas	Black partridge	Kala Tritar
Francolius pondicertans	Grey partridge	Safed Tittar
Paya crisslatus	Pearink	Mar
Coturnix colurnix	Common quail	Bater
Alectoris graeca	Chakor	Chakor
Crovus splendens	Crow	Калича
Prottacula Karneri	Parrot	Totta
Tragopan melanocephalus	Western borned Tragopan	Phulgar/Jujurana
Picoides macel	Fulvourbreasted Pied Woodpecker	Kathfowra
Streptopelia decaseto	Ring dove	Gughi
Streptopelia chinesis	Spotted dove	Gughi
Accipiter bodius	Shilina.	
Aquila rapax vindhian	Tawny eagle	
Ducula bicolor	Green Pigeon	
Parus sufamichalis	Tits	
Picus canus	Black napped Woodpecker	Woodpecker
Drycocopus javenses	Woodpecker	A industries
Muscicapa subrubra	Himalayan Fly Catcher	13 Carlo
Acidotheres tristis	Соттон Муна	Ghatan 8
Terpsphone paradisi	Paradise Bycatcher	Chati- Apres APPROV
Passer domesticus	House sparrow	tonos . to
Carduelis-spinnides	Homalayan Green Finch	Chirila
		17

MINING PLAN GM, TM & TP Projects, HPPC2, Tebsil Kotli, Mandi.

Table 7

# Mammals in Mandi

English Name	Common Name	
Leapard Cat	Mirag, Bagh	
Jungle Cat	Jangū Billi	
	Leapard Cat	

Page S4

MINING PLAN
GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Muntucus muntisk	Barking Dear	Kakkar
Vaulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sus sacrofa	Boar	Suar
Hystrix Indica	Porcupine	Sehal
Lepus nigricailis	Hare	Khargosh, Sherru, farru
Moschus moschifarus	Musk deer	Kastura
Capra Ibex Ibex	lbex	
Hemitragus jemlahicus	Himalayan Thar	Thar
Selenarctos thebatanus	Black Bear	
Ursus arctas	Brown Bear	
Panthera unica	Snow leopard	
Sus scrofa	Wild Boar	
Axis axis	Spotted deer	Chital
Cervus unicolor	Samber D REPEROVE	6月3月
Hylopetes fimbriatus	Flying squirrel	S.
Panthera pardus	Leopard	Cheetah
Felis chaus	Jungle cat	
Paradoxurus hermaphraditus	Indian Civet	Sakralu
Hipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

In the area surrounding the mining lease following are the common birds: -

- Grey Partridge (Safed Titar)
- Woodpecker

- Chakor
- Crow

0

Ð

D

3

3

6

Ð

D

D

D

3

D

D

10

0

0

8

0

1

0

0

0

0

0

9

0

0

0

0

0

0

0

0

- Red Jungle Fowl (Jangli Murga)
- · Black Partridge (Kala Titar)

63

0

0

6

8

6

6

8

8

8

0

0

ø

6

8

103

63

0

10

6

0

8

0

0

63

65

#### MINING PLAN

GBA TRA & TP Projects, HPPCI, Tehsil Kotil, Mandi

In the	leased-out	area	and	surrounding	hills	following	are	the
commo	n animais:	8				12		

- Leopard (Bagher)
- Hare
- Wild Bers (Jangli Soor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- Pip

### 1.9 CUMATE

The climate of district is hot in summer as it is situated in valley at lower attitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plently of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Cetsius, the nights are comparatively cooler, and month wise temperature is given in figure 6.

The area enjoys monsoon rainfall from third week of June to mid. September.

The climatic information given is based on the data obtained from Revenue Department of Himachal Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D C office Mandi, and at Sundemager. All information available indicates following seasons in the district.



Page 56

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

D

Э

D

Ð

D

D

ø

ø

D

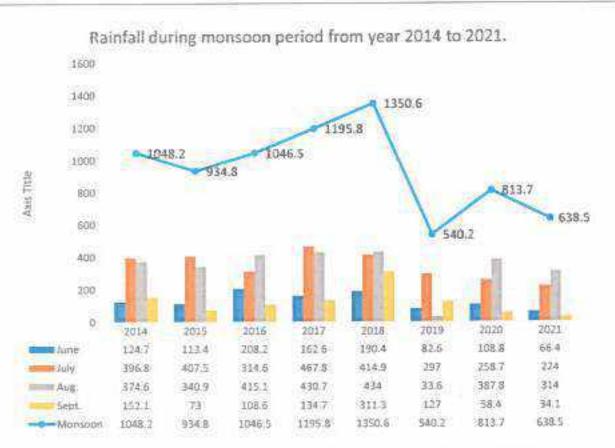


Figure 41: Yearly monsoon Rainfall from year 2014 to 2021.



Ø

Ċ.

63

8

0

0

10

8

12

0

63

63

0

8

#### 2.0 ENVIRONMENT MANAGEMENT PLAN

The impact on environment due to mining operation is generally: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate
- Air Pollution
- Noise Pollution
- Visual Impact.
- Socio- economic Impact.
- Accumulation of Scree.

#### 2.1 CHANGE IN TOPOGRAPHY.

#### No affect.

- The area is riverbed and mined out pit will be filled during rainy season hence there would be no change. It is part of a Riverbed.
- · The highest point of the Lease area is at 757 metre above mean sea level.
- The lowest point is at 640 m above MSL.
- Mine Area is proposed in the entire safe area.
- The block would be completely replanished during monsoons floads.
- The mining shall be confined to well within the riverbed corridor.
- Mining shall be undertaken to a depth of one metre or water level whichever is less.
- The Lease area is and shall remain riverbed.
- . Thus, the topography or landform of the Riverbed per se will not be changed.
- The land use of the mining Lease area is defined in the Revenue record as 'Gair Mumkin khad'
- The land under active mining would always remain from the set of the set well as post mining.

#### 2.2 Effect on Climate

- \* The mining Lease area is small
- + Mining will be confined to 126800 square metricate
- The mining depth will be up to one metre or up to water lever is less, thus water regime will not be disturbed.
- \* The mining will be confined from within the riverbanks.
- Some micro-level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed.
- The impact will need no mitigating measures.

#### 2.3 Impact on Air

No blasting material is to be used.

MINING PLAN				
GM, TM & TP Projects, HPF	CL, Tehsil Kotli, Mandi.			

- The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).
- The mining activity will be limited to excavation of about 1056 metric tons of stone, Bajri
  and sand with silt-clay per day.
- 118 tipper truck trips will be able to move the required material from mine to crusher / Project sites.
- · This activity would generate limited disturbance to air quality.

#### 2.4 Impact on Noise Level and Mitigation Measures

- The mining area represents calm surroundings.
- · The mining shall be manual causing hardly any noise.
- The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.
- About 38 trucks trips would be required for transporting mined material per working day from mining area to destination.
- The dedicated tipper truck would be properly and regularly undergoing maintenance to create minimum noise.
- Care would be taken to properly maintain the silencers of the vehicles.
- No use of horn shall be allowed in or near the mining area.
- A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of River to screen the noise, if permitted by the private land holders.

### 2.5 Effect on Flora & Fauna

- The mining Lease area is riverbed.
- There is hardly any flora or fauna on the riverbed to attract any protective or mitigating measures

### 2.6 Soil Cover

100

9

D

10

0

ß

D

0

0

0

0

0

- The mining will be confine to Riverbed.
- It has no soil cover as the area gets frequently flooded during monsoons.
- Thus, there shall be no impact on any natural soil cover.

### 2.7 Impact on Hydrology

- The mining area is part of riverhed.
- The mining depth will be up to one metre or up to water level whichever is less, thus
  water regime will not be disturbed
- The mining will be confine to central part of riverbed, away from banks.
- Thus, mining would be dredging the riverbed and reducing the silt burden downstream.
- The ground water (undercurrent of the river) will not be disturbed as mining will be undertaken above Water table.

0

0

6

8

1

3

0

0

6

8

0

0

0

6

8

0

创

0

6

6

#### 2.8 Waste disposal Management

The area is in a regular course of the Khad, and silt clay is the only waste likely to be produced. The waste generated if any will be used as backfill where separable.

#### 2.9 Socio- Economic Impact

- No adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 120 persons (if part manual mining is resorted to) directly and indirectly, in mining, transportation, and crushing unit. However, to avoid congestion and to improve mining efficiency mechanical mining is recommended if permitted to.

#### 2.10 Transport of Mineral

From Quarry to Road heads towards Dharmpur – Seog rural road is about 100m through the Khad track. The mined material is transported through tracks made in the Khad. About 1056 metric tonnes of material shall be transported per day with an average of 118 tipper truck trips. The movement of 118 tipper truck trips would not have much impact on traffic on rural road and would cause negligible environmental impact



	Saklain Khad Quarry
	MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.
	PARTII
1.Pro	gressive Mine Closure Plan/Reclamation Plan
.1 Re	eclamation
٠	The mined area being part of the river course cannot be reclaimed for any other purpose
	The land under active mining would always remain riverbed, during as well as pos- mining.
٠	The highest point of the Lease area is at 757 metre above mean sea level.
	The lowest point is at 640 m above MSL.
	The mining shall be confined to well within the riverbed corridor.
•	No mining near the banks up to 1/10 <sup>th</sup> of its width is to be undertaken as per guideline i.e. 8.5 to 18 metres, from banks.
۲	The mining depth will be up to one metre or up to water level whichever is less, thu water regime will not be disturbed.
٠	The entire quarried area will be replenished and reclaimed by the river during monsoo floods.
	The Lease area is and shall remain riverbed.
	Thus, the topography or land use of the Riverbed per se will not be changed.
-	As such no reclamation work of mined area is required to be undertaken.
1.2 N	line Waste Disposal:
245263	a) Year wise generation of mine waste and soil cover.
	As explained earlier the following category of the waste is generated
	during riverbed mining.
	<ul> <li>SHE CLAY Mixture</li> </ul>
Th	e silt and clay are generally being inseparable from sand and extracted along with it.
	As such no waste will be generated during the mining of stone, sand and
b	ajri. / 🖉 🥵 💦
1.3	The arrangements made for topsoil utilization, if any
	As the printer area is east of shocked, baying no toppoil covor

1.1 Reclamation

100

3

9

D

3

63

圆

B

13

0

D

0

0

6

0

0

0

0

3

D

D

3

0

0

0

0

0

0

- er purpose. The mineu
- ell as post The land 6 mining.
- The higher
- The lowes
- The minin 4
- guidelines, No mining i.e. 8.5 to 1
- s less, thus The minin water regi
- g monsoon The entire floods.
- The Lease
- Thus, the
- As such no

#### 1.2 Mine Waste

- a) Year w
  - nerated
- y with it. The silt and cl nd and As su

### bajri.

As the mining area is part of riverbed, having no topsoil cover therefore, no topsoil is required to be removed, or disposed of.

### 1.4. Preventive Check dams

Considering the rocky condition of riverbanks, no check walls are required to be constructed. There is a rural road passing along the Khad for some distance leading to village Saklain. H.P.P.W.D. link road passes along the lease area. For the protection of link road check/retaining walls have been suggested to be erected at vulnerable points mainly at C1 to C5. The total length may extend to 300 metres costing about Rs.100000/=.

### 1.5 Plantation work

As far as the order of Apex court in writ petition(s)No(s) 114/2014 titled as Common Cause Vs Union of India & others is concerned, the riverbed which suffer frequent foods during monsoon period and where no grass growth is possible, as such mining area cannot

ਿ

8

6

Ö.

60

61

0

81

6

3

8

0

ŏ.

103

63

0

8

0

0

6

6

0

(0)

be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance	
First	100	:15	3000	
Second	250	30	10000	
Third	250	30	12000	
Fourth	400	49	18000	
Fifth	500	55	25000	
Total	1500	170	68000	

#### Year wise survival rate.

The survival rate is about 30 percent in the area because of the rocky nature of the site. However, after yearly review it will be eosung that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured to be at least 90 percent.

### 2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is a rural road passing along the Khad at places. No mining has been proposed up to ten metres for its protection. There is questing paint of utility within radius of 100 metres of the mining lease peoplery, which may need any kind of protection.

#### 3 MANPOWER DEVELOPMENT

The mining activity will be mainly manual. Worker are mainly required in riverbed mining for extraction and loading of riverbed material into tipper truck. and tractor trolleys. Drivers for tippers and tractors will be another category of workers. Thus, employment potential is as given below.

Supervisor	2
Drivers and JCB operators	12
Unskilled workers	106
A CLEAR STATE ALL MANY STATES AND A STATE AND A STATE AND A STATES AND A STATES AND A STATES AND A STATES AND A	12 106

Thus, total generation of Employment will be to a tune of 120 both skilled and unskilled workers.

#### 4 USES OF MINERAL

201

э

3

10

D

3

3

3

0

0

D

D

0

0

B

0

0

0

0

The stone, sand and Bajri will be consumed in the dedicated crushing unit of the

Project and product grit and sand will be used in construction activities of the project.

#### 5 DISASTER MANAGEMENT & RISK ASSESSMENT:

The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:

- Inundation / Flooding
- Drowning
- Accident during mineral loading, transporting, and dumping
- · Accident due to vehicular movement
- Earthquakes

#### Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

#### Accident during mineral loading, transporting, and dumping

The consequences of this scenario are minor which may be taken care with first aid care.

#### Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

#### Earthquakes

The area falls in seismic zone IV. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.

### 6. RECOMMENDATION FOR RISK REDUCTION

#### Measures to prevent Inundation/Flooding/drowning

Saklain Khad Quarry

61

d

63

6

63

6

8

6

1

100

63

8

0

0

8

(D

ක

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

- Being on riverbed there should not be any mining operation during monsoon or rainy day
- Formation of deep pits should not be allowed
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

#### Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders.
- Operations during daylight only

### Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted.
- To avoid danger of accident roads and ramp near embankment should be properly maintained.
- The truck would be covered and maintained to prevent any spillage.
- The maximum permissible speed limit stinuld be ensured.
- The truck drivers with proper driving license would only be employed.

#### Measures to Prevent Accidents during Earthquakes

 Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes etc will be undertaken in consultation with experts.



# Declaration

e B

B

3

Э

13

D

3

3

13

1

0

 $\otimes$ 

ø

e

0

0

0

This is to declare that the Mining Plan of Minor Mineral lease of part of Saklain Khad, for Stone, bajri and sand situated in Khasra No. 1401, 1402, 1798, 974, 1409/222 and 681 measuring 20.4956 Hectares, falling in Mauza/Mohal Balda, Tanehad Kot & Thathi, Tehsil Dharampur & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs...... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

Date

Place KOTLI



The General Manager Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

# Certificate

0

B

0

1

69

0

а

120

3

03

0

0

1

0

6

0

D

2

3

B

Ð

0

D

130

0

0

0

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra Nos. 1401, 1402, 1798, 1409/222 & 681, measuring 20.4956 Hectares, falling in Mauza/Mohal – Balda, Tanehad, Kot & Thathi, Tehsil Dharampur & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

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

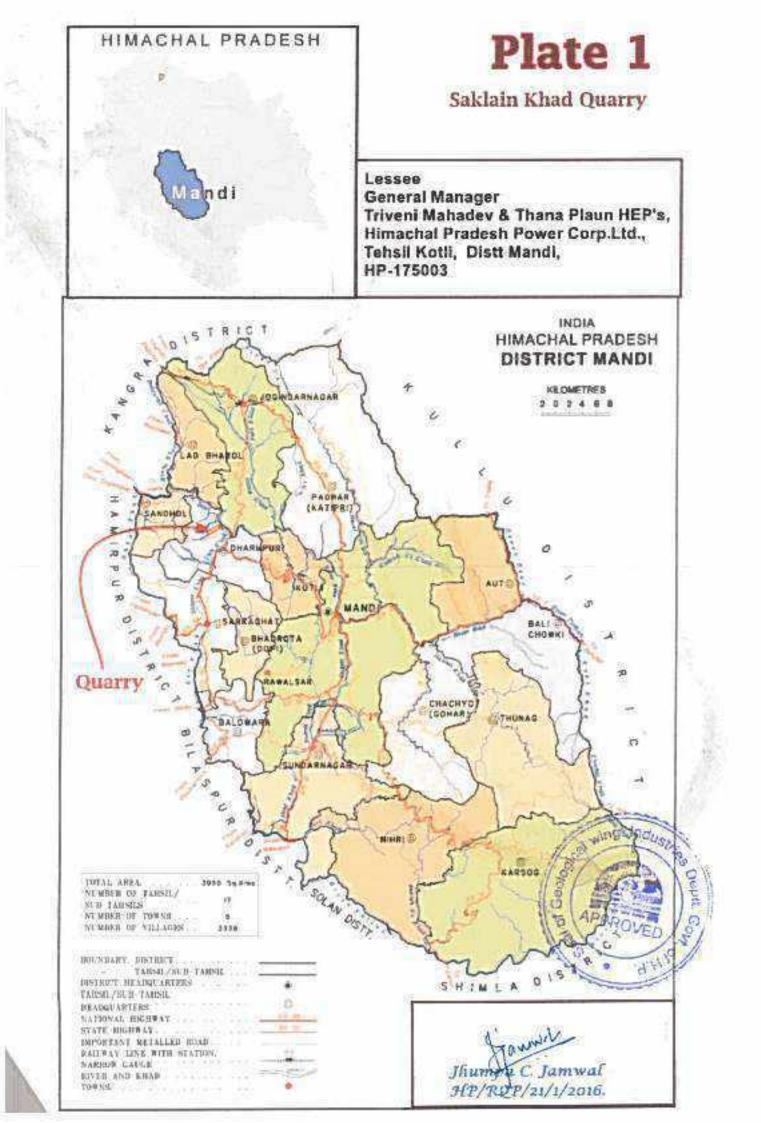
Date

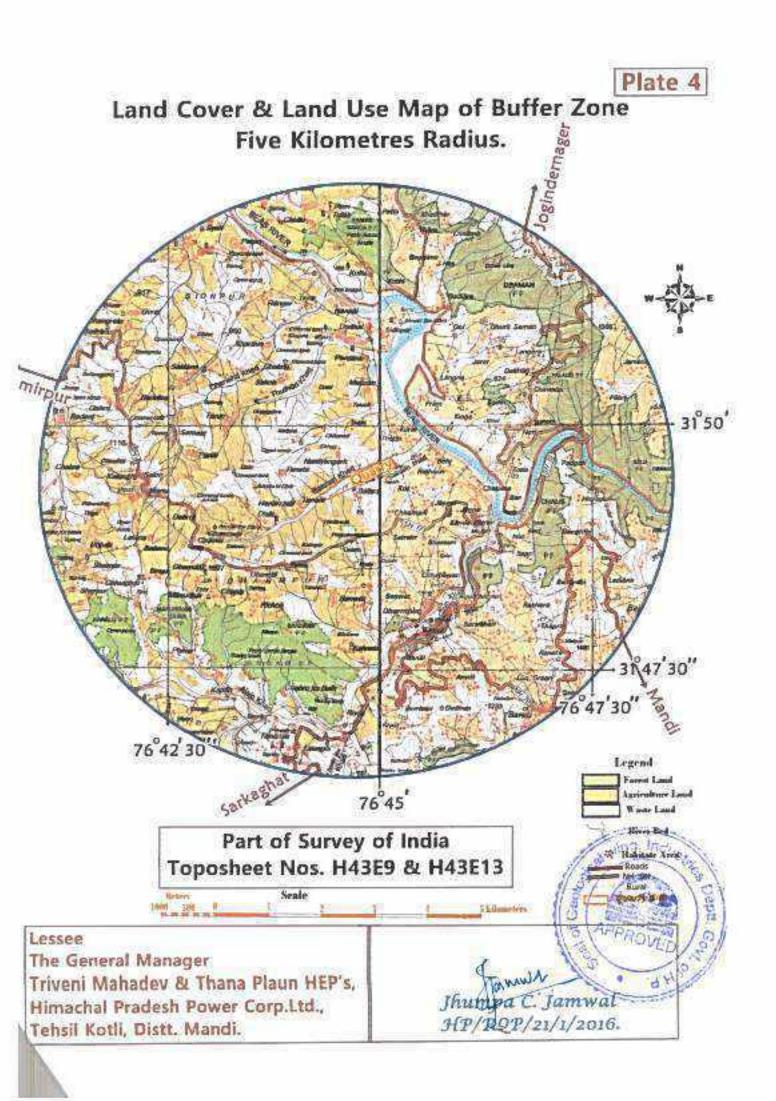
Place: Shimla

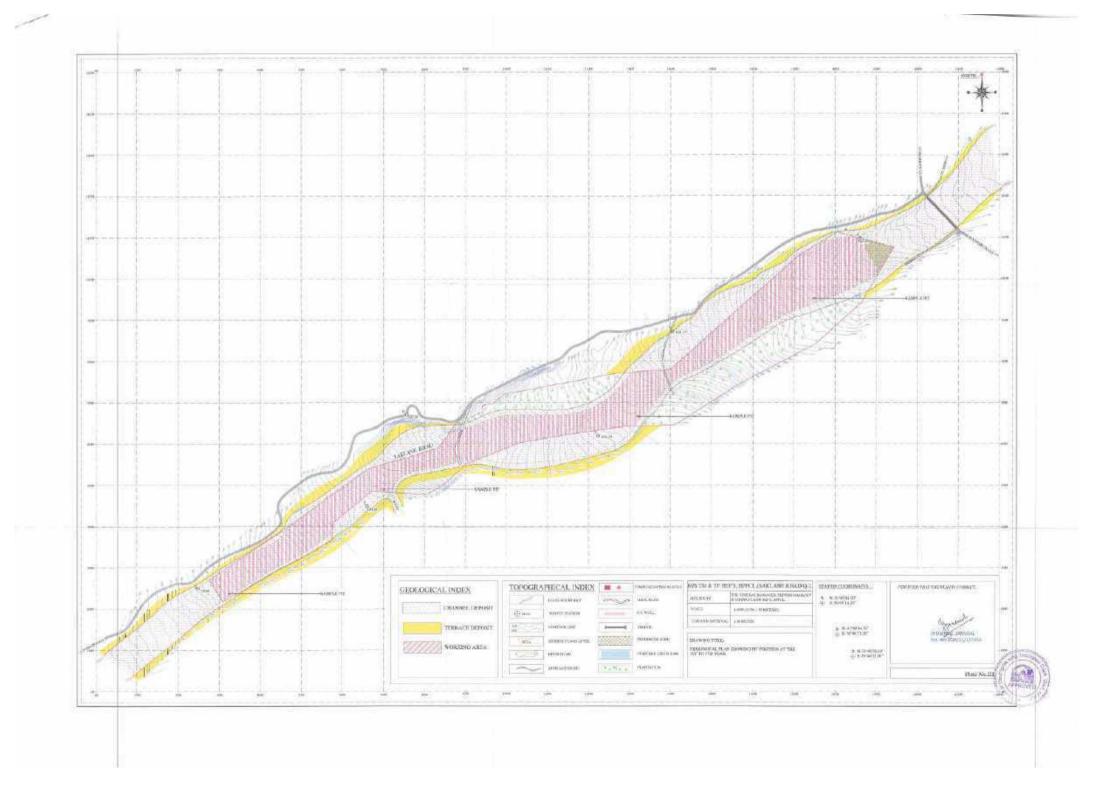
Geologica

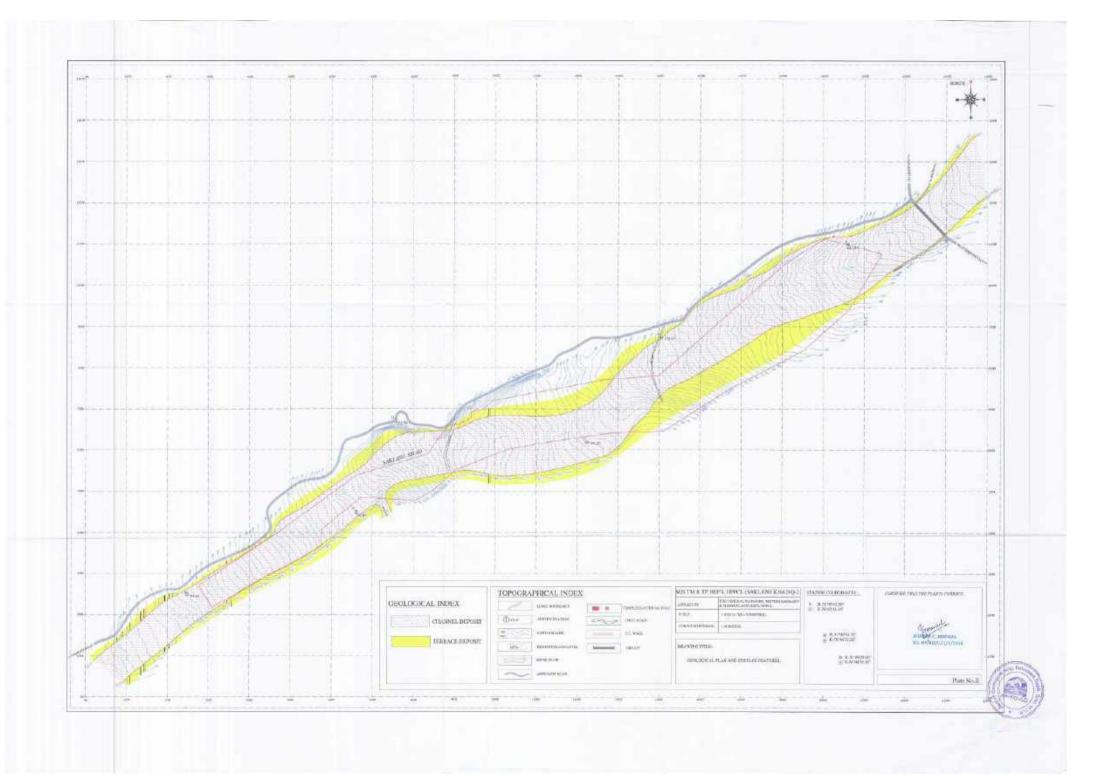
trauwe

Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016









# MINING PLAN

6

0

0

0

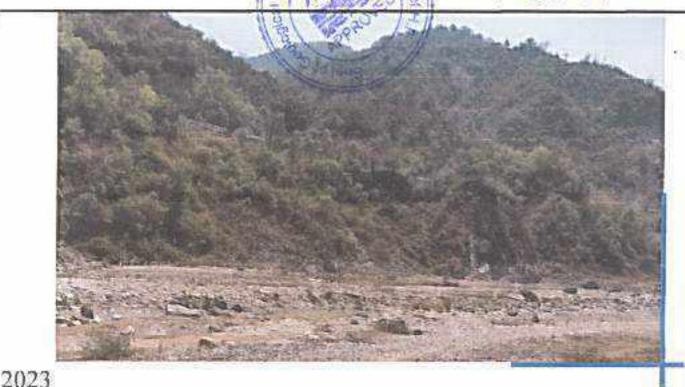
6

8

OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI, SITUATED IN KHASRA NO. 1291&1, MEASURING 4-09-69 HECTARE MAUZA BANAL & RIYUR, TEHSIL –DHARAMPUR DISTT – MANDI (H.P.)

LETTER OF INTENT GRANTED IN FAVOUR THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPS, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

Jhumpa C. Jamwal HP/RQP/21/1/2016.





# INDEX

T

•

÷Ö:

•

•

.

D

S.NO	INTRODUCTION	PAGE NO
	PARTI	
	INTRODUCTION	1
1	GENERAL	2
1.1	Name & Address of the applicant	2
1,2	Status of the Applicant	2
1.3	Mineral which the Applicant intends to Mine	2
1.4	Period for which the mining lease is granted	2
1.5	Name & Address of H.P.R.Q.P preparing the Mining Plan	2
1.6	Name of the Prospecting Agency	2
2	Location and Approach of the Area (Location Map)	3
2.1	Topo-sheet no.	3
2.2	Location of the Area	5
2.3	Address details	5
2.4	Distances from Important places in Kilometers	5
2.5	Approach of the Area	6
3	Physiographical Aspect of the Area	0
3.1	General	6
3.2	Altitude of the Area	. 7
3.3	Climate of the Area	n 1 8
3.4	Rainfall	19
3.5	Any other important Physical Feature	109
	PART-I	0181
1	Description of the area in which mine is situated 10	-/S0
1.1	General	1.5 10
1.2	Name of River/ Stream and its gradient in which the lease is situated	12
1.3	Drainage System	12
1.4	Type of Drainage	12
1.5	Origin of river	12
1.6	Altitude of Origin	12
1.7	Geometry of the Catchment of the river impacting the replenishment of deposit	12
1.8	Annual Deposition of the Place of Mining	12
1.9	The Competency of the river/stream at the mining site	12
.10a	The level of HFL	13

# Φ ø Ó

1.10b	The thread of deepest water in meandering.	13			
1.11	Altitude of the Area	13			
1.12	Description of groundwater table	13			
2	Geology				
2.1	The Regional Geology of the Area				
2.2	Local Geology of the area				
2,3	Geology of the lease area	18			
2.4	The nature of boulders, cobbles, sand etc				
2.5	Nature of rock and their Altitude	20			
2.6	Description of Annual Deposition w.r.t the Geology of catchment area and other factors	20			
3	Reserves	21			
3.1	General	21			
3.2	Percentage wise distribution of Mineral	21			
3.3	Estimate of Geological Reserve	21			
3.4	Estimate of Mineable Reserves of each Mineral	22			
3.5	Estimate Annual Deposition of Mineral	24			
4	Mine development and plan of Progressive Mining, Method of Mining				
4.1	Development and Production Programme for 5 years	26			
4.2 a	Development and Production at the end of 1st year				
4.2 b	Development and Production at the end of 2nd year				
4.2 c	Development and Production at the end of 3rd year				
4.2 d	Development and Production at the end of 4th year				
4.2 e	Development and Production at the end of 5th year	31			
4.3	End use of Mineral	32			
4.4	Detail of Road Transport	34			
199600	PARTII				
1	Base Line Data (Detail of the Land use and Social aspect of area)	36			
1.1	Detail of Population Distribution	36			
1.2	Socio-Economic of the Village	39			
1,3	Land use within 5km radius	120/: 1			
1,4	Agriculture	43/ 5/			
1.5	Horticulture Animal Husbandry	460 //			
1.6	Animal Husbandry	48			
1.7	Fisheries	49			
1.8	Flora & Fauna	50			
1.9	Climate of the Area	54			
Z	Environment Management Plan	56			
2.1	Impact on Land Use Pattern and Topography	56			

D

D

ß

D

B

D

Ð

.

2,2	Impact on Climate	56
2.3	Impact on air	56
2.4	Impact on Noise Level	57
2.5	Impact on Flora & Fauna	57
2.6	Impact on soil cover	57
2.7	Impact on Hydrology	57
2.8	Waste Disposal Management, if any	58
2.9	Socio-economic Benefits	58
2.10	Transportation of Mined Mineral	58
PAR	T III PROGRESSIVE MINE CLOSURE PLAN/RECLAMA	TION PLAN
1.1	Reclamation	59
1.2	Mine waste Disposal	59
1.3	Top Soil utilization	59
1.4	Preventive Check Dams	59
1.5	Plantation Work	59
2	Strategy for Protection Of Point Of Public Utility Etc.	60
3	Manpower Development	60
4	Use of Mineral	60
5	Disaster Management & Risk Assessment	61
6	Recommendation for Risk Reduction	61

R

.

G

# MAP INDEX

S. No.	Title	
1.	Locational Plan	1
2.	Geological Plan	
3.	Plan Showing working pit Position at the End of 1 <sup>st</sup> to 5 <sup>th</sup> year.	
4.	Buffer Zone 5 Kilometer radius Map.	- 4

Declaration Certificate of RQP



तामकाध शास्त्र. बद्यान विमान जिल्ला heological wring Topic of Industries himla APPROVED With Constitute तलों वे साथ जनुनोड़ीक 100 mm No U Lycg Bhu (cham1-4) lagher-41/2016. 4302 med 1990 21-7-23 Geologist Te IV) Geologica Minu Deptt. of industries Shimla-1

副

0 0

ē

de

# MINING PLAN OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA NO. 1291&1 MEASURING 4-09-69 HECTARE MAUZA BANAL & RIYUR, TEHSIL -DHARAMPUR DISTT - MANDI (H.P.) LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPS, M/S H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

# **INTRODUCTION:**

1

0

ø

100

0

10

0

0

ø

B

B

10

Ċ.

B

0

0

0

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' for grant of mining lease for mining sand, stone and bajri for a period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-41/2016-597 dated 23/05/2020 and extended for further period of one year vide letter No. Udyog-Bhu(Khani-4) Laghu-41/2016-5808 dated 9/11/2021.

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Nimachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and NPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely Pabber Valley Power Corporation (PVPC) and Kinner Kailash Power Corporation (KKPC), earlier owned by HPSEB, have been merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31.07.2007.

Thana plaun Hydro Electric Project is located between latitude 76° 15 E to 77° 15 E and longitude 31° 30'N to 32° 30'N in district Mandi. The project has been plauned as a runof inversion storage scheme on the right bank of river Beas with its Dam across the river Beas and underground Powerhouse located on right bank of the river near village Thana. The Stope, Bart and sand quartied from lease area will be used in the construction of the Project and its infrastructure.

In accordance with Rule 35 of the 'Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2015' the lessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the said Rules

ė

Ø

-0

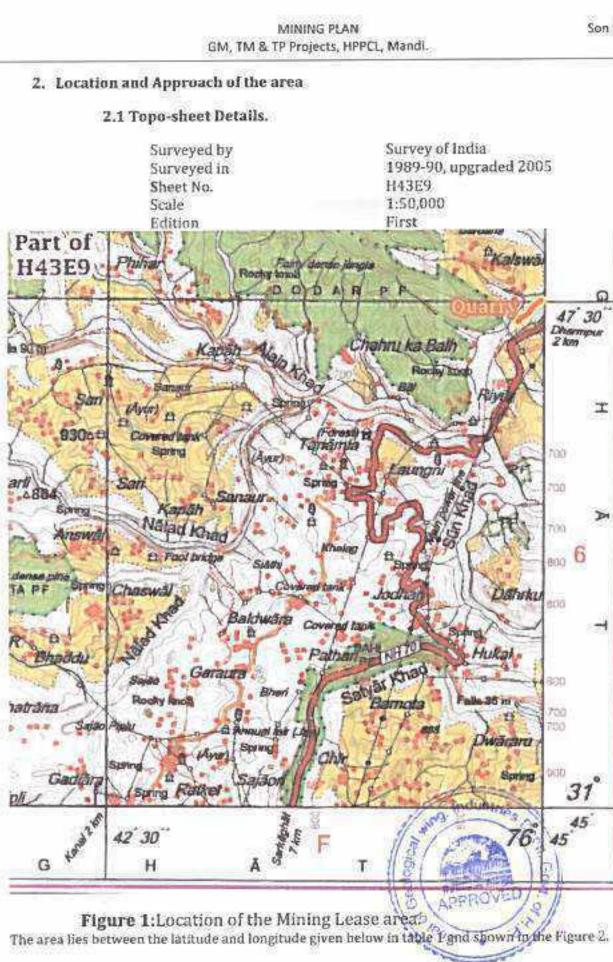
.....

.0

	GM, TM & TP Projects, HPPCL, Mandi.	1548
of th the l The	khad lease area is situated in Dharmpur Tahsil of Mandi District, Himachal Pradesh. The climat he area is tropical with well-marked summer, winter, and rainy season. The material available is lease area shall be mined (raised) by opencast method of mining. quarry lease area is located at about 3 Km. from Dhrampur. The area can also be approached ough an unmetalled road which leads to Dharampur-Kamlah road.	
Gei	neral:	
-171	Name and address of the applicant 1.1. A. Name of the applicant The General Manager	
	1.1. 8. Address of the applicant – The General Manager Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.	
1,2	Status of the applicant	
	Government undertaking.	
1.3	1.3 Minerals which the Applicant intends to mine	
	The applicants intend to mine stone, Sand and Bajri. The stones, sand and bajri will be used in construction activities of the Projects.	
1.4	Period for which the mining lease is granted	
	Five years effective from the date of execution of lease deed agreement,	
1,5	Name and address of the RQP preparing the Mining Plan: Jhumpa C. jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016 Mobile No. 9418909890.	
	1.6. Name and address of the prospecting agency The base contour map of the leased area was prepared by Shin C.P. Negl Retire Senior Surveyor, Geological Wing, Department of Industries, resident of Negl Lodge (West), Indernager, Dalli Shimla, for the RUP. The detailed prospecting of the area was carried out by the F Q.P for preparation of this report. The Secondary data is collected from variou Geological reports of the Geological Survey of India, Sathu Jal Vidwett Vigam Ltd Indian Metrological Department, Department of Economic and Statistic Himachal Pradesh, and various publications of Government of Himacha Pradesh. The detailed prospecting of the area was carried out by the R Q P for	gi or 15 1., 5,

Page 2

preparation of this report.



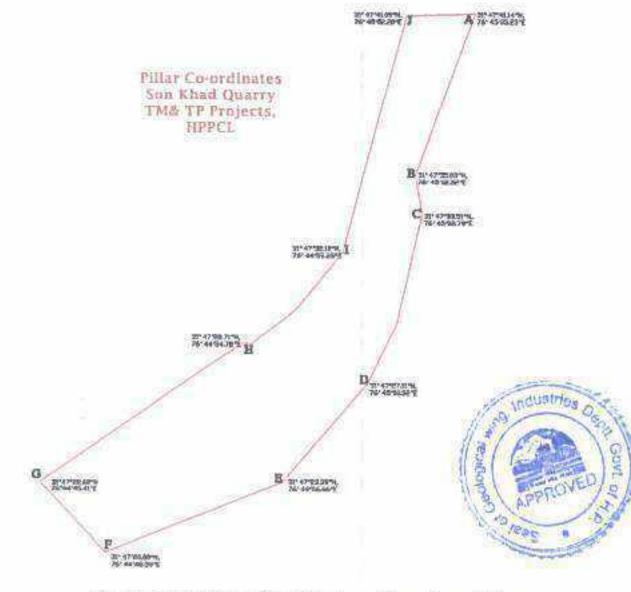
Ð

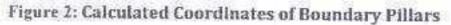
B

B

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

A Contractor	DAD APPLAS DOD	
14	31° 47' 41.09"	76° 45' 02.20"
B	31° 47' 35.03"	76° 45' 02.52"
6	31° 47' 33.51"	76° 45′ 02.79"
D	31° 47' 27,11"	76° 45' 00.32"
B	31° 47' 23.39"	76° 44' 56.46"
Ŧ	31" 47" 20.80"	76° 44' 48.59"
6	31° 47' 22.62"	76° 44' 45.41"
H)	31° 47' 28.71"	76° 44' 54.78"
1	31° 47' 32 .10"	76° 44' 59.25"
1	31° 47' 41.09"	76° 45' 02.20"





Page 4

Son Khad Querry @

đ

-8

# 2.2 Location of area of lease 2.2a Details of area

Ø

莭

The Revenue details of the area are given below in table 2 Table 2: The detail of the lease area

S. No	Khasra Number	Area Hectares	Owner of Land	Kism	Mauza/mohal
1	1291	3-73-23	Government	Gair mumkin khad	Banal
2	1	0-36-46	Government	Gair mumkin khad	Riyur
	TOT	AL	04	-09-69 HECTA	RES

2.3 Address & Detail of Lease

Village: -	Banal & Riyur
Patwar circle:	Banal
Post Office: -	Banali
Tahsil: -	Dharampur
District: -	Mandi
Sub-Divisional Office (Civil): -	Dharmpur
Divisional Office (Forest): -	Jogindernager
Range Office (Forest): -	Sarkaghat
Assistant Engineer (IPH): -	Dharampur
Assistant Engineer (PWD): -	Dharampur
State :	Himachal Pradesh
	Patwar circle: Post Office: - Tahsil: - District: - Sub-Divisional Office (Civil): - Divisional Office (Forest): - Range Office (Forest): - Assistant Engineer (IPH): - Assistant Engineer (PWD): -

2.4 Distance from Important Places to Quarry site.

S. No.	From	Te	Distance (In Rank)
1	Quarry	Roadside NH 3	0.2
2		Dharmpur	APPEOVED A
3	100	Mandi (District Offices)	2 19 71
4	Roadside	Shimla (State Hq)	16: 5 5 5 16:
5		Bunter (Airport)	121
8		Jogindernager Metre gauge Rly Stn.	51
7		Sarkaghat	57
8	10	Sujanpur Tira	5(

### 2.5 Approach to the Area.

The leased site is part of Riverbed and is at 2.5 km from Dharampur via NH3, which is approx. 200 m from the quarry site by a unmetalled Quarry road. The area can also be approached through an unmetalled road which leads to Dharampur-Kamlah road. Figure below shows the approach map of the area.



Figure 3: Approach to Quarry site



Son Khad Quarry

8

8

62

-61

6

-

句

0

6

6

8

th:

10

6

0

0

8

6

8

8

8

0

10

6

6

Ø.

æ

60

65

60

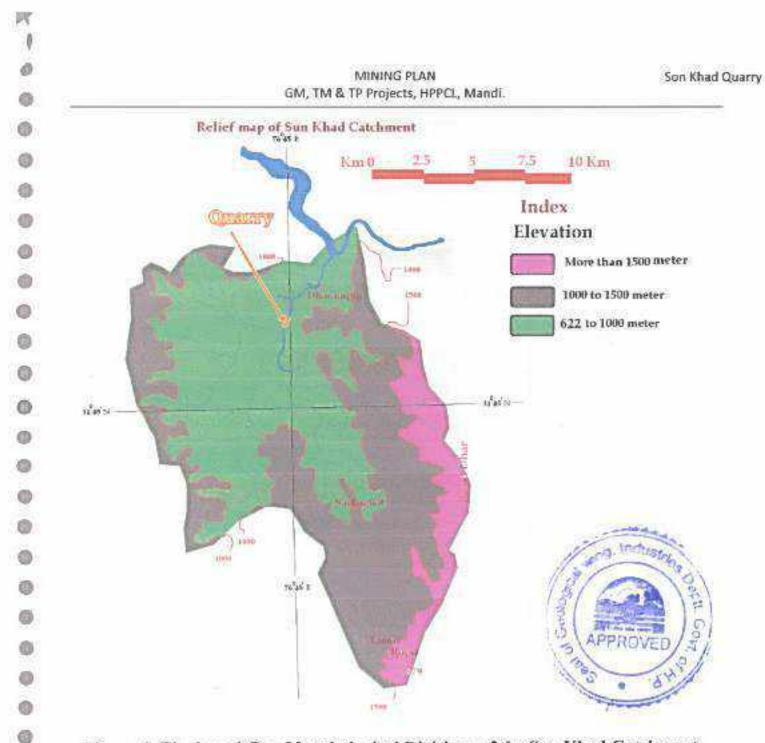
62

### 3. Physiographical Aspect of the Area

### 3.1 General

The area in general is a part of the Lesser Himalaya. The Lesser Himalayas, located in north-western India in the states of Himachal Pradesh and Uttar Pradesh, in north-central India in the state of Sikkim, and in north-eastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height.

The general relief of the Mandi District is as given below in the figure: -3: -



# Figure 4: The broad Geo-Morphological Divisions of the Son Khad Catchment.

The Satellite photograph was taken from the Google is given below (Figure: -4) to depict the general physiography of the area showing that the major ridges/water divides are generally running N-S and all spurs are running parallel to the NE-SW line.

### 3.2 Altitude of the area

0

0

0

0

0

0

0

0

0

0

0

Ô

- ➢ The highest contour of leased out area in Beas River is 648 Meters above MSL,
- > The lowest contour of the leased-out area in Beas River is 642 Meters above MSL.

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

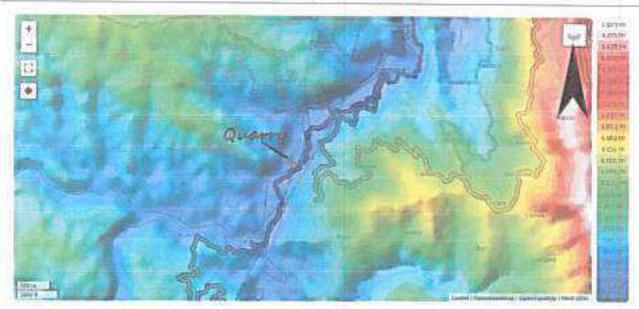
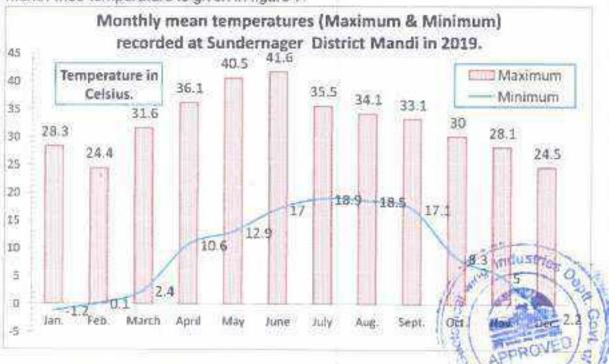
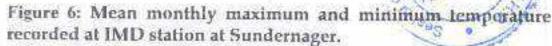


Figure 5: Terrain Map of the Area.

#### 3.3 Climate of Area

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 7.

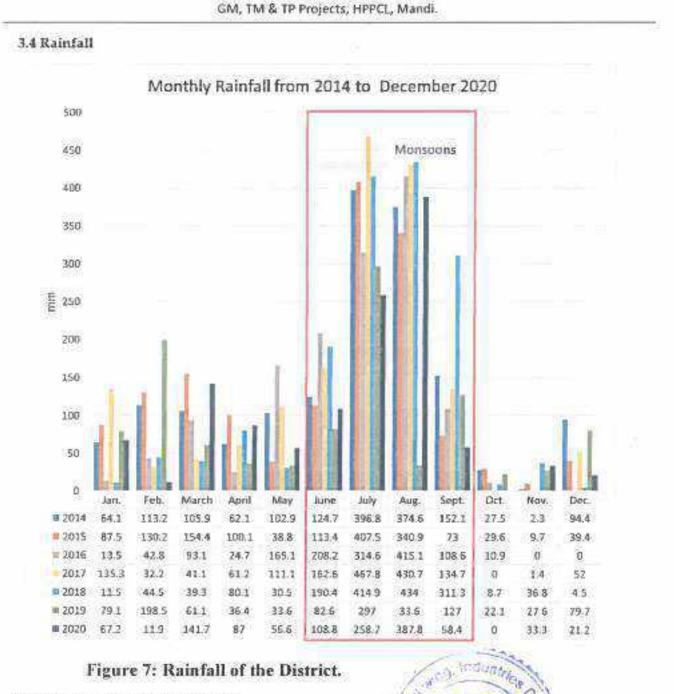




Page 8

Son Khad Quarry

e



MINING FLAN

Son Khad Quarry

### Figure 7: Rainfall of the District.

#### 3.5 Any other important feature

£B

è

۰، ک

G

Ô

The mining leased area falls in riverbed of Son Khad tributary of Beas River and accessibility to the quarry site is through a kutcha road from ( 

Son Khad Quarry

0

65

0

63

6

10

100

0

0

0

ö

0

8

0

0

6

6

0

0

0

6

8

### PART I

# 1. DESCRIPTION OF RIVER/STREAM BED IN WHICH THE LEASED IS SITUATED

# 4.1 General

The leased area is situated in the Son Khad, a primary tributary of Beas River. Son Khad originates at a height of 1879 meter above mean sea level, from Sinkandr Dhar (origin lies in the Survey of India, topo-sheet NoH43E14. The general flow is S to N.

The attitude at confluence with Beas River is 622 Metres above MSL (lies in the Survey of India, toposheet No H43E113). The total length is about 27 Km. (The total catchment of the Son Khad lies on survey of India Topo-sheet Nos H43E9, H43E10, H43E13 & H43E14.

The general analysis of the drainage system of Son Khad is given below in table 5 (as per 1:125000 scale)

Sr .No	Drainage	No of Stream	Total Length Km	Average Length Km	Bifurcation ratio
1	lst Order	65	156	2.4	0,92
2	2 <sup>nd</sup> order	16	33.6	2.1	0.94
3	3 <sup>rd</sup> order	5	31.6	6.3	0.83
4	4 <sup>th</sup> order	1	s.4	9.4	0.5Pidustries
	Total stream	87	230	1000	

# Table 3 Showing drainage analysis of the Son Khad Catchment

There is no uniformity/ equational order of average length in each profer suggesting that river has not attained proper age and valley is in process of expansion Le erdsion in upper reach will be unavoidable. Bifurcation ratio also suggest that it has not attained maturity particularly 1<sup>st</sup> and 2<sup>nd</sup> order hence regular erosion in the upper reaches. The low bifurcation ratio of the 3<sup>nd</sup> order stream is indicative that the valley is

in the stage of further expansion. The average length of 2<sup>nd</sup> order is less than 1<sup>st</sup> order is indicative of structural control of the valley.

### Basic Geometry of the catchment is as: -

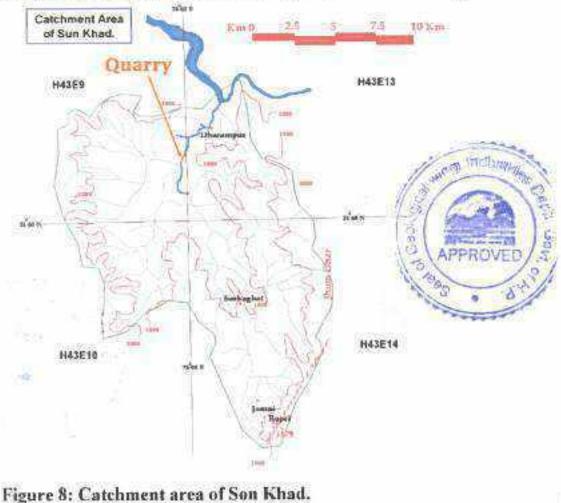
(2)

123

- Area of the Catchment = 187.4 Sq. Km Perimeter of the Catchment = 54 Km
- Length of the river 27 Km Length of Valley 22 Km
- Width of the catchment at maximum 15.2 km
- From various analysis of the drainage the son Khad can be divided into two parts
  - From origin to the 800 meter above mean sea level
    - The zone of active erosion-Young stage
- From 800-meter contour to confluence with Beas River The zone of erosion during very high flood otherwise deposition --Maturity stage.

## The leased area is situated in the zone of Maturity

## The catchment of the Son Khad is given below in the figure 8.



MINING PLAN GM, TM & TP Projects, HPPCL, Mandi	Son Khad Quarry
1.2 Name of River/ Stream in which the leased is situated	
Son Khad - Primary Inbutary of Beas River.	
1.3 Drainage System	
Beas River	0
1.4 Type of Drainage	0
Dendritic (Figure 7)	6
1.5 Origin of River/Stream	6
Son Khad originates at a height of 1879 meter above mean sea level, from Sinkandr Dhar (origin lies in the Survey of India, toposheet No H43E14). Th general flow is S to N.	
The attitude at confluence with Beas River is 622 Metres above MSL (lies in Survey of India, toposheet No H43E13.	i the C
1.6 Attitude at Origin	0
1879 metres above MSL	0
1.7 Width of River at the place of Mining	
85 to 180 Metres	
1.8 The annual deposition at the place of mining	
5 to 8 Cm, at different location, in the Son Khad as evident from the photo 1	0
	000000000000000000000000000000000000000
Photo 1 Showing annual deposition of 5 to 8 Cm near quarry area a also showing one-year depositional part. 1.9 The Competency of the River/ Stream at the mining site	ind e
The general competency at the mining area is 6 to 10 Kg approx. The largest be varies 24 to 37 cm X 19 to 34 cm X 19 to 32 cm (length X breath X height) (Photo 4.)	Sulder O
Page 12	- 0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



Photo 2 :Showing the competency of river in leased area

### 1.10 The level of HFL

10

13

10

ß

Ð

商

65

D

3

3

0

D

3

8

D

3

5

3

During monsoon floods the water level rises by about 1.5 metres, at times for short spells.

PPROVED

### 1.11 The level of LFL

About 0.40 centimetres.

## 1.12 The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

## 1.13 Groundwater table.

The depth of groundwater level varies in the area according to season and distance from water current. It lowest in the pre monscon period and highest in the post monscon period. Thus depth of groundwater table may vary from few centimetres in post monscon period and more than a metre in the pre-monscon period depending upon distance from flow.

# 2. Geology

# 2.1 Regional Geology

GEOLOGICALLY Himachal Pradesh can be broadly divided into two major geo-tectonic zones viz. the Lesser Himalayan tectogen in the south and the Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectonic break collectively designated as Main Central Thrust in the sense defined by Snkantia (1988). Mandi District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterozoic to Quaternary. The oldest rocks are of undifferentiated Proterozoic age, comprising canrbonaceous phyllite, schist, gneiss, quartzite and marble. The Ghoghar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sondernagar Group of Rocks of Meso- Proterozoic age is represented by guartzite with basic flows. The Shali Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at places stromatolytic) slate, & quartzite. The Subathu consists mainly, of olive green shales and grey shales. At the top, a band of white quartzite is exposed; this band of white quartzite has been taken as the marker, defining the top of the Subathu sequence. The thick sequence of brackish and fresh water sediments immediately succeeding the fossiliferous marine Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Miocene of Early Pleistocene age comprises coarse clastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles and cobbles occurring along present, channels of Middle to Late Pleistocene and Holocene age.

# 5.2 Local Geology

The local geological sequence in the area is given in the figure WP7 and stratigraphy of the area is given in the table WP-5

詞

9

b

þ

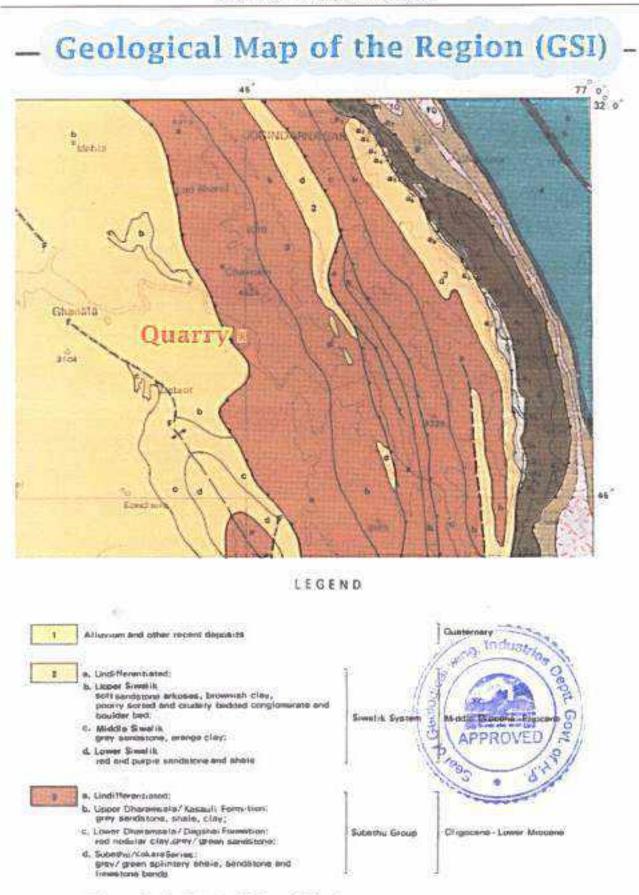
D

D

b

6

Son Khad Quarry



## Figure 9: Geological Map of the Area

### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

			1
Son	Khad	Quarry	1
1000	100.010	CONDITI'S	

đ

6

0

6

6

c

63

8

8

6

eh

8

8

PROVED

		10 M (10 10 10 10 10 10 10 10 10 10 10 10 10 1				
Table: Stratigraphy	of	the	Son	Khad/Son	Khad	Area
a wanter a mar manage where a			2011	THE GOULD ON THE	1.010.000.000	F11 - M

Sr. No	Formation	Rocks
1	Newer Alluvium Channel Alluvium	Grey micaceous, fine to coarse grained sand, silt, clay, boulders, cobbles and pebbles of sandstone and quartzite
2	Upper Siwalik	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown claystone
3	Middle Siwalik	Massive Sandstone with minor conglomerate and local variegated claystone
4	Lower Siwalik	Alternation of fine to medium- grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium maroon claystone in the middle part
5	Upper Dharamshala	Medium to fine grained, hard, bluish grey and massive Sandstone, green clay and siltstone
6	Lower Dharamshala	Hard, grey, well bedded, and high mica content sandstone

# 2.2.1 Dharamshala Group

The thick sequence of brackish and freshwater sediments immediately a succeeding the fossiliferous manne Subathu Formation is the Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon, these rocks are exposed, in the core of the Sarkaghat anticline.

This highly folded and faulted sequence of Dharamshala aggregating to about 4000 meter displays a contrasting topography with that of younger and softer Siwalik rocks. The thick, hard, and highly competent Dharamshala rocks stand out as prominent ridges with higher relief.

Dharamshala Group is divided into two Formations:

Upper Dharamshala

#### Lower Dharamshala

#### 2.2.1. a: Upper Dharamshala Formation

Upper Dharamshala consists of thick sequence of sandstones, sittstones, and clays. The Sandstones are medium to fine grained, hard, bluish grey and massive while the clays and sittstone are usually green.

#### 2.2.1. B: Lower Dharamshala Formation

Lower Dharamshala formation consists of very bright and red and mauve coloured clay and shales with thin bands of sandstone which are steel grey in colour, highly micaceous and well bedded.

#### 2. 2.2 Siwalik Group

D

D

b

D

D

D

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They comprise mudstones, sandstones, and coarsely bedded conglomerates laid down when the region was a vast basin during Middle Miocene, to Upper Pleistocene times. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive multiordered drainage systems. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times), subsequently resulting in a unique topographical entity - the Siwalik Hills. The Siwaliks are divided stratigraphically into three major Subgroups -Lower, Middle, and Upper. These Subgroups are further divided into individual Formations that are all laterally and vertically exposed today in varying linear and random patterns.

Ongoing erosion and tectonic activity have greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), and earthpillars, filled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and Choe terraces. Associated badlands features include the lack of yegetation, steep slopes, high drainage density, and rapid erosion rates.

In the advent of Neogene, a depression was formed in front of the rising mountains (Proto- Himalaya). This depression becomes a repository of a thick sequence of molassic sediments of the Siwalik. The Siwalik Group comprising conglomerates friable micaceous sandstone, siltstone and claystone.

The conglomerates in general are poorly cemented but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite. The stray pebbles of granite, limestone, sandstone, breccias and lumps of claystone are also observed at places. Often the size of pebbles is large enough to be called as Boulders. The conglomerates not only occur as regular band but also as lenticular bands alternative with MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

micaceous sandstone and clay-beds. The sediments were bought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly Rising Mountain mass of the Himalaya, in the north.

Son Khad Quarry

1

4

1

6

6

1

1

0

0

6

6

Ű.

0

0

đ

8

8

0

1

đ

0

8

8

60

0

8

8

6

65

0

0

The Siwalik Group is divisible into three sub-groups respectively the Lower. Middle and Upper on the basis of the lithostratigraphy as given in the table (Table -4)

> 2. 2.2.a: Lower Siwalik: - The lower Siwalik consists essentially of a sandstone-clay alternation. In district Kangra the lower sequence of the lower Siwalik consists of medium grained sub-graywacke interbedded with thick red clay, but higher up in sequence, sandstones are coarser, and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartzite possible derived from the Shali. The total thickness is 1600 metres.

> 2. 2.2.b: Middle Siwalik - The Middle Siwalik Subgroup comprises of large thickness of coarse micaceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 metres

> 2. 2.2.c: Upper Siwalik: -The Upper Siwalik is mainly represented by sandstone inter-bedded with silt and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clays intercalations. The general thickness in the district is 2300 metres.

### 2.2.3 Newer Alluvium

Newer Alluvium is composed of cyclic sequence of grey, micaceous, fine to coarse grained sand, silf, boulders, cobble, pebble and clays. Newer alluvium exposed as point bar/channel bars within the active channels.

### 2.3 Geology of the leased area

The quarry out area forms a part of the stream bed covered with boulders, cobbles, pebbles, river born bain, and sand and clay deposit of Channel alluvium. The rocks in the catchments of Son Khad is of Upper Siwalik Formation. The area is comprising predominantly the quartizte Boulders, Sand and river born bain of Sandstone. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour.

### 2.4 Nature of the Boulder/ Cobble/ Sand

含

3

13

b

1

3

13

話

D

0

65

3

D

0

1

13

(D)

0

0

8

0

The area lies with in the regular course of the Son Khad gets flooded in the rainy season

All the deposit comprises quartzite, sand and fraction of granite, limestone and breccias- fragments. The boulders are white, spotted white, greenish white, pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit varies from one to three meter

During the monsoon this bed replenishes to a large extend from the Upper Siwalik Formation rocks due to erosion by heavy flow from higher reaches. Oue to sudden decrease in the carrying capacity and competency of the river the annual deposition of one to three cm is received.

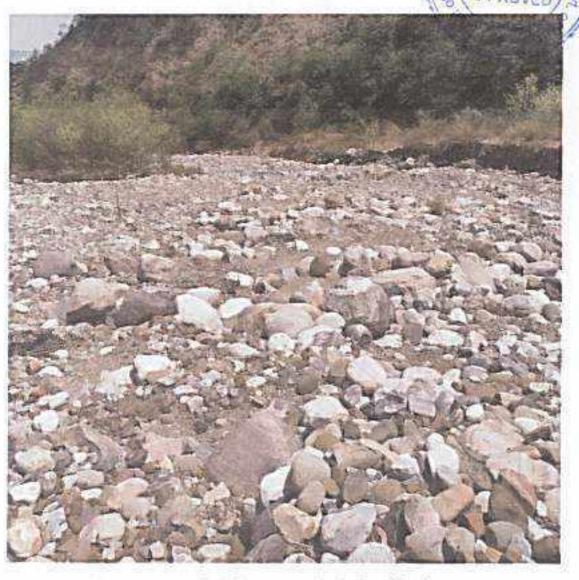


Photo 3; Showing the nature of the Lease area in the Son Khad.

#### Son Khad Quarry

1

61

đ

13

8

3

8

0

0

0

8

0

ê

臣

Ó

65

MUSTIN,

# 2.5 The Nature of the rock along the bank

The rocks along the left bank belong to Terrace Deposition of the Quaternary Formation consisting of boulders, cobbles, pebbles, niver born bajn, and sand and clay deposits and tertiary formations consisting of sandstone, claystone and boulderbeds.



Photo 4 Rocks on the banks.

### 2.6 Estimate Annual Deposition of Mineral

The area being part of the River which receives annual rainfall, the mining bits will get replenished during the rainy (monsoons) season. As abundant precaution, keeping in view the variation in rainfall particularly highest rainfall, which generally causes floods, the factor of five cm annual replenishment is taken into consideration in general. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. However, it is generally observed that replenishment of more than five cm occurs in a year as all the old pits get filled with mineral during the very first flood of the monsoon. Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains.

Page 20

### 3. RESERVE ESTIMATE

### 3.1 General Consideration

B

ß

3

63

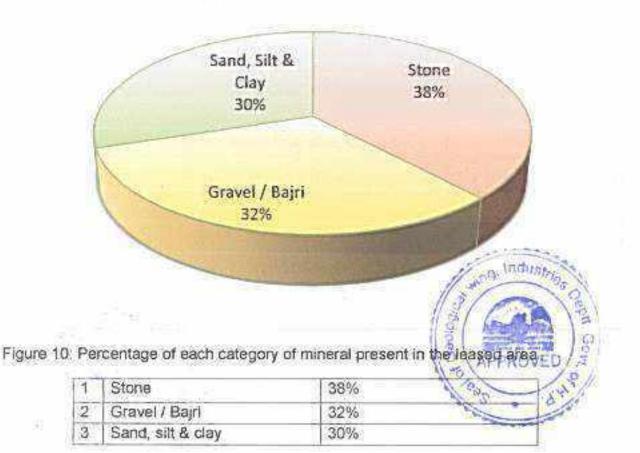
The basic requirement of the leased or will be stone, bajri and sand for construction of Project.

### 3.2 Percentage wise distribution of Mineral:

The table below shows the percentage wise distribution of minerals and figure 9 depicts the pie chart for the same.

Table shows the percentage wise distribution of minor minerals:

Percentage of Minerals/Material in the Mining Lease Area



## 3.3 Estimate of Geological Reserve

The entire block falls within the river corridor. Thus, the mining leased area of 40969 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than 5 metres. However, considering its depth for

¢.

đ

0

10

£

8

1

18

6

¢Ì,

6

0

1

Ć

ŝ

0

63

đ

6

63

0

63

0

0

8

23

0

Ø.

8

purpose of estimation of Geological reserves to a depth five metres and specific gravity to be 2.25, the Geological deposits in the area are to a tune of about 460900, tonnes as shown in the chart.

Geological	Thickness,	leased Area	<b>Reserves Rounded</b>	
Beserves	in metres	(Square Metres)	off (In tonnes)	
Proved	3	10969	160900	
Specific Gr	acity 2.2.5			
Formula =	Surface area	X thickness/depth )	vecific gravity =	

3.4 Estimate of Mineable reserves of boulders, Bajri and Sand

The basic requirement of the leased or is sand, stone and bajri. As per the policy guidelines issued by the State Government for Mining of River / Riverbed and to calculate the mineable reserve the following points are taken into consideration: Adequate safe distance has been provided from the points of utilities as per Rules and guidelines.

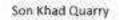
As per the policy guidelines issued by the State Government for Mining of River / Riverbed,

- In this case only one-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- Mining is not permitted within 1/10<sup>th</sup> of riverbed or 5 meters from the banks (HFL) of the river / River whichever is higher. The width of the River in leased area is 85 to 180 meters; thus, no mining is proposed in the area up to 9 to 18 meters from the banks.
- The water table level will go down as the water recedes after the monsoons.
- The depth of water table will be at lowest in the pre-monsoon season
- A geological map on 1:2000 scale is prepared and main litho units were marked on the plan to know the surface spread of each unit.

The entire width of the river gets flooded during heavy rains in monsoons. The mined area gets replenished in the very early floods in the beginning of the monsoon season.

The total mineable area and deposit is shown in figure 12, table 7 and figures 13.

The part of the area, i.e., 21700 square metres of lease area, is mineable as it falls within the river corridor, leaving out the safety zone provided along the banks.



MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

e B

D

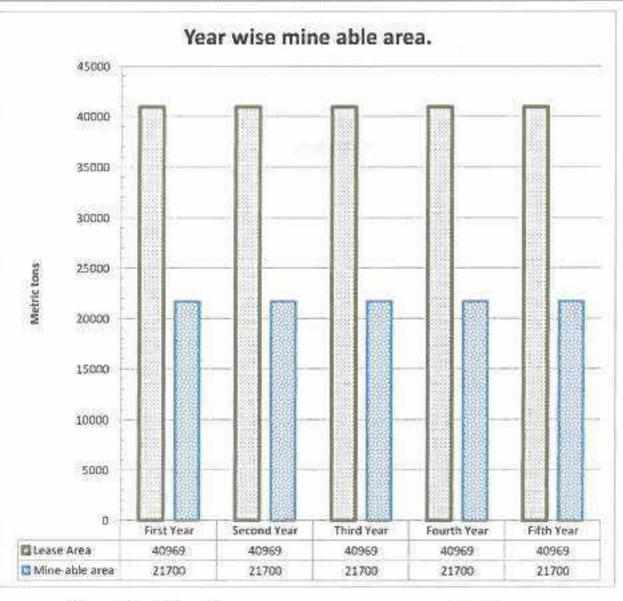
D

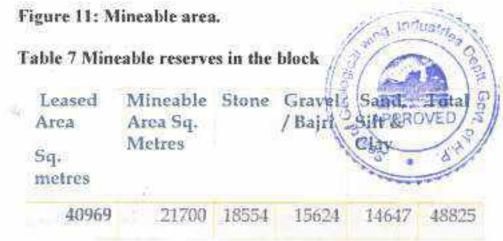
D

D

B

m





MINING PLAN GM, TM & TP Projects, HPPCL, Mandi. Son Khad Quarry 🔍

63

0

6

e

đ

0

6

đ

6

0

0

0

0

0

0

曲

0

0

-

0

8

0

0

6

8

0

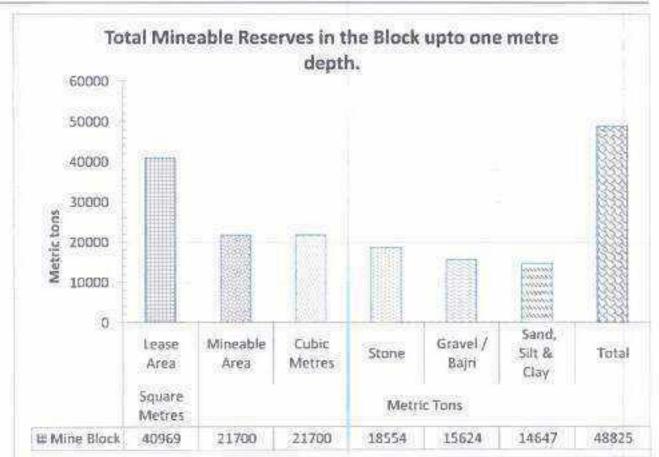
0

0

0

0

8



## Figure 12: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 21700 square metres contains 21700 tonnes of mineable material. The entire mine able block will be mined every year.

## 3.4a Depth of mining

The Rule 34 (IV) of Rules stipulates 'the depth of mining in the riverbed shall not exceed one metre or water level whichever is less'.

One metre maximum depth from the surface is considered for mining of the reserve.

### 3.4b. Specific Gravity

The specific gravity of Quartzite is 2.65 and of sand is 1.85. Hence average specific gravity of 2.25 is taken for calculation of the deposit.

## 3.5. Estimate of Annual deposition

The reserves of all the constituents of leased block have been calculated for the safe mineable area to be 48825 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure13. Depending upon normal rainfall from year to year causing erosion in the catchments and flooding of Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

Figure 14 shows the proposed production of materials in five years.

5

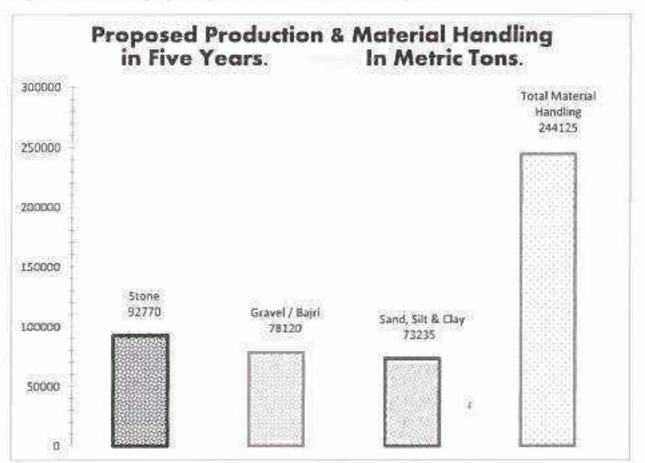
b

D

þ

10

D



## Figure 13: Proposed production of total material in five years

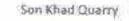
## 4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent semi mechanical. Normally it has been observed that a worker can mine/excavate about three to four tonies of material in a day. To excavate 180 tonnes of material in a day 45/60 workers would be required. Working of so many persons in a small area would cause, condection and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to both manual as well as mechanically. Workers are mainly deployed in riverbed mining for extraction and for loading of extracted material into tipper truck and tractor trolleys loader/ JCB will be operated. Drivers/ Operators for loaders, tippers and tractors will be another category of workers.

## Considerations

- No blasting is required.
- Only manual/semi mechanically extraction of RBM (River Bome Material) will be undertaken.

P-110	VING PL	AN	
GM, TM & TP P	rojects,	HPPCL,	Mandi,



đ

đ

4

14

1

8

ł

1

Ø.

đ

đ

đ

6

e

0

1

đ

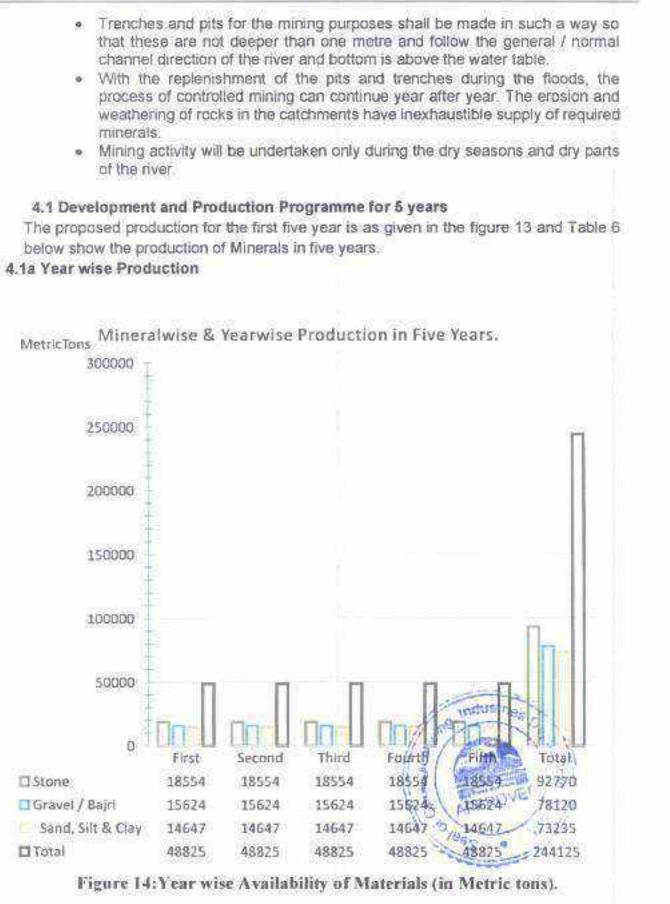


Table 4 Year wise production of materials.

9 9

D

D

D

В

9

Ð

b

53

5

Ð

0

0

D

3

3

Ð

D

3

Ð

0

10

B

B

D

0

Year	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
First	18554	15624	14547	48825
Second	18554	15624	14647	48825
Third	18554	15624	14647	48825
Fourth	18554	15624	14647	48825
Fifth	18554	15624	14647	48825
Total	92770	78120	73235	244125

The proposed production is sufficient to for sustaining a viable mining project. The year wise mine working planned for the Quarry is presented in the map 3. Year wise production of River Borne Material, sand, stone and bajri is given in figures 15, 16, 17, 18 & 19.



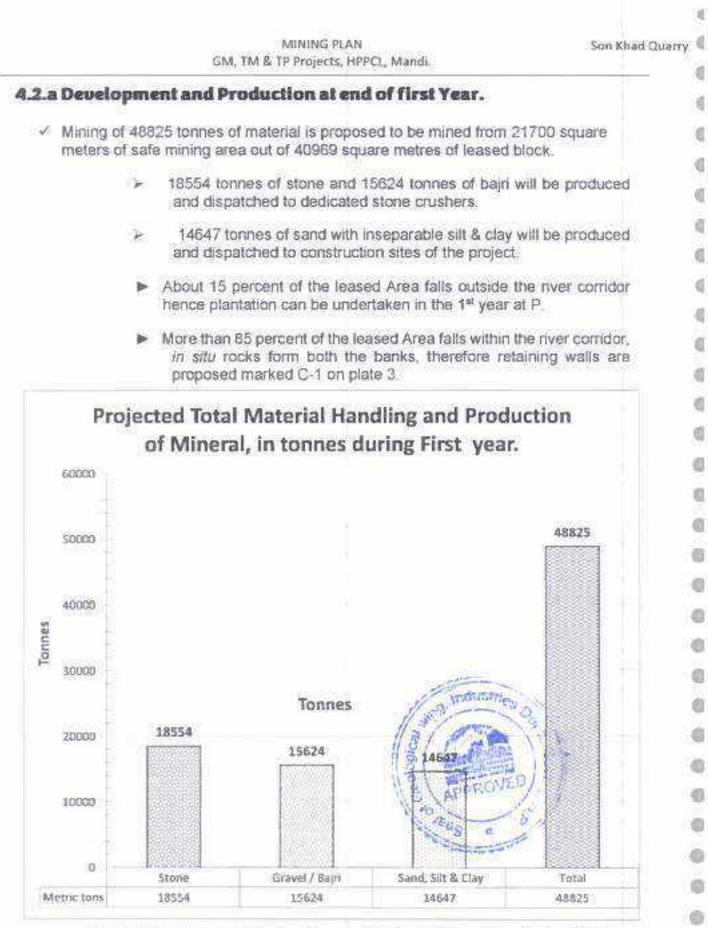
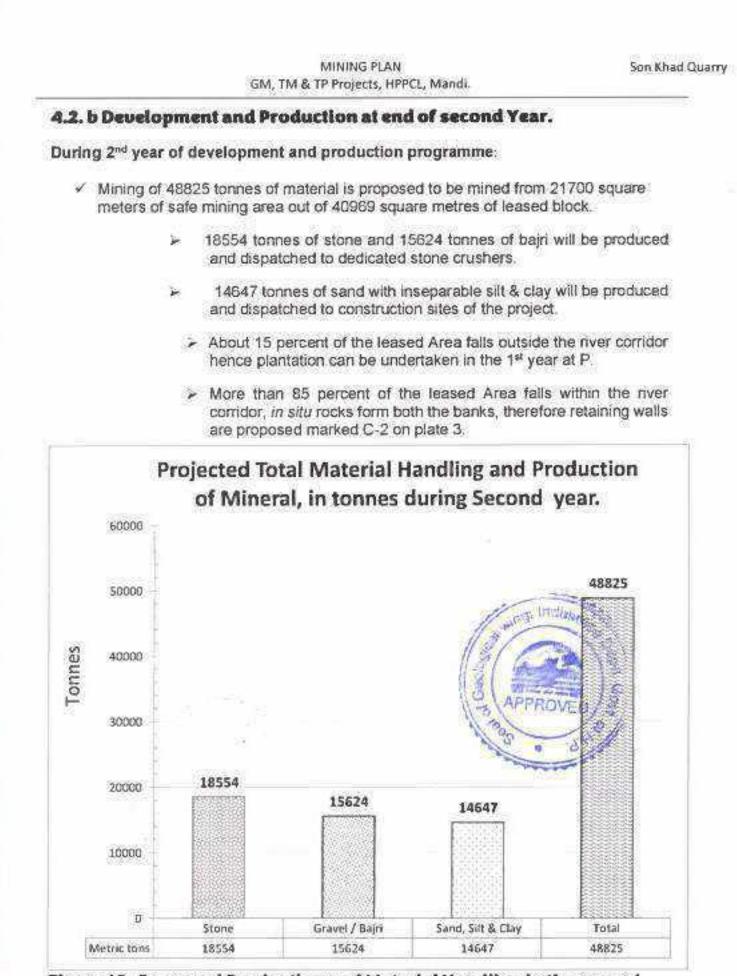
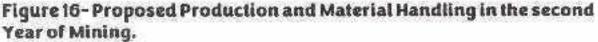


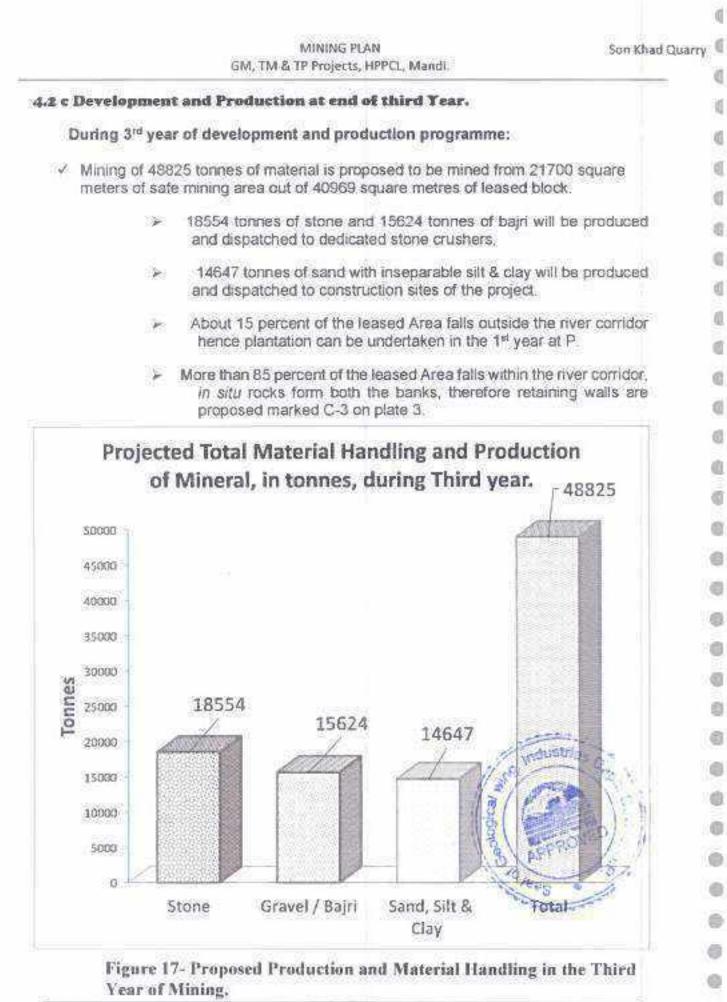
Figure 15- Proposed Production and Material Handling in the First Year of Mining.



12

b





Page 30

0

65

G

12

1411

D

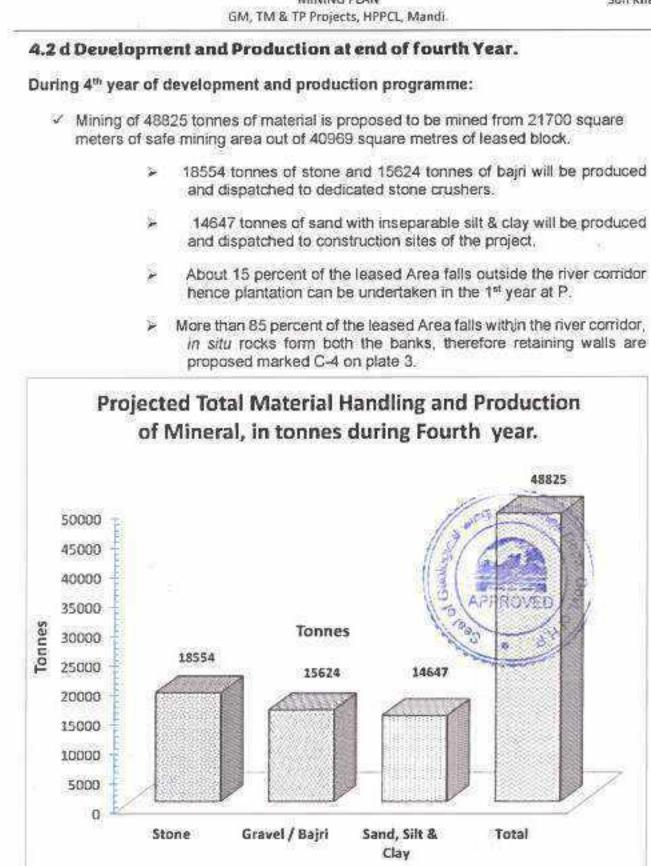
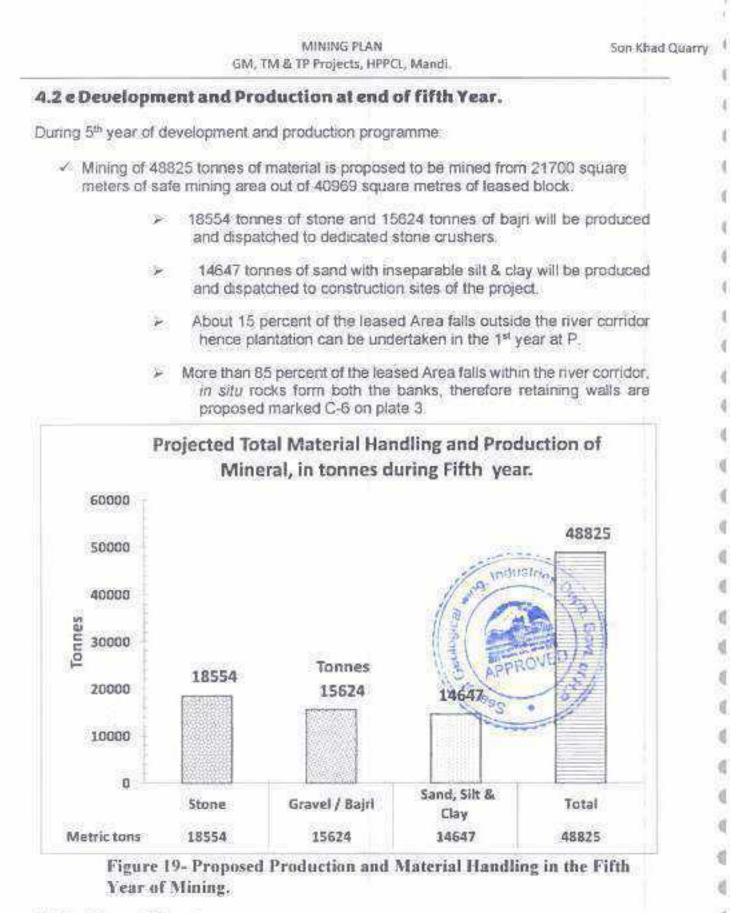


Figure 18- Proposed Production and Material Handling in the Fourth Year of Mining.



## 4.3 End Use of Mineral

The extracted mineral stone, sand and Bajri for will consumed in the Project construction activities. đ

0

10

61

Page 32

ß

Б

P

bi

臣

ā.

Ð

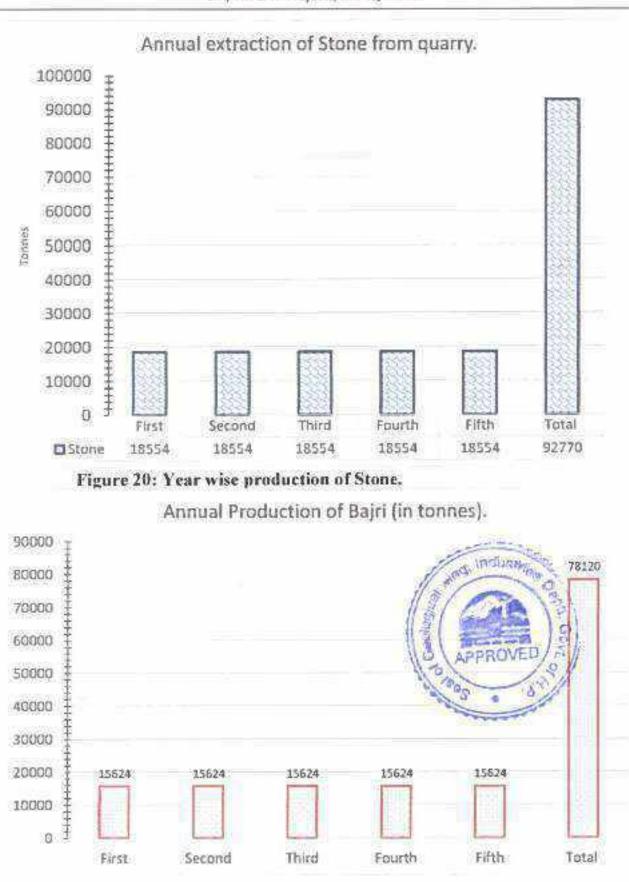


Figure 21: Annual Production of Bajri.

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Son Khad Quarry

đ

8

łÌ

16

8

늰

췽

0

佰

0

司

0

0

6

3

0

۲

0

0

8

8

9

0

0

-0

0

戀

6

0

1

0

industrian

120100

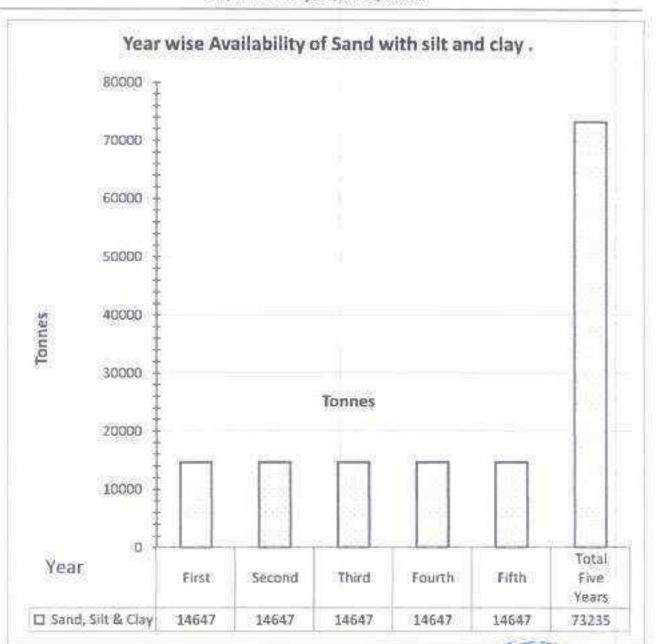


Figure 22: Annual production of sand along with silt & clay 3

## 4.4 Detail of road Transport

The maximum total extraction of minerals stone, sand and bajri for use in the Project would be 48825 tonnes or 180 Tonnes per day, considering 270 working dry days. Thus, about 20 tipper truck trips would be required to move the material from quarry to crusher / construction sites. The track through River is about 200 metres from the leased area to roadside. The evacuation route is shown in figure 23.

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

e D

B

9

3

D

D

D

3

3

D

D

D

1

0

D

Ð

D

D

0

0

8

Ð

0

1

9

۵

Ð

0

0

0

1

0

8

0

Son Khad Quarry

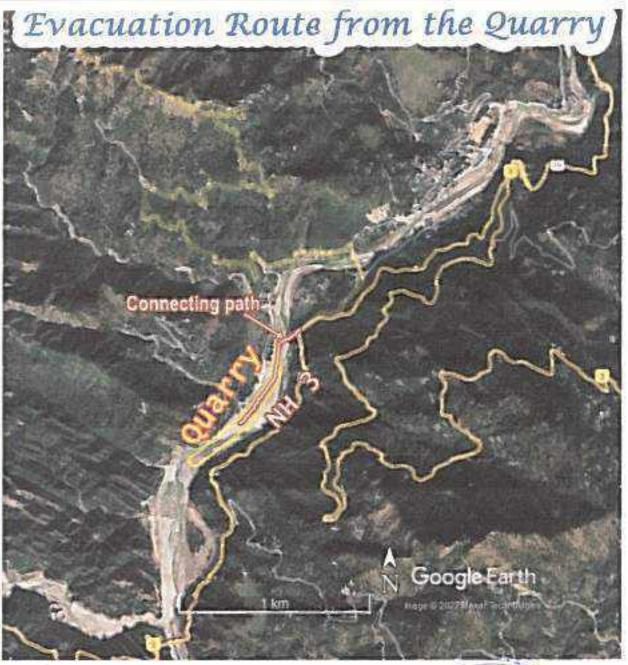


Figure 23. Evacuation route Map



		N	INING PL	AN	
GM, TM	8	TP	Projects,	HPPCL,	Mandi.

Son Khad Quarry

đ

6

63

Ċ)

ei,

10

#### PART II

#### Environment Management Plan

#### 1.0 Base Line Data

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below:

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate -
  - Rainfall
    - Wind Speed

Temperature

- Air Quality
- Noise level
- Visual Impact
  - Socio- economic Impact in of Scree - Mine Waste.

Accumulation of Scree

The base line information of the existing environment was collected from various sources such as

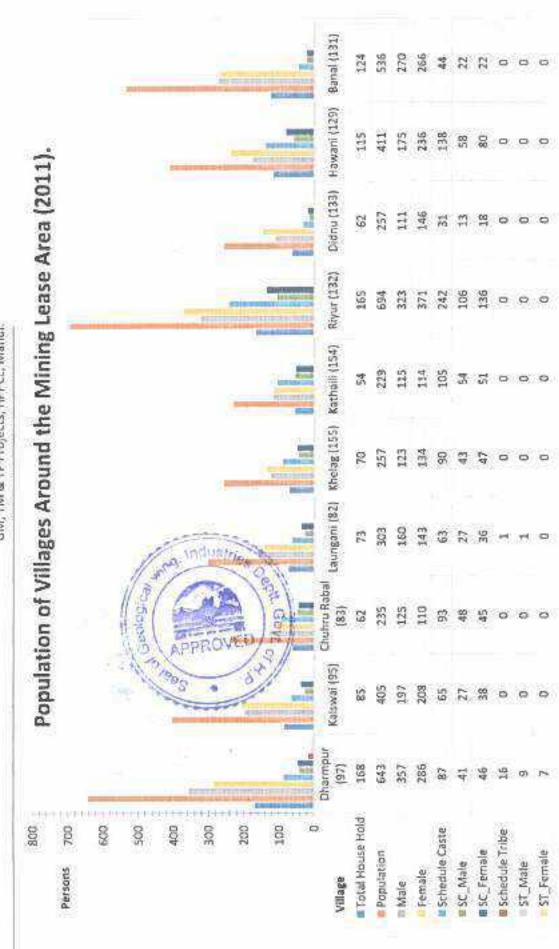
- ✓ Census Department, Government of India.
- Department of Economics and Statistics, Government of Himachal Pradesh.
- Directorate of Land Records, Government of Himachal Pradesh.
- Directorate of Horticulture, Government of Himachal Pradesh
- Fishery Department, Government of Himachal Pradesh
- Forest Department Covernment of Himachal Pradesh
- ✓ Animal Busbandry Department, Government of Bimachal Pradesh
- ✓ Survey of India, Government of India
- Metrological Department Government of India

to have in depth understanding of the existing environment and to assess the likely impact of mining activity in the Area

## 1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Census is given below in the figure 24. Education wise and employment wise break of population in surrounding villages is given in figure 25. The population details of Mandi District and sub tensil pharampur is given in figure 26.

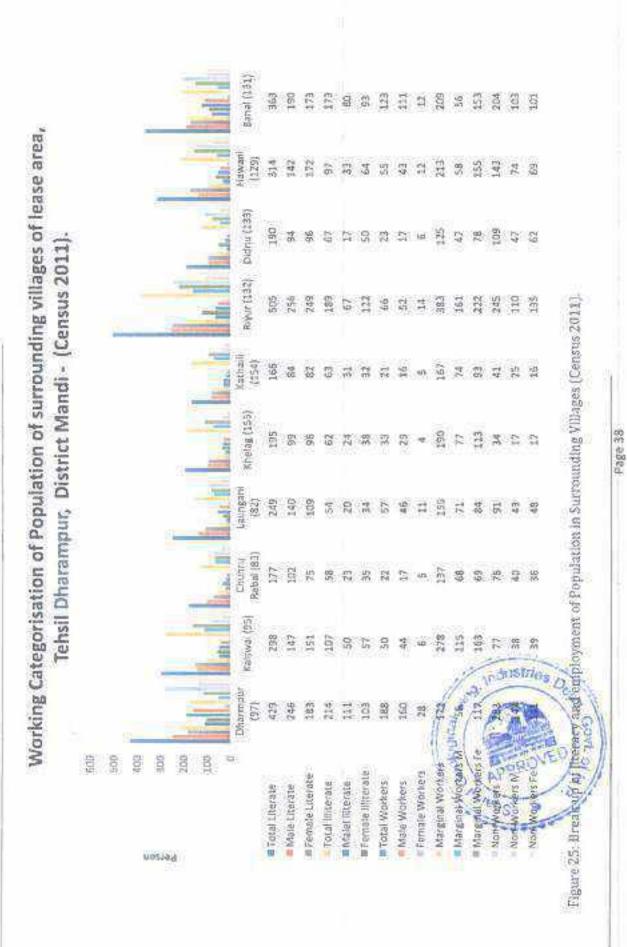




Page 37

Figure 24; Population of the villages of the zone of influence.

MINING PLAN Son Khad Quarry GM, TM & TP Projects, HPHCL, Mandi.



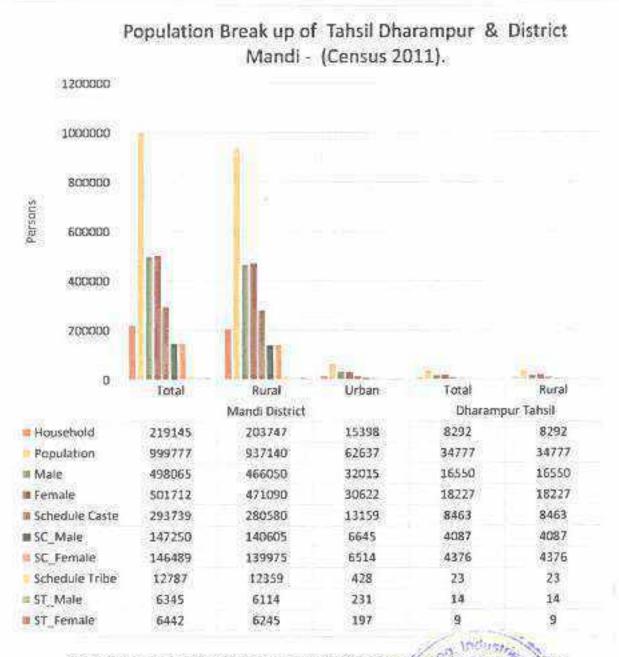
0 0 0

道

a

5

## MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.



## Figure 26: Population break up of District Mandi & Tehsil Dharampur.

Sieces

APPROVE

#### 1.2 Socio Economy of the Village/Population.

13

0

D

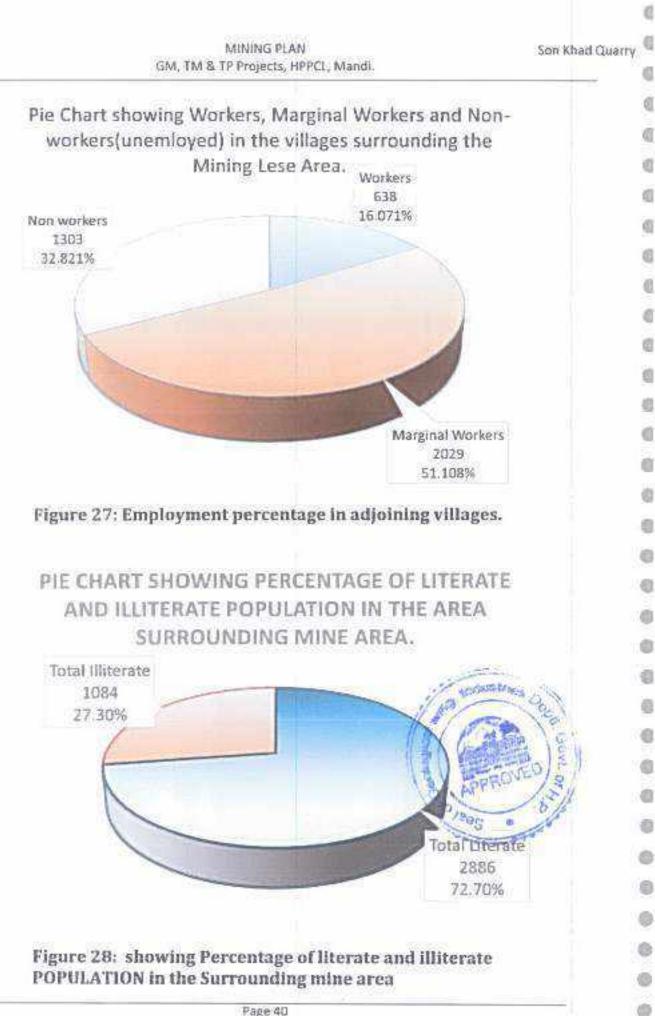
D

6

0

No adverse impact on the socio-economic condition of the area is envisinged.

The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. As can be seen in figure 27 there is moderately high percentage of *unemployed* (33.49%) and *underemployed* (51.19%) people in the area despite moderately high level of literacy, (71.94% literates, figure 28) of literacy.



Page 40

		MINING GM, TM & TP Proje	2000000000	Ð	Son K
1.3. Land Use Pa	ittern				
Prima figure	2014/2010 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00 12:00	of the district can b	e classified in fol	lowing 6 categ	ories as shown in
	i. Forest				
	ii. Grass an	id Scrub Land (part	ially agriculture)		
	fil. Water B	odies (Stream and	corridor)		
	iv. Agricult	ure land			
	v. Waste la	ind			
3. 4. 5. 6. 7. 8. 9.	Culturable w Fallows Land Current Fall Area under i Barren and l Barren & Un Permanent I Forest	d other than Curren ows – net area sow non-agricultural us Un-cultivable land i-cultivable Land. Pastures and Other	nt Fallows n es Grazing Land 77198		and industrial of the second s
31-4578	Ghar	Rewalder	sadar Baraj		51.95.0
	Fornit	Bendernager			51'50'9
31' 58 %	Appenders Grade Strik Packs Nor-appende Drug Copelit Others	- 20	Korwig		

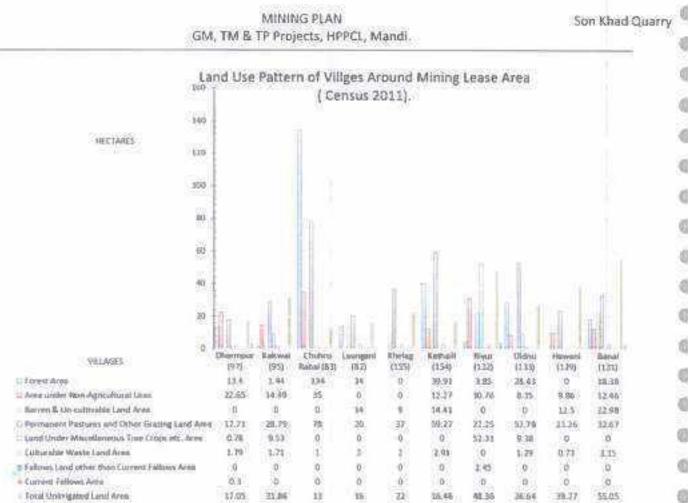
The below figures show the land use pattern of nearby villages and sub tehsil Dharampur

respectively.

0

8

0



# Figure 30: Showing Land Use Pattern of villages around the mining lease area.

D.

a.

3,77.

0.05

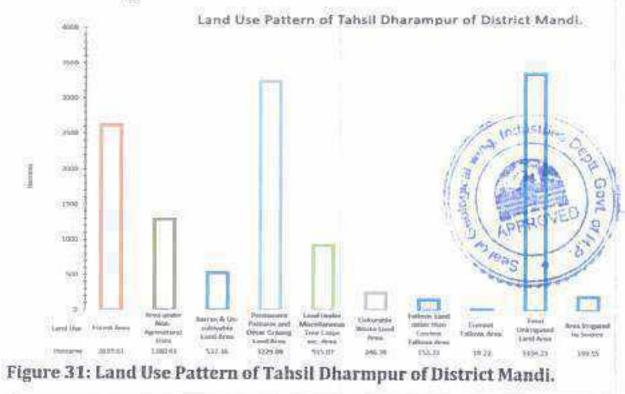
3,41

ö

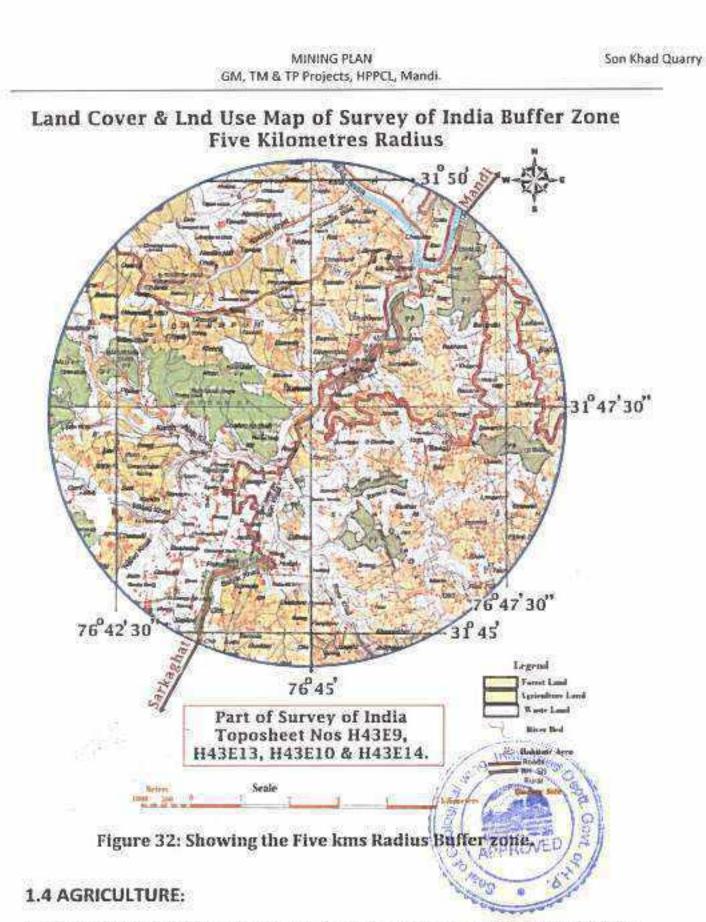
伯

ø

# Area tringared by Source



Page 42



The economy of Mandi district is predominately agrarian as around 80 per cent of the total population is dependent on agriculture and activities allied to it for earning their livelihood. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the uneven. The crops usually face moisture stress during the remaining period of the year due to

3

0

		GI	M, TM & TP	INING PLA Projects, H	Service of the servic	di.		13	Son Khad Qua
nadequate a	nd irregular 1	ainfall. Th	e irrigation	facilities a	e provided	l by lifting v	vater from	steams,	
shallow dug	vells and me	diùm to d	eep tube we	ells in the v	alley area.				
he source o	water and in	rigation i	n district Ma	andi can be	classified i	nta fallowi	ng five clas	ises	
> Lift h	rigation Sche	me,							
<ul> <li>Kuhli</li> </ul>									
	used for don used for irrig		00585,						
	wells/	arioro							
	od trops are j	grouped in	nto three ca	tegories:					
> Cere	its.								
Pulse	28								
	r food crops   food crop ar			garcane an	d turmeric	6			
► Oil se	5 CM 10	ea e or ra	ID EIROS;						
	r non-food cr	ops such	as cotton, to	bacco and	fodder cro	p,			
he area und	er each categ	ory of the	e crop is give	en below in	figure: -33	3.			
NUMERIC AND ADDRESS OF A DECEMBER OF				15 75 HN	NIETZS IN		205	A	81
N WENG	¥ 34		2.0			Thus more a	indor uppe	tables an	d ( )
igure: -34 st	ow producti			luces in dis	trict Mandi	ine area i	moer rege		u.:
igure: -34 st	ow production is given in			luces in dis	trict Mandi	, nie area i	moer rege		
igure: -34 st	ion is given in	n the figur	e: -35.	_	121				
igure: -34 st	ion is given in	n the figur	e: -35.	_	121				
igure: -34 st	ion is given in	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st	ion is given in	the figur	e: -35.	in Hect	tares) u	inder N			
igure: -34 st	ion is given in	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st	ion is given in	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st	ion is given in	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st heir product 70000	ion is given in	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st heir product 70000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st heir product 70000 60000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	inder N			
igure: -34 st heir product 70000 60000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder N	Major	IP . Ch	
igure: -34 st heir product 70000 60000 50000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder N	Major	ites ye	
igure: -34 st heir product 70000 60000 50000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder N		IE S Y S	
igure: -34 st heir product 70000 60000 50000 40000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	in a year	GpvL
igure: -34 st heir product 70000 60000 50000 40000 30008	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	TER YAN	
igure: -34 st heir product 70000 60000 50000 40000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	lina ya na	GpvL
igure: -34 st heir product 70000 60000 50000 40000 30008 20000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder N	Major	TEA How	GpvL
igure: -34 st heir product 70000 60000 50000 40000 30008	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	les yes	GpvL
igure: -34 st heir product 70000 60000 50000 40000 30000 20000 10000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	TEA HAR	GpvL
igure: -34 st heir product 70000 60000 50000 40000 30008 20000	Agricu	the figur	e: -35. : Area (i	in Hect	tares) u	Inder M 19-20.	Major	It a ya	GpvL of M

Page 44

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

e. N

b

D

D

Ð

D

b

3

D

3

D

D

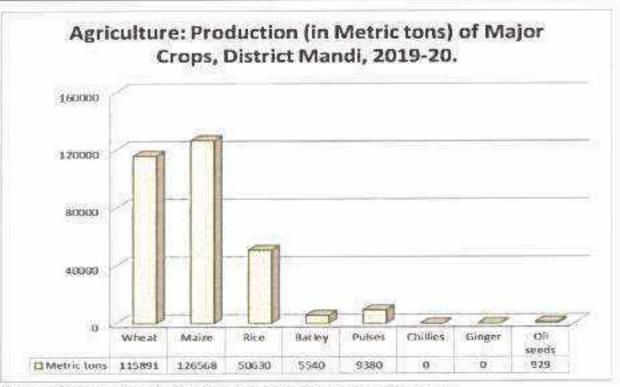


Figure 34 Showing production of each crop in District Mandi.

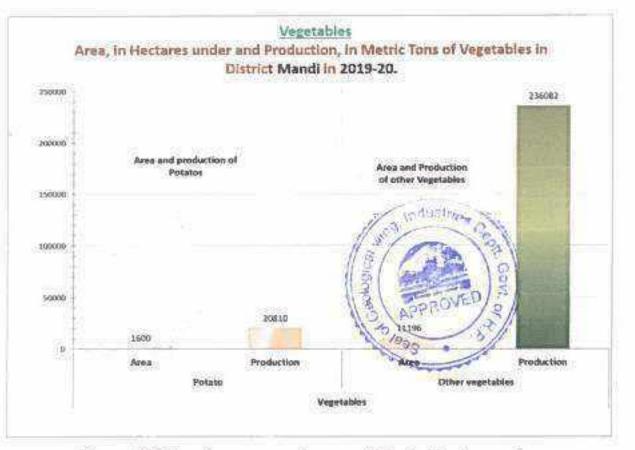


Figure 35: Showing area under vegetable, in Hectare and Production, in Metric tons, of District Mandi.

	G	MINING PLAN M, TM & TP Projects, HP		Son Khad Quai
1.5 HOR	ITICULTURE			
produce 1 categorie low-lying	the various fruits. is namely high hi valley areas. Fru	The topography of t	ons of the district are quite s the district can be grouped i higher elevation, mid hill are depending upon the terrain,	nto three eas and
	The main hortic	ulture produce of the	area can be classified into	following
five ca	ategories;	10		1850.
	1. Apple			
	A.S. 1968 St. 200-4	mperate fruits		
	3. Subtropit	S		
	4. Nuts and	l dry fruits		
	5. Citrus fru			
Mand	The area under i are shown in Ta		the production of each fruit	t in distnct
1910/81154	LOID DIGHTI UL LU	abite o.		
			In the second	192004
Tabl	le 5; Area un	der each fruit a	and their production	nin
	le 5; Area un rict Mandi.	der each fruit a	and their production	in
	rict Mandi.		1251	1 in
	rict Mandi. Sta	atus of Nort	iculture	i in
	rict Mandi. Sta Dis	atus of Nort arict Mandi.	iculture .2019-20	i in
	rict Mandi. Sta	atus of Nort	iculture	i in
Dist	rict Mandi. Sta Dis	atus of Hort arict Mandi. Area (In	iculture 2019-20 Production (In Metric Tons)	i in
Dist	rict Mandi. Sta Dis Fruit	atus of Hort arict Mandi. Area (In Hectares)	iculture 2019-20 Production (In Metric Tons) 57158	
Dist	rict Mandi. Sta Dis Fruit	afus of Hort Arict Mandi. Area (In Hectares) 16748	iculture 2019-20 Production (In Metric Tons) 57158 827	
Dist	rict Mandi. Sta Dis Fruit	afus of Hort arict Mandi. Area (In Hectares) 16748 2856	iculture 2019-20 Production (In Metric Tons) 57158 827 443	
Dist	rict Mandi. Sta Dis Fruit Apple Plum Peach	afus of Hort Arict Mandi. Area (In Hectares) 16748 2856 783 297 1772	iculture 2019-20 Production (In Metric Tons) 57158 827 443	
Dist	rict Mandi. Sta Dis Fruit Apple Plum Peach Apricot	afus of Hort arict Mandi. Area (In Hectares) 16748 2856 783 297	iculture 2019-20 Production (In Metric Tons) 57158 827 443 320	
Dist	rict Mandi. Sta Dis Fruit Apple Plum Peach Apricot	afus of Hort Arict Mandi. Area (In Hectares) 16748 2856 783 297 1772	iculture 2019-20 Production (In Metric Tons) 57158 827 443 320	
Dist	rict Mandi. Sta Dis Fruit Apple Plum Peach Apricot Pear Cherry	afus of Hort arict Mandi. Area (In Hectares) 16748 2856 2856 283 297 1772 24	iculture 2019-20 Production (In Metric Tons) 57158 827 443 320	
Dist	rict Mandi. Sta Dis Fruit Apple Plum Peach Apricot Pear Cherry Grees Almonds	afus of Hori arici Mandi. Area (In Hectares) 16748 2856 783 297 1772 24 0	iculture 2019-20 Production (In Metric Tons) 57158 827 443 320	
Dist	rict Mandi. Su Dis Fruit Apple Plum Peach Apricot Pear Cherry Green Almonds Persimmon	afus of Hori arici Mandi. Area (In Hectares) 16748 2856 2856 283 297 1772 24 0 252	iculture 2019-20 Production (In Metric Tons) 57158 827 443 320	

.

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

э 1

Þ

D

1

9

Þ

Þ

3

D

3

1

þ

Ð

þ

D

D

.

D

Ð

D

D

D

D

D

D

D

D

D

٥

Ð

Ø

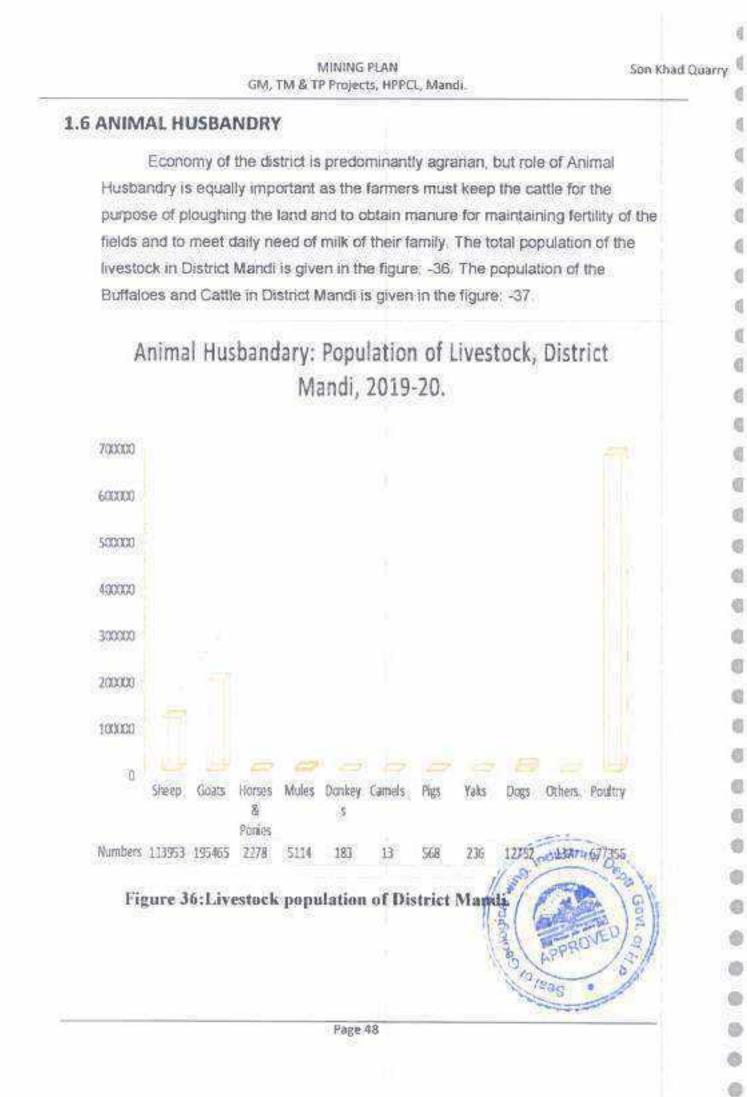
D

0

0

0

Strawberry	2	0
OTF	6313	2930
Almonds	1502	288
Walnut	1055	137
Piccanut	392	22
Nuts & Dry Fruits	2949	447
Orange	730	255
Malta	196	
K. Lime	2999	245
Galgal	538	345
Others	3	6
Citrus	4466	845
Mango	4964	2683
Litchi	590	701
Gauva	693	311
Papaya	24	32
Loquat	4	untiustrie 0
Aonala	154	1 2000 000
Grapes	2	
p-grnate	473	13 APPROVEIZE
Jackfruit	215	32 The second s
Others	8	15
OSTF	7127	4059



#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi

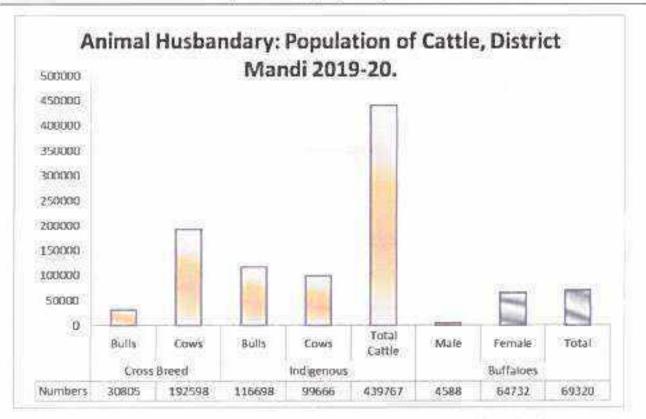


Figure 37: Showing Population of Cattle Buffaloes in District Mandi.

# **1.7 FISHERIES**

e N

> There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi district:

Trout

Mahasir

Gid Seviyon

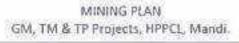
Dise Gugli and

Mirror Carps

The exotic trout fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himalayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trout fishing.

No perennial stream passes through the area under consideration.





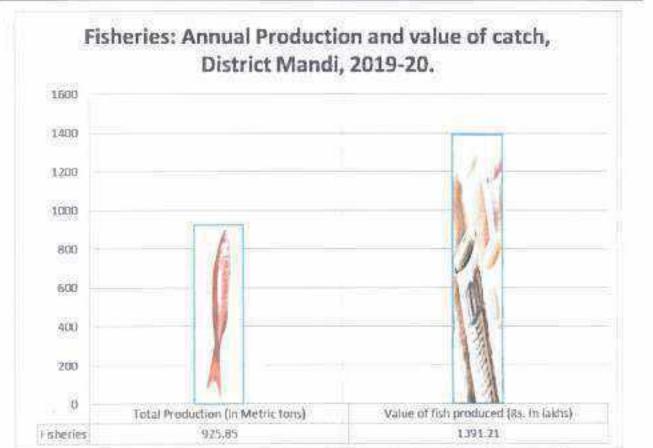
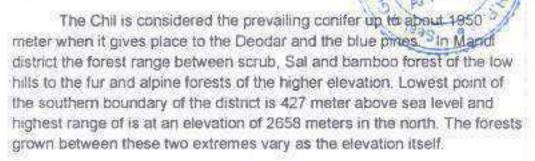


Figure 38: Showing Fish catch / production and its sale value in 2016-17.

## **1.8 FLORA AND FAUNA**

#### 1.8.1 Flora



sical

The most prominent varieties of trees found in the district are

Simbal (Bombex malabaricum), Mango (Magniferaindica) Tun (Cedrela toana) Several species of acacia and albizia

Page 50

10

6

đ

0

6

闷

0

0

0

Ċ

6

週

0

đ

10

63

個

0

0

65

8

Son Khad Quarry

Salambra (Odina wodier)	
Termnalia	
Jamun ( Engenia jambolana	
Larger tour	
Ramboo	

The common fruit trees are banana, apple, ber, jamun, mango, mulberry, almond, peach etc

#### Shrubs

The most common shrub at the higher elevation is Berberis, Indigofera and Desmodium and following other shrubs are also found.

- 1. Vitex
- 2, Munj
- 3. Ber
- 4. Ipomea
- 5. Dodonaea &
- 6. Bamboo.

The common fruit trees are banana, apple, ber, Jamun, mange, pear mulberry, apple, almond, cherry, peach etc APPROVED



#### 1.8.2 Fauna

0.1

#### Animals

Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in the district. Common Mammals & Birds in the Mandi District is given in the Table -7

## Table 7: Common mammals and birds in the Mandi District.

1000	1.1			÷20	
ाः	124	Ы	26	th .	
	**		÷.		

Birds	3	-
Zoological Name	English Name	Common Name
Milvus migrants	Vulture	Cheel, Gidh, Eell
Eudynamys scalapacca	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

Son Khad Quarry

I,

ł

ţ

ľ

116

1

1

1

3 i

Ì.

1

4

đ

4

€

4

6

1

Ø

0

0

0

0

0

0

0

0

0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Calums livia	Hawk	Baj
Francolius francolinus	Black partridge	Kala Tittar
Francolius.pondicerions	Grey partridge	Safed Tittar
Paya crisslatus	Peacock	Mor
Coturnix colurnix	Common quail	Bater
Alectoris graeca	Chakor	Chakor
Grovus spiendens	Crow	Kanwa
Prottocula Korneri	Parrot	Totta
Tragopan melanocepholus	Western horned Tragopan	Phulgar/Jujurana
Picaides mavei	Fulvourbreasted Pied Woodpecker	Kathfowra
Streptopelia decaocto	Ring dove	Gughi
Streptopelia chinesis	Spotted dove	Gughi
Accipiter badius	Shikra	
Aquila rapax vindhian	Tawny eagle	+
Ducula bicolar	Green Pigeon	
Parus rufonuchalis	Tits	*
Picus canus	Black napped Woodpecker	Woodpecker
Divcocopus javensis	Woodpecker	
Muscicapa subrubro	Himalayan Fly Catcher	
Acidatheres tristis	Common Myna	Ghatari
Terpsiphone paradisi	Paradise flycatcher	Choti-Pinja monstream
Passer domesticus	House sparrow	13 000 000
Carduelis spinoides	Himalayan Green Finch	Chinas G
Table 7	Mammals in Mandi	- BLAFFROMENS

## Mammals in Mandi

	Mammals in Ma	indi andi
Zoological Name	English Name	Common Name
Felis bengalensis	Leapard Cat	Mirag, Bagh
Felis Chane	Jungle Cat	Jangli Billi

Page 52

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Muntucus muntisk	Barking Dear	Kakkar
Vaulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
Preshytes entellus	Languor	Languor
Sus sacrofa	Boar	Suar
Hystrix indica	Porcupine	Sehal
Lepus nigricoilis	Hare	Khargosh, Sherru, farru
Moschus moschifarus	Musk deer	Kastura
Capra ibex Ibex	Ibex	
Hemitragus jemlahicus	Himalayan Thar	Thar
Selenarctos thebatanus	Black Bear	
Ursus arctas	Brown Bear	
Ponthera unica	Snow leopard	
Sus scrofa	Wild Boar	
Axis axis	Spatted deer	Chital manuary
Cervus unicolor	Samber	11/marsh
Hylopetes fimbriatus	Flying squirrel	11 23
Ponthera pardus	Leopard	Cheetan ROVED S
Felis chaus	Jungle cat	1005 · 5
Paradoxurus hermaphroditus	Indian Civet	Sakralu
Hipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

In the area surrounding the mining lease following are the common birds:

- Black Partridge (Kala Titar)
- Grey Partridge (Safed Titar)
- Woodpecker

- Chakor
- · Crow

2

11

ТŘ.

4

1

1

37

10

1

1

k

1

1

Þ

5

3

В

В

D

Ð

3

1

В

3

3

3

0

0

0

0

0

0

Red Jungle Fowl (Jangli Murga)

1

đ

6

0

6

6

63

8

60

0

#### In the leased-out area and surrounding hills following are the common animals: -

- Leopard (Bagher)
- Hare
- Wild Bore (Jangl) Soor)
- Jackal
- Barking Deer (Kakkar)
- Monkey
- Sambar
- Pig

## 1.9 CLIMATE

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. <u>Monsoon</u> brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 6.

The area enjoys monsoon rainfall from third week of June to mid-September.

The rainfall records available with the District Collectors office from 2004 to 2014 are depicted in the figure 7

The climatic information given is based on the data obtained from Revenue Department of Himachal Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D.C office Mandi, and at Sundemager All information available indicates following seasons in the district:

Winter Summer/Pre-monsoon Monsoon Post Monsoon/ Autumn



Page 54

MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

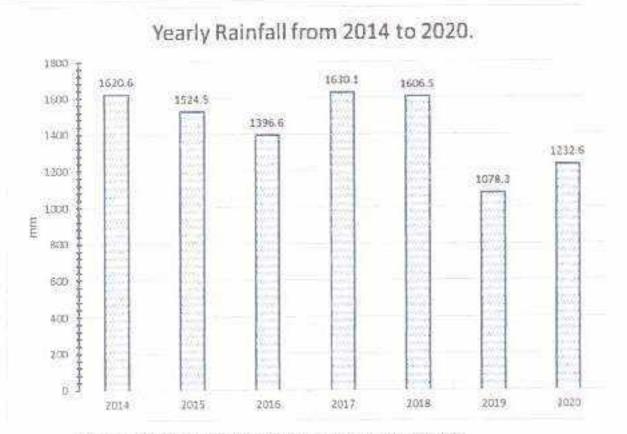


Figure 39: Yearly Rainfall from year 2014 to 2020.

IT

4

0

)

)

þ

D

b

3

3

5

D

ø

3

b

Ð

0

0

0

0



8

đ

Q

đ

8

G

đ

0

0

6

0

8

65

-

65

## 2.0 ENVIRONMENT MANAGEMENT PLAN

The impact on environment due to mining operation is generally: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks.
- Effect on Hydrology
- Effect on Climate
- ➢ Air Pollution
- Noise Pollution
- Visual Impact
- ➢ Socio- economic Impact
- Accumulation of Scree.

## 2.1 CHANGE IN TOPOGRAPHY.

- No affect.
- The area is riverbed and mined out pit will be filled during rainy season hence there would be no change. It is part of a Riverbed.
- The highest point of the Lease area is at 648 metre above mean sea level.
- The lowest point is at 642 m above MSL.
- Mine Area is proposed in the entire safe area.
- The block would be completely replenished during monsoons floods.
- \* The mining shall be confined to well within the riverbed corridor.
- Mining shall be undertaken to a depth of one metre or water level whichever is less.
- The Lease area is and shall remain riverbed.
- Thus, the topography or landform of the Riverbed per se will not be changed.
- The land use of the mining Lease area is defined in the Revenue record as 'Gair Mumkin khad'.
- The land under active mining would always remain riverbed, during as well as post mining.

## 2.2 Effect On Climate

- The mining Lease area is small.
- Mining will be confined to 21700 square metres safe acea.
- The mining depth will be up to one metre or up to water level whichever is less, thus water regime will not be disturbed.

2

- The mining will be confined from within the riverbanks.
- Some micro level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed
- The impact will need no mitigating measures.

## 2.3 Impact on Air

No blasting material is to be used.

- The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).
- The mining activity will be limited to excavation of about 180 tonnes of stone, Bajri and sand with silt-clay per day.
- 20 tipper truck trips will be able to move the required material from mine to crusher / Project sites.
- This activity would generate very limited disturbance to air quality.

## 2.4 Impact on Noise Level and Mitigation Measures

- The mining area represents calm surroundings.
- The mining shall be manual causing hardly any noise.
- The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material
- About 20 trucks trips would be required for transporting mined material per working day from mining area to destination.
- The dedicated tipper truck would be properly and regularly undergoing maintenance to create minimum noise.
- Care would be taken to properly maintain the silencers of the vehicles.
- No use of horn shall be allowed in or near the mining area.
- A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of River to screen the noise, if permitted by the private land holders.

## 2.5 Effect on Flora & Fauna

- The mining Lease area is riverbed.
- There is hardly any flora or fauna on the riverbed to attract any protective or mitigating measures

## 2.6 Soil Cover

- The mining will be confine to Riverbed.
- · It has no soil cover as the area gets frequently flooded during monscoas-
- Thus, there shall be no impact on any natural soil cover.

## 2.7 Impact on Hydrology

- The mining area is part of riverbed.
- The mining depth will be up to one metre or up to water level whichever is less, thus
  water regime will not be disturbed
- The mining will be confine to central part of riverbed, away from banks.
- Thus, mining would be dredging the riverbed and reducing the silt burden downstream.
- The ground water (undercurrent of the river) will not be disturbed as mining will be undertaken above Water table.

4

1

đ

đ

đ

0

60

6

#### 2.8 Waste disposal Management

The area is in a regular course of the Khad and silt clay is the only waste likely to be produced. The waste generated if any will be used as backfill where separable.

#### 2.9 Socio- Economic Impact

- Nn adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 30 persons directly and indirectly, in mining, transportation, and crushing unit.

#### 2.10 Transport of Mineral

From Quarry to Road heads towards NH3 is about 200m through the Khad track. The mined material is transported through tracks made in the river. About 180 metric tonnes of material shall be transported per day with an avecage of 20 tipper truck trips. The movement of 20 tipper truck tips would have hardly any impact on traffic on NH 3 and would cause negligible environmental impact



#### PART III

#### 1.Progressive Mine Closure Plan/Reclamation Plan

#### 1.1 Reclamation

- The mined area being part of the river course cannot be reclaimed for any other purpose.
- The land under active mining would always remain riverbed, during as well as post mining.
- The highest point of the Lease area is at 648 metre above mean sea level.
- The lowest point is at 642 m above MSL.
- The mining shall be confined to well within the riverbed corridor.
- No mining near the banks up to 1/10<sup>th</sup> of its width is to be undertaken as per guidelines, i.e. 9 to 18 metres, from banks.
- The mining depth will be up to one metre or up to water level whichever is less, thus
  water regime will not be disturbed.
- The entire quarried area will be replenished and reclaimed by the river during monsoon floods.
- The Lease area is and shall remain riverbed.
- Thus, the topography or land use of the Riverbed per se will not be changed.
- As such no reclamation work of mined area is required to be undertaken.

#### 1.2 Mine Waste Disposal:

a) Year wise generation of mine waste and soil cover.

As explained earlier the following category of the waste is generated during riverbed mining.

- Silt/ Clay Mixture
- The silt and clay are generally being inseparable from sand and extracted along with it. As such no waste will be generated during the mining of stone, sand and

## bajri.

## 1.3 The arrangements made for topsoil utilization, if any odustries

As the mining area is part of riverbed, having no topsoil cover therefore, no topsoil is required to be removed, or disposed of

## 1.4. Preventive Check dams

Considering mostly rocky condition of riverbanks, only small check walls are required to be constructed on the left bank and are shown as C-1 to C-5 in the plate 3.

## 1.5 Plantation work

As far as the order of Apex court in writ petition(s)No(s) 114/2014 titled as Common Cause Vs Union of India & others is concerned, the riverbed which suffer frequent foods during monsoon period and where no grass growth is possible, as such mining area cannot be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

0

0

Son Khad Quarry

1

£.

đ

đ

6

đ

6

6

6

6

0

0

ė.

6

0

0

0

#### MINING PLAN GM, TM & TP Projects, HPPCL, Mandi.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance
First	50	5	2000
Second	50	5	2000
Third	50	5	2000
Fourth	50	5	2000
Fifth	50	5	2000
Total	250	25	10000

#### Year wise survival rate.

The survival rate is about 30 percent in the area because of the rocky nature of the site. However, after yearly review it will be ensuring that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured to be at least 90 percent.

## 2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is no point of utility within radius of 100 metres of the mining lease periphery, which may need any kind of protection.

#### 3 MANPOWER DEVELOPMENT

The mining activity will be mainly manual. Worker are mainly required in nverbed mining for extraction and loading of riverbed material into tipper truck and tractor trolleys. Drivers for tippers and tractors will be enother category of workers. Thus, employment potential is as given below.

Munshi Drivers

Unskilled workers

Unskilled workers Thus, total generation of Employment will be to a tune of 20 both skilled and unskilled workers.

## 4 USES OF MINERAL

The stone, sand and Bajri will be consumed in the dedicated crushing unit of the Project and product grit and sand will be used in construction activities of the project.

#### DISASTER MANAGEMENT & RISK ASSESSMENT 5

The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below:

- Inundation / Flooding
- Drowning
- Accident during mineral loading, transporting, and dumping
- Accident due to vehicular movement
- Earthquakes

## Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

#### Accident during mineral loading, transporting and dumping

The consequences of this scenario are minor which may be taken care with first aid care.

### Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

## Earthquakes

The area falls in seismic zone IV. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets. +000

## 6. RECOMMENDATION FOR RISK REDUCTION

## Measures to prevent Inundation/Flooding/drowning/

- Being on riverbed there should not be any mining operation during monsoon or rainy day
- Formation of deep pits should not be allowed
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

## Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders.
- Operations during daylight only.

#### Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted.
- To avoid danger of accident roads and ramp near embankment should be properly maintained.
- · The truck would be covered and maintained to prevent any spillage.
- · The maximum permissible speed limit should be ensured.
- The truck drivers with proper driving license would only be employed.

#### Measures to Prevent Accidents during Earthquakes

 Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes etc will be undertaken in consultation with experts.



# **Declaration**

This is to declare that the Mining Plan of Minor Mineral lease of part of Son Khad, for Stone, bajri and sand situated in Khasra No. 1291 & 1 measuring 4.0969 Hectares, Mauza/Mohal Banal & Riyur, Tehsil Dharampur & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

APPROVED

Date: Place: Kotli

> Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp. Ltd., Tehsil Kotli, Distt. Mandi.

anagel



# Certificate

11

1

1

1.

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra No. 1291 & 1, measuring 1.5452 Hectares, Mauza - Banal & Riyur, Tehsil Dharampur & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.

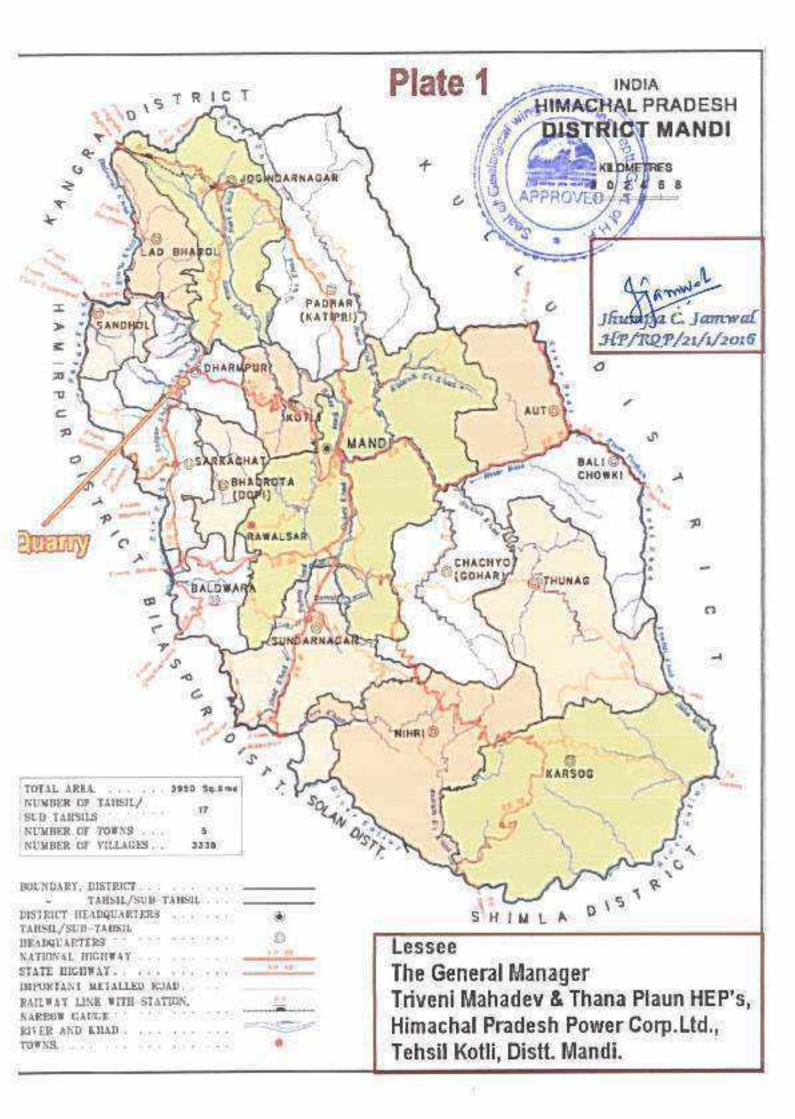
While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

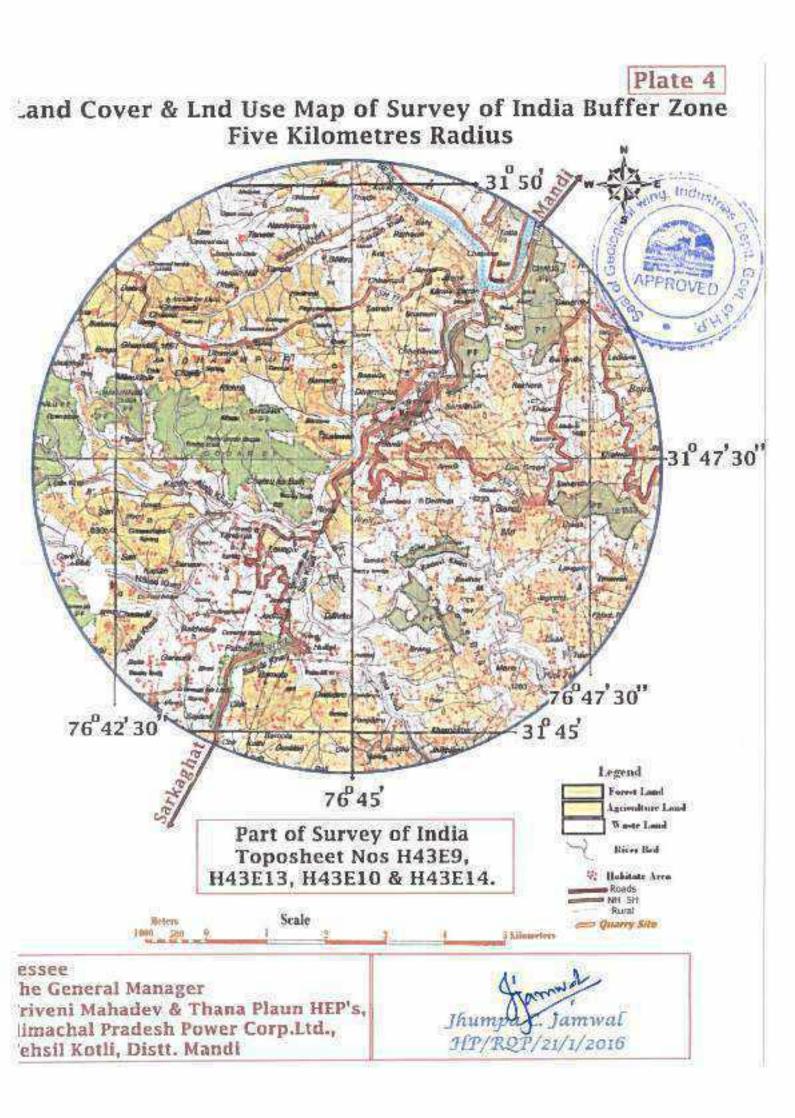
 The information provided and data furnished in this 'Mining Plan' is correct to the best of my knowledge.

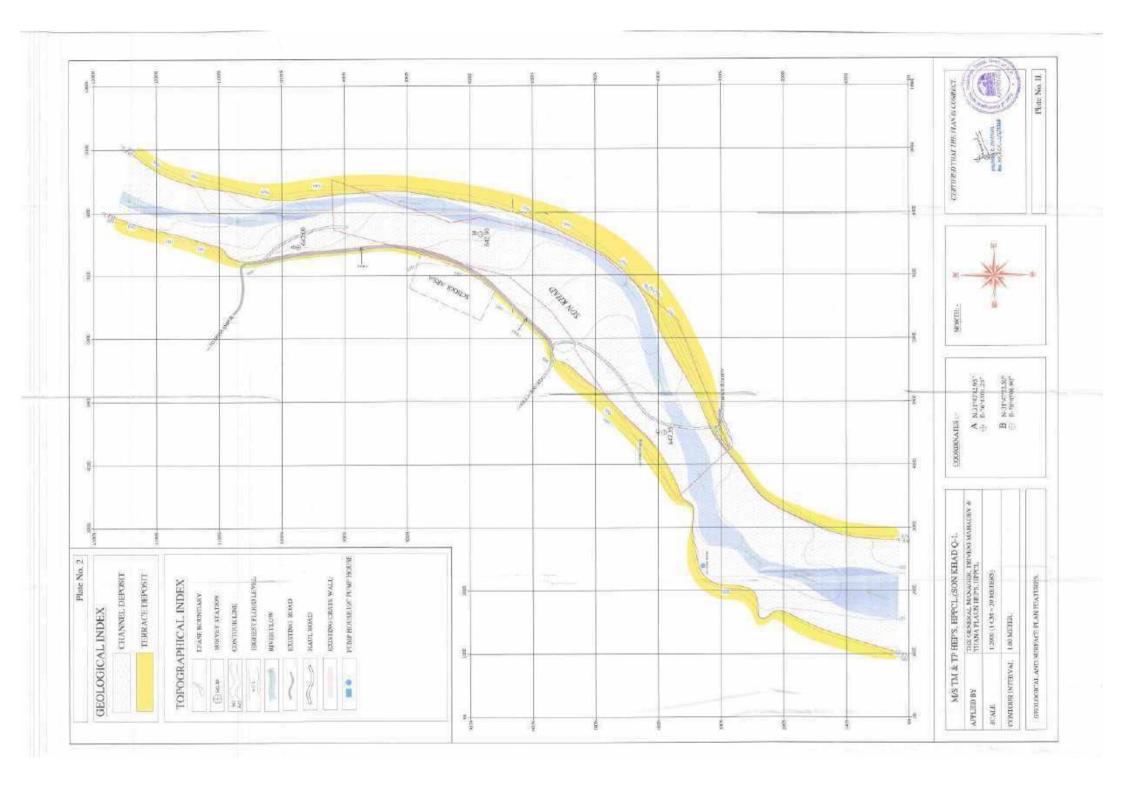
Date Place: Shimla

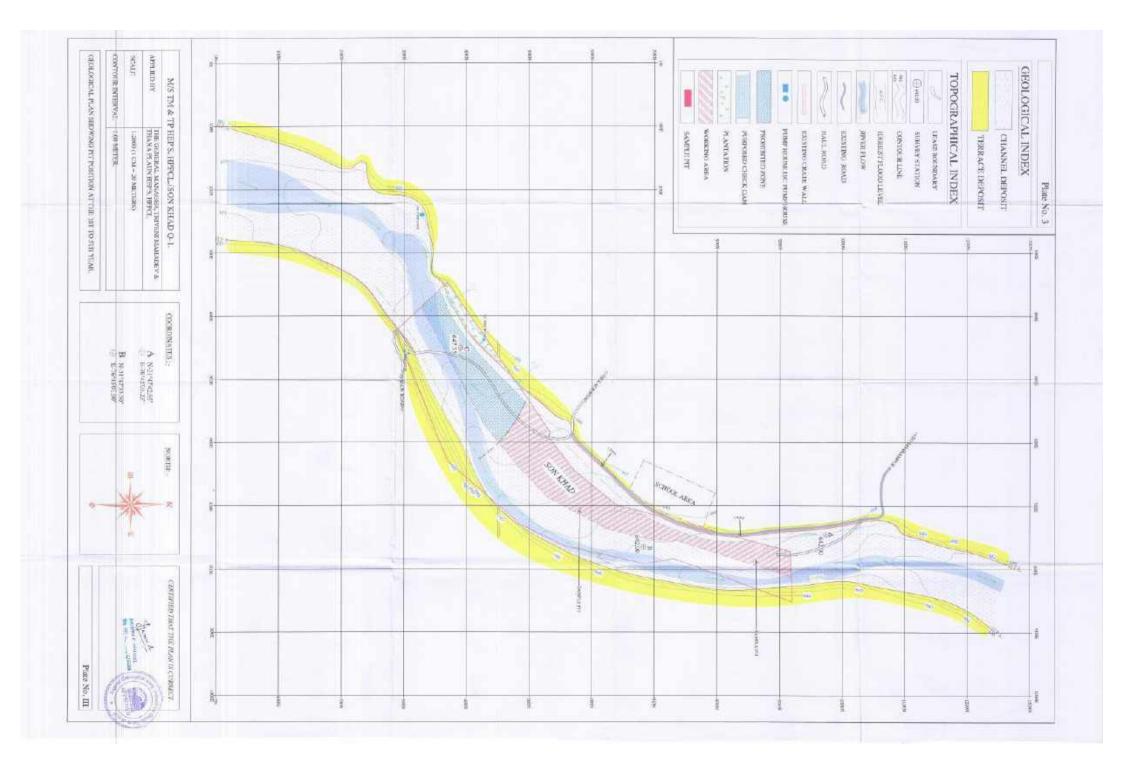
in the the set NOSE I npa C. Jamwal Ihn Cottage No. 21, Type IV, HP Government Officers Residences.

CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016











OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI KHASRA NOs.1/1, 1/2, 5748/5595/1 & 5748/5595/2, MEASURING 9.5030 HECTARE MAUZA TATOLI PARDANA & SIDHPUR, TEHSIL –DHARAMPUR, DISTT – MANDI (H.P.)

Ø

8

0

0

0

0

0

0

0

0

0

0

0

6

0

0

0

◎ 2023



LETTER OF INTENT ISSUED IN FAVOU of the general manager, APPROVED TRIVENI MAHADEV & THANA PLAUN HEPS, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

> Jhumpa C. Jamwal HP/RQP/21/1/2016.

# INDEX

.

.

.

....

.

S.NO	INTRODUCTION			
	PARTI	- 1816 - CHIMAN SOLOA		
	INTRODUCTION	1		
1	GENERAL	2		
1.1	Name & Address of the applicant	2		
1.2	Status of the Applicant	2		
1.3	Mineral which the Applicant intends to Mine	2		
1.4	Period for which the mining lease is granted			
1.5	Name & Address of H.P.R.Q.P preparing the Mining Plan	2		
1.6	Name of the Prospecting Agency	2		
2	Location and Approach of the Area (Location Map)			
2.1	Topo-sheet no.	3		
2.2	Location of the Area	5		
2.3	Address details	5		
2.4	Distances from Important places in Kilometers	5		
2.5	Approach of the Area	6		
3	Physiographical Aspect of the Area			
3.1	General	6		
3.2	Altitude of the Area	7		
3.3	Climate of the Area	8		
3.4	Rainfall	9		
3.5	Any other important Physical Feature	9		
	PART-I			
1	Description of the area in which mine is situated	10		
1.1	General	10		
1.2	이는 이 가슴 가슴 이 아들 것이 같아요. 이 아들 것이 같아요. 이 아들 것이 아들에게 들었다. 그는 것이 아들 것이 아들에게 들었다. 그는 것이 아들에게 하는 것이 아들에게 하는 것이 아들에게 들었다. 그는 것이 아들에게 들었다. 그는 것이 아들에게 들었다. 그는 것이 아들에게 하는 것이 아들에게 들었다. 그는 것이 아들에게 들었다. 것이 아들에게 들었다. 그는 것이 아들에게 들었다. 것이 아들에게 같이 아들에게 들었다. 것이 아들에게 말했다. 것이 아들에게 말했다. 것이 아들에게 말했다. 것이 아들에게 들었다. 것이 아들에게 말했다. 것이 아들에게 들었다. 것이 아들에게 못했다. 것이 아들에게 못했다. 것이 아들에게 물었다. 것이 아들에게 못했다. 것이 아들에게 물었다. 것이 아들에 가 있다. 것이 아들에게 말했다. 것이 아들에 가 있다. 것이 아들에게 말했다. 것이 아들에게 말했다. 것이 아들에 가 있는 것이 아들에 가 있는 것이 아들에 가 있다. 것이 아들에 가 있는 것이 아들에 가 있다. 것이 아들에 가 있는 것이 아들에 가 있는 것이 아들에 가 있다. 것이 아들에게 것이 아들에게 것이 아들에 가 있다. 것이 아들에 가 있는 것이 아들에 것이 것이 하는 것이 아들에 것이 아들에 가 있다. 것이 아들에 가 있는 것이 아들에 가 있다. 것이 아들에 가 있는 것이 아들에 것이 것이 것이 것이 것이 것이 것이 아들에 것이			
1.3	Drainage System	Induquia		
1.4	lease is situated Drainage System Type of Drainage Origin of river	Induate		
1.5	Origin of river	-> 12		
1.6	Altitude of Origin			
1.7	Geometry of the Catchment of the river impacting the replenishment of deposit	PROVED		
1.8	Annual Deposition of the Place of Mining	-12+		
1.9	The Competency of the river/stream at the mining site	1200		
1.10a	The second diversity of the second diteration diversity of the second diversity of the second diversit			

1.10b	The thread of deepest water in meandering.	13
1.11	Altitude of the Area	13
1.12	Description of groundwater table	13
2	Geology	14
2.1	The Regional Geology of the Area	14
2.2	Local Geology of the area	14
2.3	Geology of the lease area	18
2.4	The nature of boulders, cobbles, sand etc	19
2.5	Nature of rock and their Altitude	20
2.6	Description of Annual Deposition w.r.t the Geology of catchment area and other factors	20
3	Reserves	21
3.1	General	21
3.2	Percentage wise distribution of Mineral	21
3.3	Estimate of Geological Reserve	21
3.4	Estimate of Mineable Reserves of each Mineral	22
3.5	Estimate Annual Deposition of Mineral	24
4	Mine development and plan of Progressive Mining, Method of Mining	25
4.1	Development and Production Programme for 5 years	26
4.2 a	Development and Production at the end of 1ª year	28
4.2 b	Development and Production at the end of 2nd year	29
4.2 c	Development and Production at the end of 3rd year	30
4.2 d	Development and Production at the end of 4th year	31
4.2 e	Development and Production at the end of 5th year	31
4.3	End use of Mineral	32
4.4	Detail of Road Transport	34
	PART II	
1	Base Line Data (Detail of the Land use and Social aspect of area)	36
1.1	Detail of Population Distribution	36
1.2	Socio-Economic of the Village	39
1.3	Socio-Economic of the Village Land use within 5km radius Agriculture Horticulture Animal Husbandry Fisheries Flora & Fauna	41
1.4	Agriculture	4360 1
1.5	Horticulture // 3/ m	46 2
1.6	Animal Husbandry	111 121
1.7	Fisheries 8	19 0
1.8	Flora & Fauna	150/3/
1.9	Climate of the Area	54 9 /
2		56-1
2.1	Impact on Land Use Pattern and Topography	-56

D

1

0

Ð

13

Ø

D

(D

Ð

D

8

D

10

6

0

10

0

D

0

0

ø

13

D

0

ø

0

D

0

0

0

.

0

2.2	Impact on Climate	56		
2.3	Impact on air	56		
2.4	Impact on Noise Level	57		
2.5	Impact on Flora & Fauna	57		
2.6	Impact on soil cover	57		
2.7	Impact on Hydrology	57		
2.8	Waste Disposal Management, if any	58		
2.9	Socio-economic Benefits	58		
2.10	Transportation of Mined Mineral	58		
PAR	T III PROGRESSIVE MINE CLOSURE PLAN/RECLAMA	TION PLAN		
1.1	Reclamation	59		
1.2	Mine waste Disposal	59		
1.3	Top Soil utilization	59		
1.4	Preventive Check Dams	59		
1.5	Plantation Work	59		
2	Strategy for Protection Of Point Of Public Utility Etc.	60		
3	Manpower Development	60		
4	Use of Mineral	60		
5	Disaster Management & Risk Assessment	61		
6	Recommendation for Risk Reduction 61			

Ô

.

.

.

# MAP INDEX

S. No.	Title	Plate No.		
1.	Locational Plan	1		
Ζ,	Geological Plan			
3.	Plan Showing working pit Position at the End of 1 <sup>st</sup> to 5 <sup>th</sup> year.			
:42	Buffer Zone 5 Kilometer radius Map.	4		

Declaration Certificate of RQP







# PPROVET

Aspti. of Indensity.

तामकारा शाख्य

उद्योग दिप्पाग डिक्सफ laological witty

And a new separate We some No. Usuger - Bhu (chann-u) loshu - 541/14-1626 Mucu 25/5/23 Cectorist (chio-IV) Geologic (tring) Depth of Undustries Shimla-1 GM/AGM/DM (Sm

Sm/AGm/ Dm Can 17 05

.

.

-

e

# MINING PLAN OF MINOR MINERAL LEASE FOR SAND, STONE & BAJRI SITUATED IN KHASRA NO. 1/1, 1 /2, 5748/5595/1 & 5748/5595/2, MEASURING 9.5030 HECTARE MAUZA TATOLI PRADHANA & SIDHPUR, TEHSIL -DHARAMPUR, DISTT - MANDI (H.P.)

# LETTER OF INTENT ISSUED IN FAVOUR OF THE GENERAL MANAGER, TRIVENI MAHADEV & THANA PLAUN HEPs, M/s H.P. POWER CORPORATION Ltd, TEHSIL KOTLI, DISTRICT MANDI, HIMACHAL PRADESH

# **INTRODUCTION:**

ø

0

0

0

0

0

0

0

9

Ø

0

0

0

.

0

0

The General Manager, Treveni Mahadev & Thana Plaun Hydro-Electric Projects, Himachal Pradesh Power Corporation, Tehsil Kotli, District Mandi, Himachal Pradesh, have been issued a "Letter of Intent' valid for one year for grant of mining lease for mining sand, stone and bajri vide letter No. Udyog-Bhu(Khani-4) Laghu-541/2017-6599 dated 21/12/2021.

Himachal Pradesh Power Corporation Limited (HPPCL), was incorporated in December 2006 under the Companies Act 1956, with the objective to plan, promote and organize the development of all aspects of hydroelectric power on behalf of Himachal Pradesh State Government (GoHP) and Himachal Pradesh State Electricity Board (HPSEB) in Himachal Pradesh. The GoHP has a 60% and HPSEB a 40% shareholding in HPPCL. Special Purpose Vehicles namely Pabber Valley Power Corporation (PVPC) and Kinner Kallash Power Corporation [KKPC], earlier owned by HPSEB, have been merged with HPPCL with the objective of developing new hydro projects in their respective river basins with effect from 31.07.2007.

Thana Plaun Hydro Electric Project is located between latitude 76° 15'E to 77° 45'E and longitude 31° 30'N to 32° 30' N in district Mandi. The project has been planned as a runoff river currictorage scheme on the right bank of river Beas with its Dam across the river Beat and underground Powerhouse located on right bank of the river near village Thana. The Stone, Bajtr and sand quartied from lease area will be used in the construction of the Project and its infrastructure.

In accordance with Rule 35 of the 'Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation, and Storage) Rules 2013, the lessee must submit 'Mining Plan' of the area granted or applied for mining lease for a period of five years. Accordingly, this 'Mining Plan' is prepared in accordance with the 'FORM 'M' annexed with the stad Rules

MINING PLAN

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

8

3

63.

0

8

8

0

8

0

0

6

6

6

0

-65

6

0

0

0

۲

0

0

8

8

Ô

0

8

6

8

0

0

0

0

0

6

Thodu khad lease area is situated in Dharmpur Tahsil of Mandi District, Himachal Pradesh. The climate of the area is tropical with well-marked summer, winter, and rainy season. The material available in the lease area shall be mined (raised) by opencast method of mining.

The quarry lease area is located at about 5.4 Km. from Dhrampur on Dharmpur Seoh Road.

# General:

1.1 Name and address of the applicant

1.1. A. Name of the applicant --

- The General Manager
  - B. Address of the applicant The General Manager Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.
- 1.2 Status of the applicant

Government undertaking.

- 1.3 Minerals which the Applicant intends to mine. The applicants intend to mine stone, Sand and Bajri. The stones, sand and hajri will be used in construction activities of the Projects.
- 1.4 Period for which the mining lease is granted. Five years effective from the date of execution of lease deed agreement.
- 1.5 Name and address of the RQP preparing the Mining Plan:

Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016 Mobile No. 9418909890.

#### 1.6. Name and address of the prospecting agency

The base contour map of the leased area was prepared by Shri C.P.Negi, Retired Senior Surveyor, Geological Wing, Department of Industries, resident of Negi Lodge (West), Indernager, Dalli Shimla, for the RQP.

The detailed prospecting of the area was carried out by the R Q P for preparation of this report. The Secondary data is collected from various Geological reports of the Geological Survey of India, Satluj Jal Vidyut Nigam Ltd., Indian Metrological Department, Department of Economic and Statistics, Himachal Pradesh, and various publications of Government of Himachal Pradesh. The detailed prospecting of the area was carried out by the R Q P for preparation of this report.





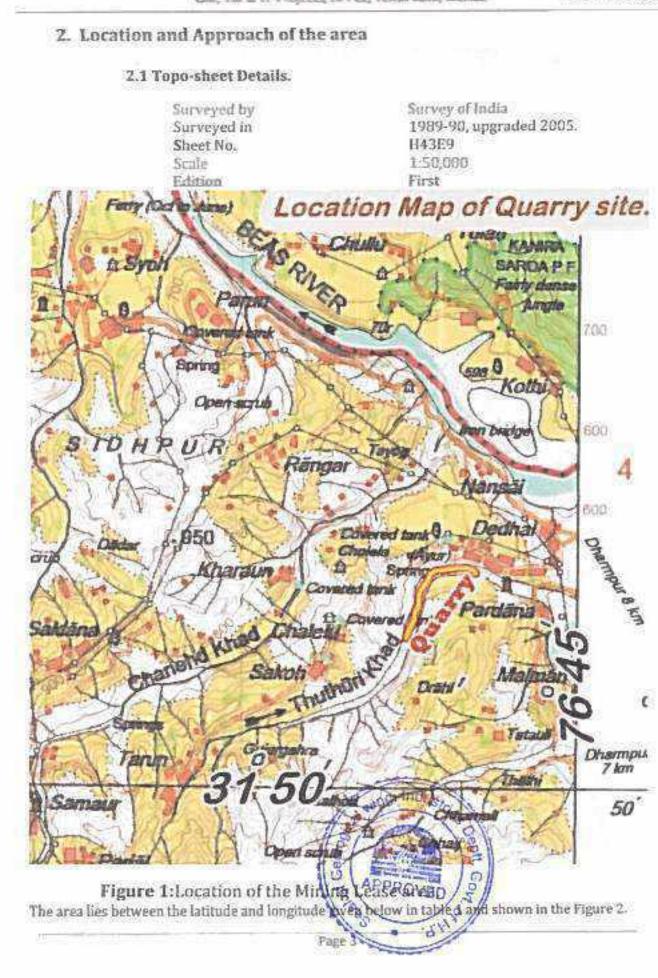
G

Ö

G

s





#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

e



			GM, TM	MINING PLA & TP Projects, HPPCL,	AVEC	endî.	Thodu Khad Quar
2.2	Locati	on of ar	ea of lea	ise			
2.2	a Details	of area					
Tab	le 2:The		the lease	a are given below i area	n table 2		
S. No	Khasr Numb	a A	rea ectares	Owner of Land	Kism	Mauza/n I	icha
1	1/1	1	.4911	Government	Gair	Tatoli	
2	1/2	3	.4787		mumkin	Pardhana	
3	5748/ 95/1		.4911	khad		Sidhpur	
4	5748/ 95/1		.0421				
			9.50	30 HECTAR	ES		
Adn	ninistreti	re Office	Disl Sub Divi	isil: - irict: - i-Divisional Office ( isional Office (Forest) ige Office (Forest): istant Engineer (IP istant Engineer (PV te :	N Civil):- D st):- J - S	Iharampur Iandi Iharampur Iogindernage Sarkaghat Iharampur Iharampur Iimachal Pra	
2.4	Distance	from Imp		ces to Quarry site.			desn
2.4	Distance		ortant Pla		HILLING STRATE		desn
2.4	Distance S. No.		ortant Pla	ces to Quarry site. Fom the Qua	rry site	unce L.mil.)	gesn
2.4	and	Dist	ances f	ces to Quarry site. Fom the Qua	rry site	a present of the second s	gesn
2.4	S. 160.	Dist	ances f	rom the Quarry site. Fom the Qua	rry site	Lind.)	gesn
2.4	8. No.	Dist	ances f	rom the Qua rom the Qua a	rry site	LmL) 0.400	gesn
2.4	8. No. 1 2	Dist	ances f	res to Quarry site. Fom the Qua a backside bacampur	rry site Disk (tu )	Lml.) 0.400 9	gesn
2.4	8. No. 1 2 3	Dist: Frem Quarry	e N	res to Quarry site. Fom the Qua oachside hacampor otii	rry site Disk (tu ) es)	Lml.) 0.400 9 53	gesn

e

Ø

D

Ð

Ð

.

.

Star of

## MINING PLAN

Thody Khad Quarry

-83

ŵ

.

.

Deph

£,

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

7	Jogindernager Metre gauge Riy Sin.	55
8	Surkaginat	26
0	Dharamsafa	92
	Gaggal Airport	103

#### 2.5 Approach to the Area.

The leased site is part of Riverbed and is at 9 km from Ditarampur via Dharampur. Seeh Road, which is approx. 400 m from the quarry site by a a link road. Figure below shows the approach map of the area.

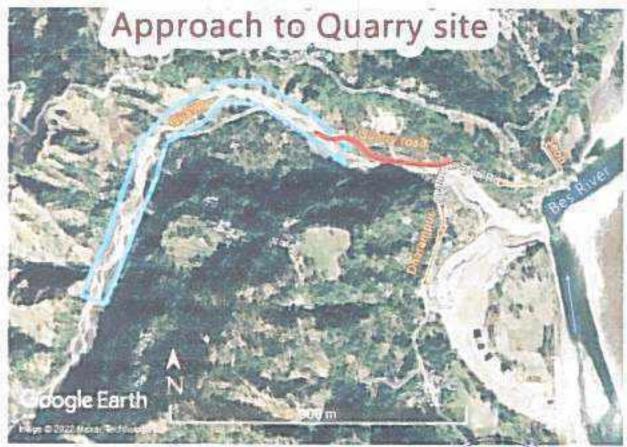


Figure 3: Approach to the Centre of Quarry site of Industries

## 3. Physiographical Aspect of the Area

3.1 General

The area in general is a part of the Lesser Himologia, The Lesson Amalayas, located in north-western India in the states of Himachal Pradeshand Guar Pradesh.

in north-central India in the state of Sikkim, and in north-eastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height.

The general relief of the Thodu Khad region is as given below in the figure: -4: -

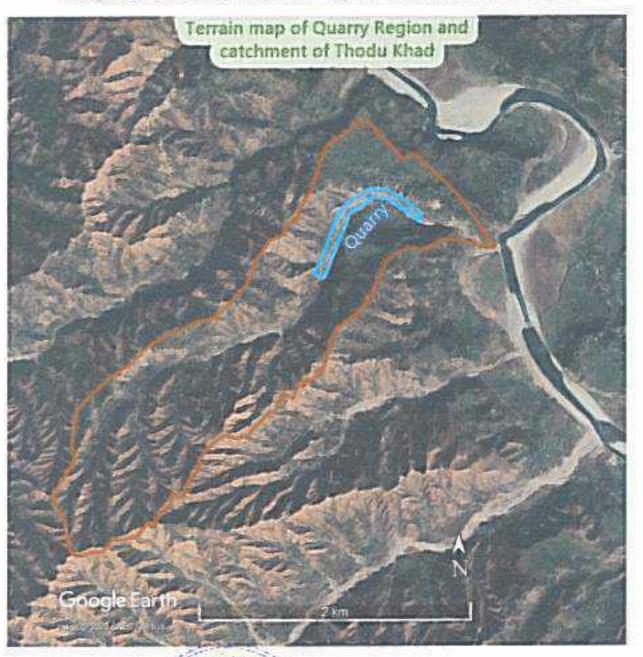


Figure 4: The terrain map of the Thodu Khad region.

The Satellite photograph was taken from the Google is given Figure: -I to depict the general physiography of the brea showing that the major ridges/water divides are generally running NE-SW and all spurs are running parallel to the NE-SW line.

3.2 Altitude of the area

kе.

ø

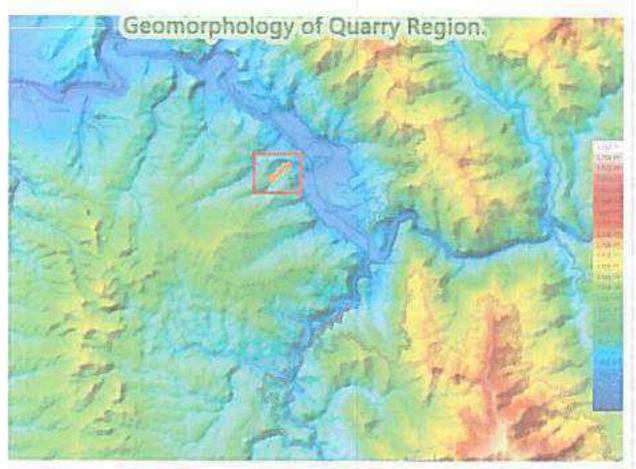
酿

0/

> The highest contour of leased out area in Thodu Khad is 721 Meters above MSL,

.0

(3)



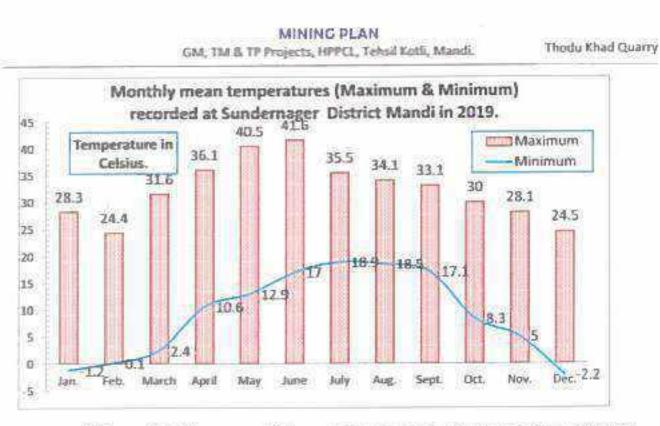
The lowest contour of the leased-out area in Thodu Khad is 630 Meters above MSL.

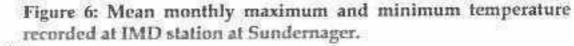
Figure 5: Terrain Map of the Area.

#### 3.3 Climate of Area

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. Monsoon brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Cetsius and sometimes for few days jumping to above 40 degrees Cetsius, the nights are comparatively cooler, and month wise temperature is given in figure 7.









Ð

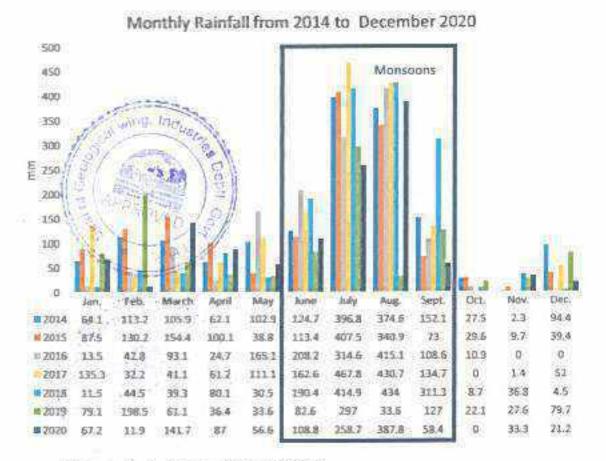
D

ø

自

B

Ô.



## Figure 7: Rainfall of the District.

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Ø.

-

## 3.5 Any other important feature

The mining leased area falls in bed of Thodu Khad tributary of Beas River and accessibility to the quarry site is through a linkroad from Dharmpur-Sandhol Road.



#### PARTI

100

Ð

6

1

0

0

韵

9

ø

62

0

0

0

0

6

1

0

B

۲

6

0

0

0

•

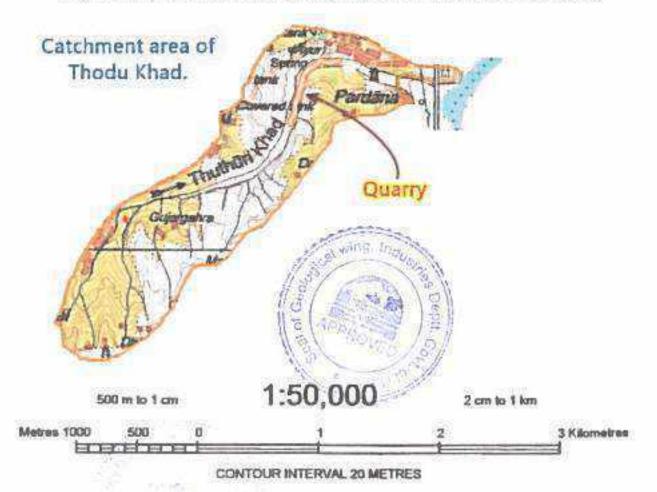
Ô.

## 1. DESCRIPTION OF RIVER/STREAM BED IN WHICH THE LEASED IS SITUATED

## 4.1 General

The leased area is situated in the Thodu Khad, a primary tributary of Beas River. Thodu Khad originates at a height of 1172 meter above mean sea level, from a peak east of Parial village (origin lies in the Survey of India, topo-sheet NoH43E9). The general flow is SW to NE.

The attitude at confluence with Beas River is 609 Metres above MSL (lies in the Survey of India, toposheet No H43E13). The total length is about 5.32 Km. (The catchment of the Thodu Khad lies on survey of India Topo-sheet Nos H43E9.



## Figure 8: Catchment of Thodu Khad.

There is no uniformity/ equational order of average length in each order suggesting that river has not attained proper age and valley is in process of expansion i.e erosion in upper reach will be unavoidable. Elifurcation ratio also suggest that it has not attained maturity particularly 1<sup>st</sup>, and 2<sup>nd</sup> order hence regular erosion in the upper reaches. The low bifurcation ratio of the 3<sup>rd</sup> order stream is indicative that the valley is

473	18.4	1,7,000	10.1		
vtin	411	NG.	PL	瓜香	¢ 0

Thiodu Khad Quarry

8

1

63

0

0

6

0

63

0

司

6

8

0

63

8

8

0

6

6

0

8

0

0

6

0

6

ø

0

60

60

6

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

in the stage of further expansion. The average length of 2<sup>nd</sup> order is less than 1<sup>st</sup> order is indicative of sinuctural control of the valley.

The general analysis of the drainage system of Thodu Khad is given below in (as per 1: 50000 scale)

## Basic Geometry of the catchment is as: -

Area of the Catchment = 3.24 Square kilometres

Effective celchment = 3:20 Square kilometres.

Perimeter of the Catchment = 9.86 Km

Effective periphery = 9.5 km

Length of the river 5.16 Km

Average width of valley 765 Km

Width of the catchiners at maximum 0 \$70 km

From various analysis of the drainage the Thodu Khad can be divided into two parts

 From origin to the 750 metar above mean sea level The zone of active erosion—Young stage

From 750-moter contour to confluence with Beas River

The zone of erosion during very high flood otherwise deposition -Maturity stage

The leased area is situated in the zone of Maturity.

1.2 Name of River/ Stream in which the leased is situated

Thodu Khad - Primary tributary of Beas River

## 1.3 Drainage System

Beas River

The effective catchment of the Thodu Khad is given below in the figure 8.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

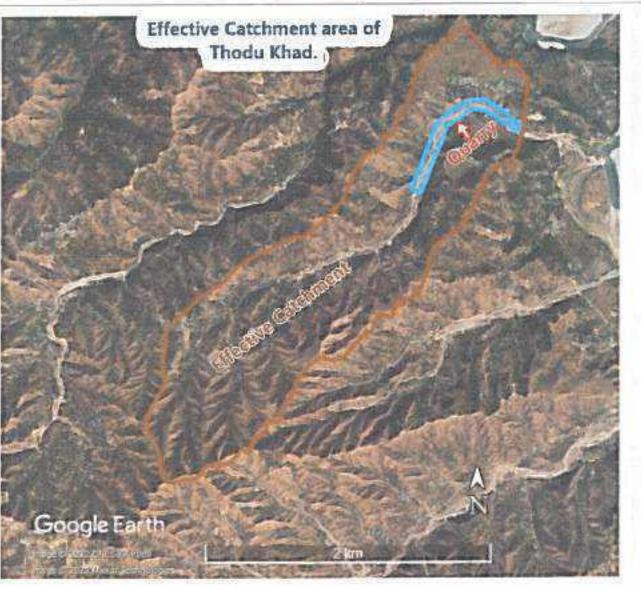


Figure 9 Effective Catchment area of Thodu Khad.

## 1.4 Type of Drainage

Dendritic (Figure 8)

0

ð

B

Þ

8

3

0

8

D

D

13

0

8

0

D

0

0

0

0

0

0

0

0

3

0

۲

8

10

0

0

0

0

•

0

0

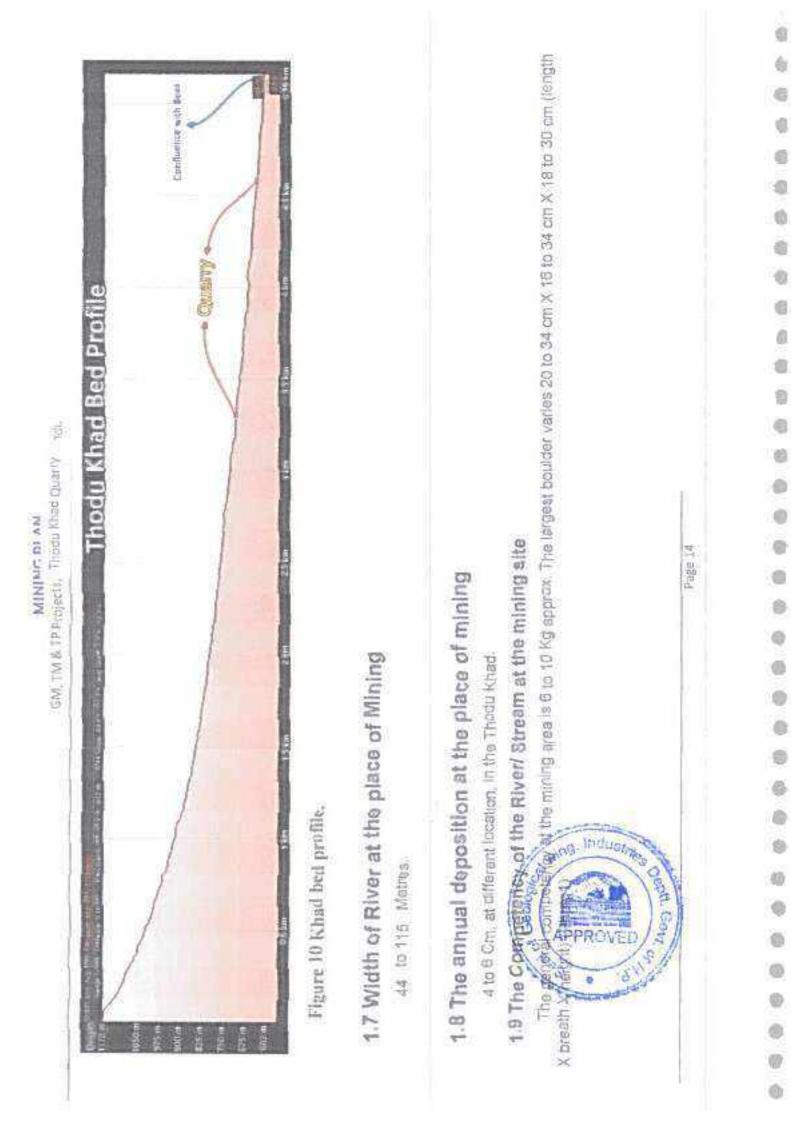
# 1.5 Origin of River/Stream

Thoda Khad ouginates s) a height of 1172 meter above mean sea level, near Parial village (originalies in the Survey of India, toposheet No H43E9). The general flow is SW to NE.

The attitude at confluence with Beas River is 609 Metres above MSL (lies in the Survey of India, toposheet No H43E13.

## 1.6 Attitude at Origin

1172 metres above MSL.



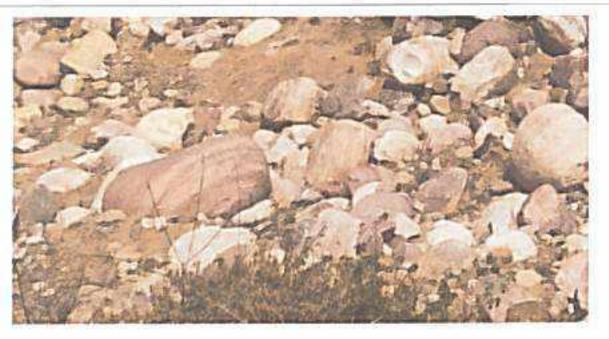


Photo 1:Showing the competency of river in leased area

## 1.10 The level of HFL

63

0

0

0

0

۲

3

6

0

6

0

0

0

3

6

0

0

0

6

0

0

Ð

0

0

0

0

0

0

0

0

6

0

۲

During monsoon floods the water level rises by about one metre, at times for short spells.

## 1.11 The level of LFL

Khad is seasonal.

## 1.12 The thread of deepest water in meandering.

The landform being depositional the meandering thread is constantly changing during the rains depending upon the water level.

## 1.13 Groundwater table.

The depth of groundwater level varies in the area according to season and distance from water current. It lowest in the pre monsoon period and highest in the post monsoon period. Thus, depth of groundwater table may vary from few centimetres in post monsoon period and more than a metre in the pre-monsoon period depending upon distance from flow.

## 2. Geology

## 2.1 Regional Geology

GEOLOGICALLY Himachal Pradesh can be broadly divided into two major geo-tectonic zones viz. the Lesser Himalayan tectogen in the south and the

#### MINING PLAN

GM, TM & TP Projects, HPPC1, Tehsil Kotli, Mandi.

Thodu Khad Quarry

8

0

۲

0

6

6

0

0

0

8

0

-60

0

e

8

8

63

0

۲

0

0

8

60

0

6

ø

0

0

(D

简

0

Tethys Himalayan Tectogen in the north. These two tectonic zones are juxtaposed with each other along a major tectoric break collectively designated as Main Central Thrust in the sense defined by Srikantia (1988). Mandi District lying within the Lesser Himalaya and the Shiwalik Foothill comprises rocks ranging in age from Proterozoic to Quaternary. The oldest rocks are of undifferentiated Proterozoic age, comprising canrbonaceous phyllite, schist, gneiss, quartzite and marble. The Ghoghar Dhar (Undifferentiated Proterozoic age) occurs as an intrusive body within the Chail Group of rock. This granite body is well foliated and composed of gneisses, granite with minor aplite and basic veinlets. The Sundernagar Group of Rocks of Mesa- Proterozeic age is represented by quartzite with basic flows. The Shall Group of Rocks (Meso- Proterozoic) Comprising limestone, dolomite, (at places stromatolytic) state, & quartzite. The Subathu consists mainly, of olive-green shales and grey shales. At the top, a band of white quartzile is exposed, this band of white quartzite has been taken as the marker defining the top of the Subathu sequence. The thick sequence of brackish and trashwater sedments immediately succeeding the tossiliterous manne Subathu are classified as Dharamshala Formation. The Dharamshala Formation are widely exposed in the Mandi parautochthon, further west in the autochthon. these rocks are exposed, in the core of the Sarkaghat anticline. The Shiwalik Group of Middle Middene of Early Pleistocene age comprises coarse dastic fluviatile deposits of sandstone, clay and conglomerates. The Quaternary sediments (Older Alluvium and Newer Alluvium) along prominent channels consisting of sand, silt, clay, pebbles and cobbles occurring along present channels of Middle to Late Pleistocene and Holocene age.

## 5.2 Local Geology

The local geological sequence in the area is given in the figure WP-7 and stratigraphy of the area is given in the table WP-5



MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

B

e

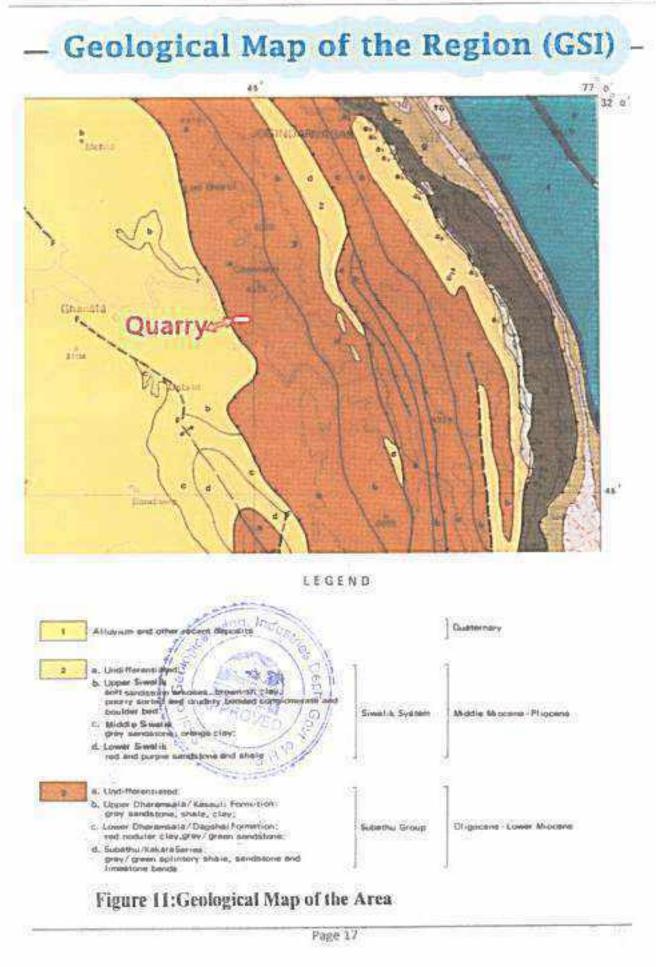
D

D

O

ß

Thodu Khad Quarry



#### MINING PLAN GM, TM & TP Projects, HPPCI, Tehsil Kntli, Mandi.

Industries

-01

ø

### Table: Stratigraphy of the Thodu Khad and surrounding region Area

Sr. No	Formation	Rocks
1	Newer Alluvium Channel Alluvium	Grey micaceous, fine to coarse grained sand, silt, clay, boulders, cobbles and pebbles of sandstone and quartzite
2	Upper Siwalik	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown claystone
3	Middle Siwalik	Massive Sandstone with minor conglomerate and local variegated claystone
4	Lower Siwalik	Alternation of fine to medium-grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium marcon claystone in the middle part
5	Upper Dharamshela	Medium to fine grained, hard, bluish grey and massive Sandstone, green clay and siltstone
6	Lower Dharamshala	Hard, grey, well bedded, and high mica content sandstone

## 2.2.1 Dharamshala Group

The thick sequence of brackish and freshwater seeing his the thick sequence of brackish and freshwater seeing his back and the second s

This highly folded and faulted sequence of Oharamshala apgregating to about 4000 meter displays a contrasting topography with that of younger and softer Siwalik rocks. The thick, hard, and highly competent Dharamshala rocks stand out as prominent ridges with higher relief.

Charamshala Group is divided into two Formations:

Upper Dharamshala

#### Lower Dharamshala

#### 2.2.1. a: Upper Dharamshala Formation

Upper Dharamshala consists of thick sequence of sandstones, sittstones, and clays. The Sandstones are medium to fine grained, hard, bluish grey and massive while the clays and sittstone are usually green.

#### 2.2.1. B: Lower Dharamshala Formation

Lower Dharamshala formation consists of very bright and red and mauve coloured clay and shales with thin bands of sandstone which are steel grey in colour, highly micaceous and well bedded.

#### 2. 2.2 Siwalik Group

100

0

0

6

6

۵

10

部

ø

1

0

8

0

0

0

.

0

0

0

0

0

0

6

0

0

0

۲

0

The Siwalik deposits are one of the most comprehensively studied fluvial sequences in the world. They comprise mudstones, sandstones, and coarsely bedded conglomerates laid down when the region was a vast basin during Middle Miocene, to Upper Pleistocene times. The sediments were deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive multiordered drainage systems. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times), subsequently resulting in a unique topographical entity - the Siwalik. Hills. The Siwaliks are divided stratigraphically into three major Subgroups -Lower, Middle, and Upper. These Subgroups are further divided into individual Formations that are all laterally and vertically exposed today in varying linear and random patterns.

Ongoing erosion and tectonic activity have greatly affected the topography of the Siwaliks. Their present-day morphology is comprised of hogback ridges, consequent, subsequent, obsequent, and resquent valleys of various orders, gullies, choes (seasonal streams), and earthpillars, filled earth buttresses of conglomerate formations, semi-circular choe-divides, talus cones, colluvial cones, water-gaps, and Choe terraces. Associated badlands features include the lack of vegetation, steep slopes, high drainage data ity, and rapid erosion rates.

The conglomerates in general are poorly compiled but at places they are very hard. These consist mainly of pebbles and cobbles of quartzite. The stray pebbles of granite, limestone, sandstone, brecolas and lumps of claystone are also observed at places. Often the size of pebbles is targe enough to be called as Boulders. The conglomerates not only occur as regular band but also as lenticular bands alternative with micaceous sandstone and clay-beds. The sediments were bought down 2 to 25 million years ago by the numerous fast flowing rivers issuing forth from rapidly Rising Mountain mass of the Himalaya, in the north.

#### MINING PLAN GM, TM & TP Projects, HPPCI, Tehsil Kotli, Mandi.

8

曲

0

۵

0

8

8

0

6

8

8

6

0

0

6

8

8

0

0

8

8

0

0

6

6

0

0

0

ŵ

1

0

The Siwalik Group is divisible into three sub-groups respectively the Lower, Middle and Upper on the basis of the lithostratigraphy as given in the table (Table -4).

> 2. 2.2.a: Lower Siwalik: - The lower Siwalik consists essentially of a sandstone-clay alternation. In district Kangra the lower sequence of the lower Siwalik consists of medium grained sub-graywacke interbedded with thick red clay, but higher up in sequence, sandstones are coarser, and clasts become more frequent while the clays are less developed. The uppermost horizon consists of conglomerate with well-rounded clasts of grey quartizite possible derived from the Shali. The total thickness is 1600 metres.

> 2. 2.2.b: Middle Siwalik: - The Middle Siwalik Subgroup comprises of large thickness of coarse miceceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwalik along a gradational contact. The sandstone is less sorted than those in Lower Siwalik. Clay bends are dull coloured and silty. The general thickness is 1400 to 2000 metres.

> 2. 2.2.c: Upper Siwalik: -The Upper Siwalik is mainly represented by sandstone Inter-bedded with slit and conglomerate. The lower portion of the Upper Siwalik mainly consists of soft, massive, pebbly sandstone with intercalations of conglomerates. In the upper portion the conglomerate intercalation is replaced by the clay's intercalations. The general thickness in the district is 2300 metres.

#### 2.2.3 Newer Alluvium

Newer Alluvium is composed of cyclic sequence of grey, micaceous, fine to coarse grained sand, silt, boulders, cobble, pebble and clays. Newer alluvium exposed as point bar/channel bars within the active channels.

# 2.3 Geology of the leased area

The quary out area forms a part of the stream bed covered with boulders, cobbles, pebbles inver born bajn, and sand and clay deposit of Channel alluvium. The rocks in the catchments of Thodu Khad is of Upper Siwalk Formation. The area is comprising predominantly the quartzite Boulders. Sand and river born bajn of Sandstone. The boulders are white, spotted white, greenish white, core, purple and dark green in colour.

# 2.4 Nature of the Boulder/ Cobble/ Sand

The area lies with in the regular course of the theu in the rainy season

All the deposit comprises quartzide, sand and fraction of some imposione and breccias- fragments. The boulders are white, spotted aprile, greepish white,

pink, purple and dark green in colour. Quartzite fragments are rounded, subrounded and discoidal in shape having smooth surface. Their size varies from gravel to boulder.

Thickness of the deposit varies from one to three meter.

(1)

3

0

10

13

0

0

0

9

0

8

03

D

0

0

0

0

0

0

3

0

ø

D

1

0

0

0

0

0

0

0

During the monsoon this bed replenishes to a large extend from the Upper Siwalik Formation rocks due to erosion by heavy flow from higher reaches. Due to sudden decrease in the carrying capacity and competency of the river the annual deposition of one to three cm is received.



Photo 2; Showing the nature of the Lease area in the Thodu Khad.

# 2.5 The Nature of the rock along the bank

The rocks along the left bank belong to Tenace Deposition of the Quaternary Formation consisting of boulders, cobbles, pebbles, river born bajri, and sand and clay deposits and tertiary formations consisting of sandarone, claystone, and boulder beds.



#### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

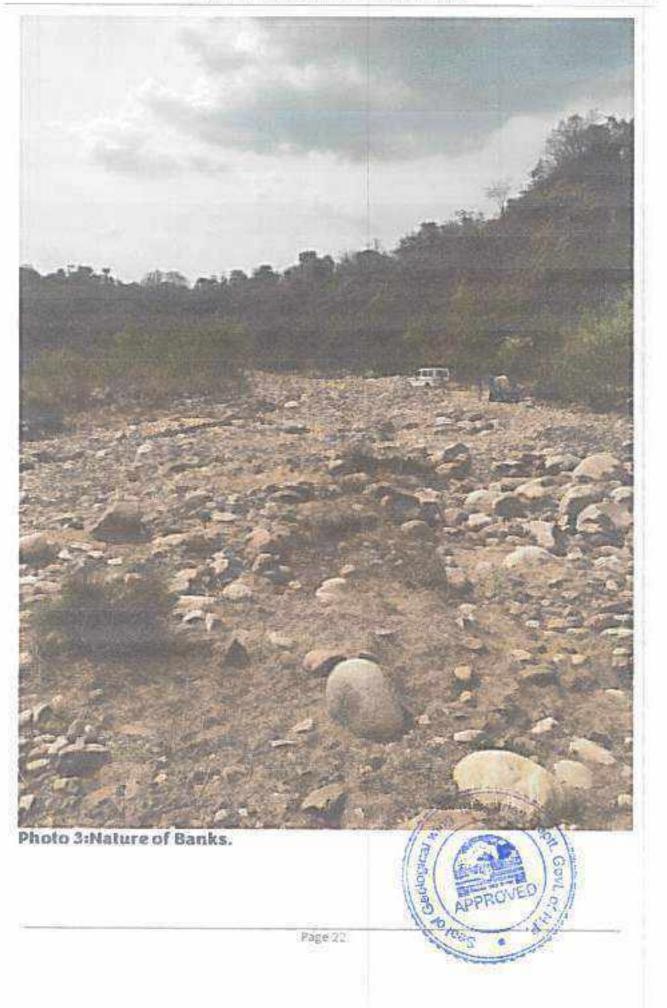
.0

.

.

÷

.



#### 2.6 Estimate Annual Deposition of Mineral

10005

8

0

D

0

0

0

1

0

0

0

13

6

0

63

8

0

0

0

ø

0

0

0

1

0

0

6

0

0

The area being part of the river/Khad which receives annual rainfall, the mining pits will get replenished during the rainy (monsoons) season. As abundant precaution, keeping in view the variation in rainfall particularly highest per day rainfall, which generally causes floods, the factor of five cm annual replenishment is taken into consideration. The annual replenishment of the material also depends on the discharge, grade of river and geology of catchment area. The rocks of the catchment area are formed of tertiary boulder bed formations are very much prone to weathering as the rains easily erode the cementing clay, thus loosening the boulders, which are caried down during the floods. Thus, it is generally observed that replenishment of more than five cm occurs in a year as all the old pits get filled with RBM during the very few early floods of the monsoon. Hence mined out area of the pre- monsoon will be filled with mineral during monsoon and even during winter rains. Mining area being



8

0

6

0

10

63

6

6

-8

1

18

6

0

.

Ö.

0

8

8

0

۲

۲

6

8

0

0

0

0

8

0

0

0

0

0

0

# 3. RESERVE ESTIMATE

#### 3.1 General Consideration

The basic requirement of the lessee will be stone, bajri and sand for construction of Project.

#### 3.2 Percentage wise distribution of Mineral:

The table below shows the percentage was distribution of minerals and figure 12 depicts the pre-chart for the same

Table shows the percentage wise distribution of minor minerals.

# Percentage of Minerals/Material in the Mining Lease Area

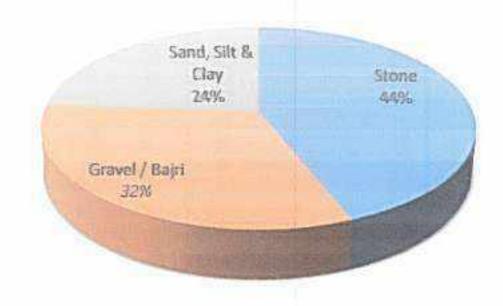


Figure 12. Percentage of each category of mineral present in the leased area.

1	Stone	44%	and moustines
2	Gravel / Bajri	32%	15/00 121
3	Sand, slit & clay	24%	18/ 6-2 \6

#### 3.3 Estimate of Geological Reserve

The entire block falls within the river corridor/khad trrace. Thise this mining leads area of 95030 square metres can be considered for estimation of geological Deposit. The estimated thickness of deposit is more than 5 metres. However, considering its depth for purpose of estimation of Geological reserves to a depth five metres and

specific gravity to be 2.25, the proven Geological deposits in the area are to a tune of about 1969087, metric tons as shown in the chart.

Geological Reserves	Thickness, in metres	Lease Area (Square Metres)	Reserves Rounded off (In tonnes)
PROVED	5	95030	1069000
PROBABLE	10	95030	2138175
INFERRED	20	95030	4276350
Specific Gra	vity 2.25		
Formula = Si Reserves	urface area 🕽	thickness/dep	th X specific gravity =

#### 3.4 Estimate of Mineable reserves of boulders, Bajri and Sand

0

ø

8

6

0

0

8

6

0

0

0

8

0

0

0

6

6

0

0

0

0

The basic requirement of the leased or is sand, stone and bair. As per the policy guidelines issued by the State Government for Mining of River / Riverbed and to calculate the mineable reserve the following points are taken into consideration: Adequate safe distance has been provided from the points of utilities as per Rules and guidelines.

As per the policy guidelines issued by the State Government for Mining of River / Riverbed,

- In this case only one-meter area is proposed as safety zone as the depth of mining is constrained to one metre.
- Mining is not permitted within 1/10<sup>th</sup> of riverbed or 5 meters from the banks (HFL) of the river / River whichever is higher. The width of the river in leased area is 44 to 115 meters; thus, no mining is proposed in the area up to 5 to 12 meters from the banks/HFL.
- The water table level will go down as the water recedes after the monsoons.
- The depth of water table will be at lowest in the pre-monsoon season.
- A geological map on 1:2000 scale is prepared and main litho units were marked on the plan to know the surface spread of each unit.
- The entire width of the over gets flooded during heavy rains in monsoons. The mined area gets repletished in the very early floods in the beginning of the monsoon season.
- The total mineable area and deposit is shown in figure 13, table 3 and figures 14.
- The part of the area, i.e., 71450 square metres of lease area, is mineable as it falls within the river corridor, leaving out the safety zone provided along the banks/HFL.

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu thad Quarry

:0

.0

.....

.

ø

(0)

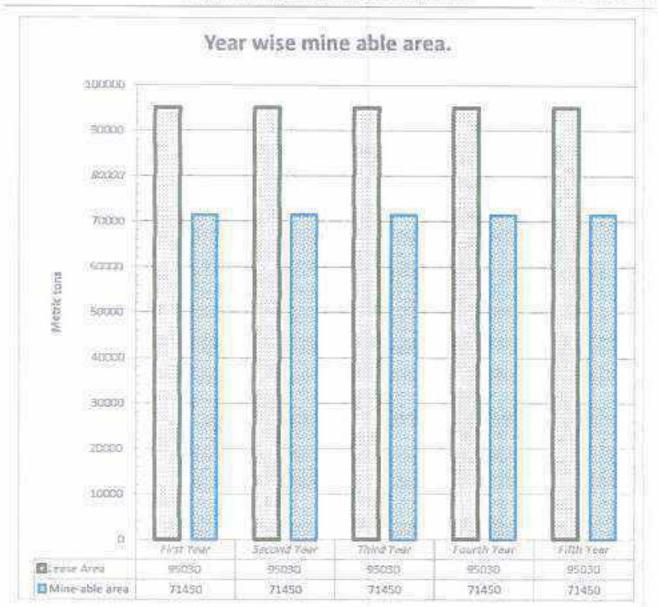
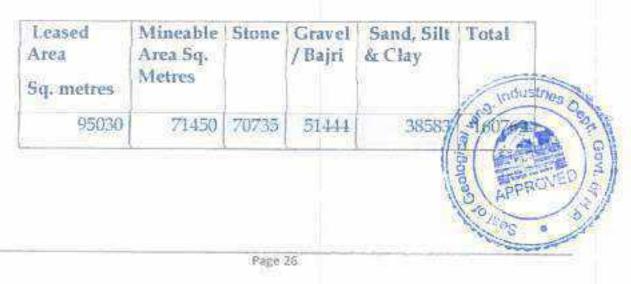
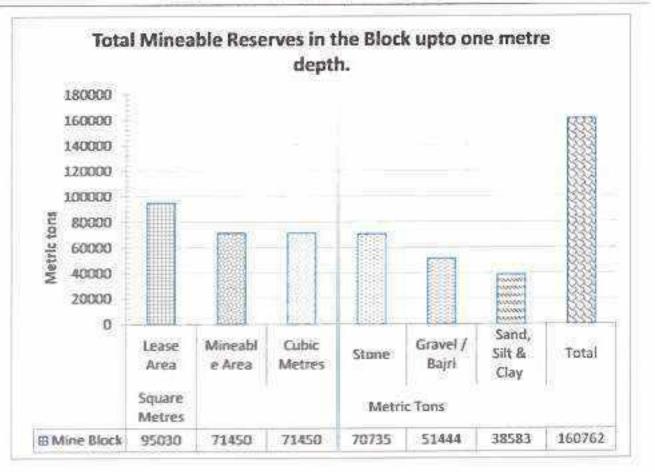


Figure 13: Mineable area.

Table 3 Mineable reserves in the block





# Figure 14: Mineable Reserve up to One Metre depth

Thus, the safe mine-able block of 71450 square metres contains 160762 tonnes of mineable material. The entire mine able block will be mined every year.

# 3.4a Depth of mining

6

Ð

۵

0

6

D

D

8

B

0

0

0

63

6

0

6

(B)

ê

0

8

D

10

63

6

0

0

0

0

0

The Rule 34 (IV) of Rules stipulates 'the depth of mining in the riverbed shall not exceed one metre or water level whichever is less'.

One metre maximum depth from the surface is considered for mining of the reserve.

# 3.4b. Specific Gravity

The specific gravity of Quartzite is 2.65 and of sand is 1.85. Hence average specific gravity of 2.25 is taken for calculation of the deposit

# 3.5. Estimate of Annual deposition

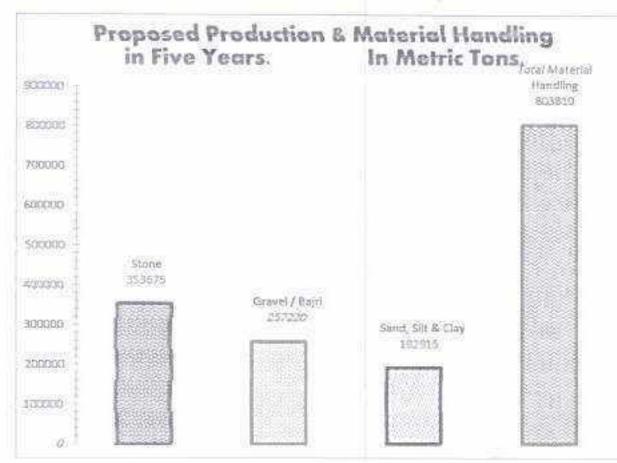
The reserves of all the constituents of leased block have been calculated for the safe mineable area to be 71450 tonnes, considering the specific gravity as 2.25 as shown in para 3.6. The reserves have been calculated for year of mining, computing mine-able deposit up to maximum permissible quarry depth of one metre are depicted in figure13. Depending upon normal rainfall from year to year causing erosion in the catchments and flooding of MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kirdl, Mandi,

Thoda Khad Quarry

i0

Riverbed, the minerals are inexhaustible, but presently these deposits are part of Geological Formations of catchments.

Figure 15 shows the proposed production of materials in five years.



# Figure 15: Proposed production of total material in five years

# 4 MINE DEVELOPMENT AND PLAN OF PROGRESSIVE MINING

The mining activity will be manual and to some extent mechanical with excavators with permission from competent authority. Normally it has been observed that a worker can mine/excavate about three to four tonnes of material in a day. To excavate o an average 595 tonnes of material in a day 150 to 175 workers would be required. Working of so many persons in a small area would cause congestion and crowding effecting in their efficiency of working. Therefore, mining shall be resorted to by both manual as well as mechanical methods. Workers are mainly deployed in riverbed mining for extraction and for loading of extracted material in a day of the deployed in rector trolleys in addition loader/ JCB will be deployed. Drivers, Operator for loaders, hopers and tractors will be another category of workers.

# Considerations

No blasting is required.

	4 TA4 8 TD	MINING		HI Adamati	Thr	idu Khad Quarr
Only manua		Projects, HPP			1.0.8	110 1017
will be unde		contained any	GALIGOLIGI	or resire to		
<ul> <li>Trenches ar that these a channel dire</li> <li>With the re process of o weathering o minerals.</li> <li>Mining activ of the river.</li> <li>4.1 Development and The proposed producti show the production of</li> </ul>	tre not der ection of the plenishme controlled in of rocks in ity will be d Product on for the	eper than o le river and ent of the mining can the catchm undertaken ion Progra first five ye	one metre bottom is pits and t continue y nents have only durin mme for t ar is as gi	and follow above the v renches du year after y inexhaustil ig the dry s 5 years	the general water table uring the f ear. The e ble supply of easons an	al / normal loods, the rosion and of required d dry parts
1.1a Year wise Production	and the second se	in nie jean	fizi			
900000 800000 700000 600000 500000 400000 300000 200000 100000					_ []	
o	First	Second	Third	Fourth	Fifth	Total
		70735	70735	70735	70735	353675
Stone	10/35		and the second states and the	10110111201	1-92 01 12:00	- 19-30-00 CCL
Gravel / Bairl	70735 51444		51444	51444	51444	257220
GStone Gravel / Bajri Sand, Silt & Clay	51444 38583	51444 38583	51444 38583	51444 38583	51444 38583	257220 192915

B

D

D

D

D

Ð

D

D

Figure 16:Year wise Availability of Materials (in Metric tons).

Thodu	Khad	Quarry
-------	------	--------

ø

Table 4 Year wise production of materials.

Year	Stone	Gravel / Bajri	Sand, Silt & Clay	Total
First	70735	51444	38583	160762
Second	70735	51444	38583	160762
Third	70735	51444	38583	160762
Fourth	70735	51444	38583	160762
Fifth	70735	51444	38583	160762
Total	353675	257220	192915	803810

The proposed production is sufficient to for sustaining a viable mining project. The year wise mine working planned for the Quarry is presented in the map 3. Year wise production of River Borne Material, sand, stone and bajri is given in figures 17, 18, 19, 20 & 21.



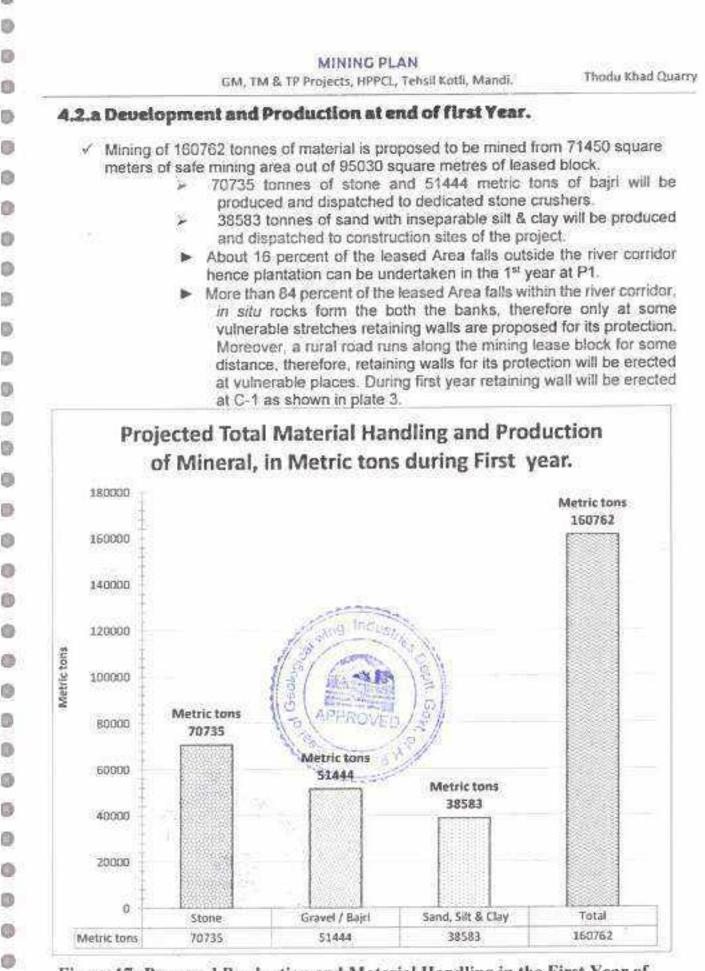


Figure 17- Proposed Production and Material Handling in the First Year of Mining.

6

100

# MINING PLAN

GM, TM & TP Projects, HPPC1\_ Tehsil Kotli, Mandi.

-81

63

63

1

100

10

0

63

0

0

6

1

-

0

0

0

8

0

0

0

6

8

8

6

8

0

e

0

60

65

0

# 4.2. b Development and Production at end of second Year.

During 2rd year of development and production programme:

- Mining of 160762 tonnes of material is proposed to be mined from 71450 square meters of safe mining area out of 95030 square metres of leased block.
  - 70735 tonnes of stone and 51444 metric tons of bajn will be produced and dispatched to dedicated stone crushers.
  - 38583 tonnes of sand with inseparable sill & day will be produced and dispatched to construction siles of the project.
  - About 16 percent of the leased Area falls outside the river comdor hence plantation can be undertaken in the 2nd year at P2.
  - More than 84 percent of the leased Area falls within the river corridor in situ rocks form the both the banks, therefore only at some vulnerable stretches retaining walls are proposed for its protection. Moreover a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During second year retaining wall will be erected at 0-2 as shown in plate 3.

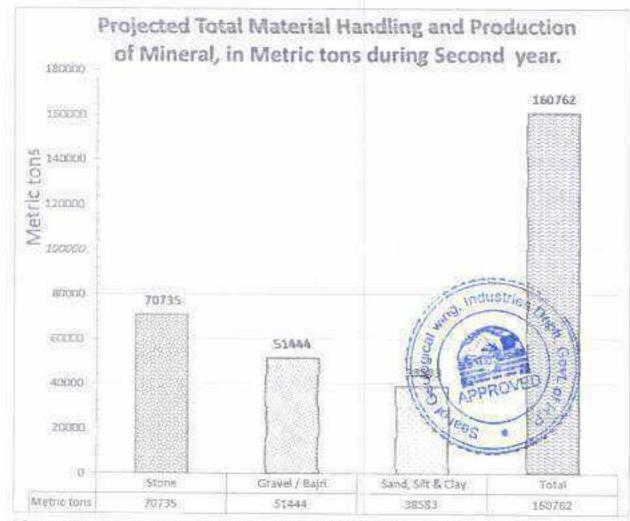


Figure 18- Proposed Production and Material Handling in the second Year of Mining.

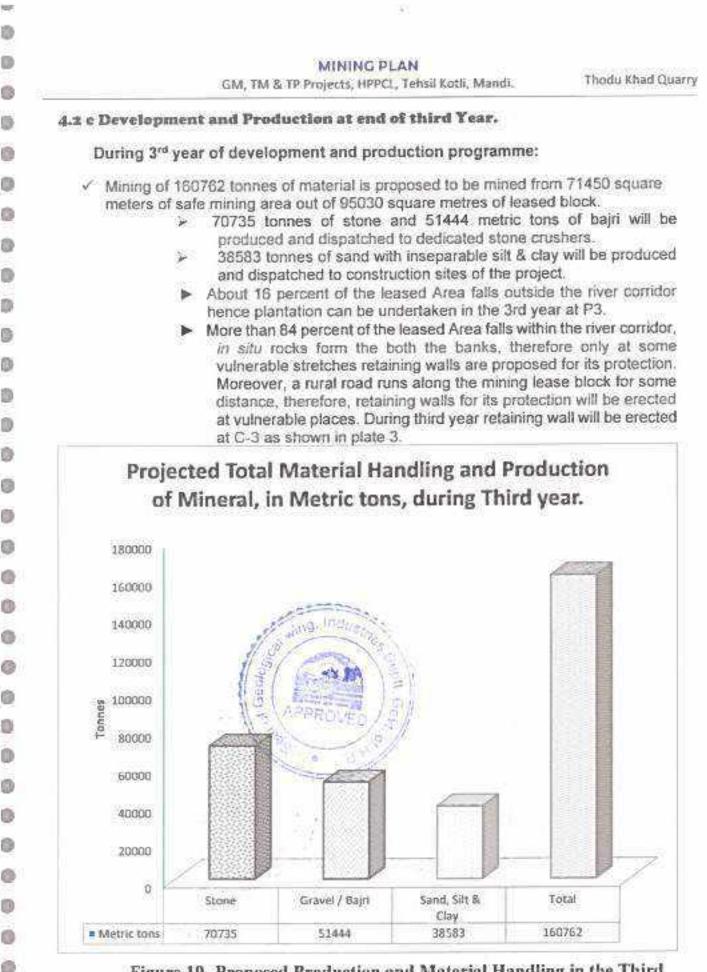


Figure 19- Proposed Production and Material Handling in the Third Year of Mining.

6

63

1

#### MINING PLAN GM, TM & TP Projects, HPPCI, Tehsil Koti, Mandi,

8

63

8

0

0

8

63

0

0

6

8

0

0

0

6

0

0

0

6

6

ø

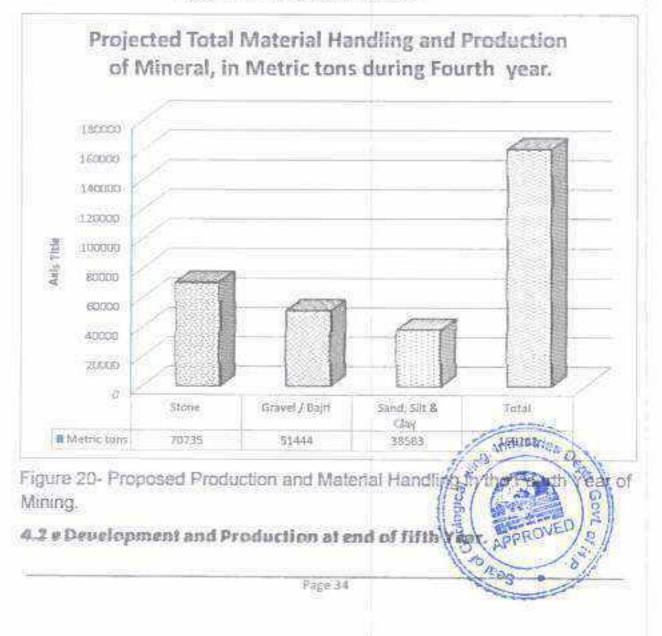
3

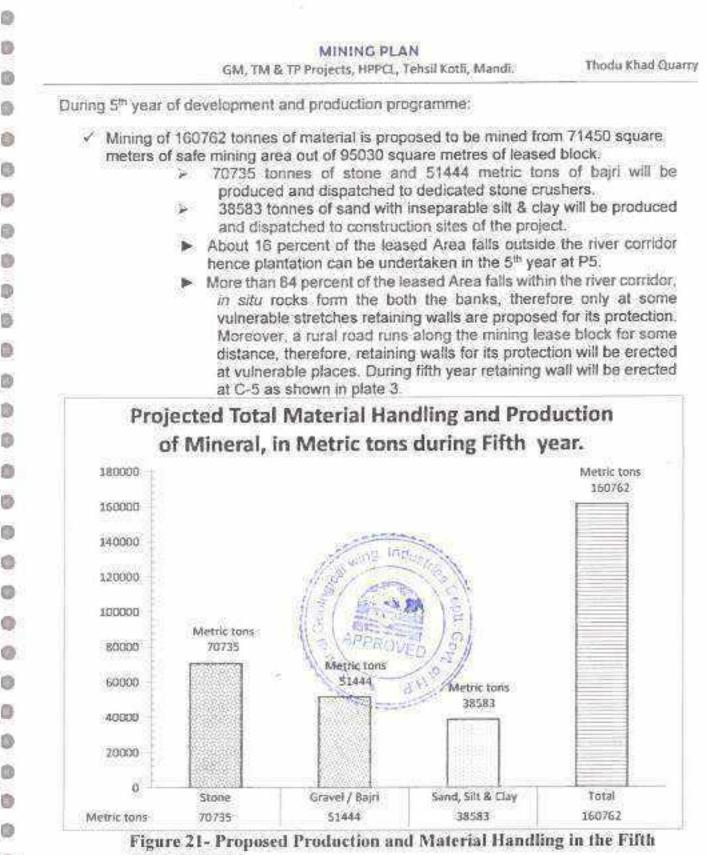
65

# 4.2 d Development and Production at end of fourth Year.

During 4th year of development and production programme:

- Mining of 160762 tonnes of material is proposed to be mined from 71450 square maters of safe mining area out of 95020 square metres of leased block.
  - 70735 tonnes of stone and 51444 metric tons of bajir will be produced and dispatched to dedicated stone crushers
  - 36565 tormes of sand with inseparable sit & day will be produced and dispatched to construction sites of the project.
  - About 16 percent of the leased Area falls nufside the river corridor hence plantation can be undertaken in the 4th year at P4.
  - More than 84 percent of the leased Area falls within the river corridor in situ rocks form the both the banks, therefore only at some vulnerable stretches retaining walls are proposed for its protection. Moreover a rural road runs along the mining lease block for some distance, therefore, retaining walls for its protection will be erected at vulnerable places. During fourth year retaining wall will be erected at C-4 as shown in plate 3.







4.3 End Use of Mineral

0

0 0

0

100

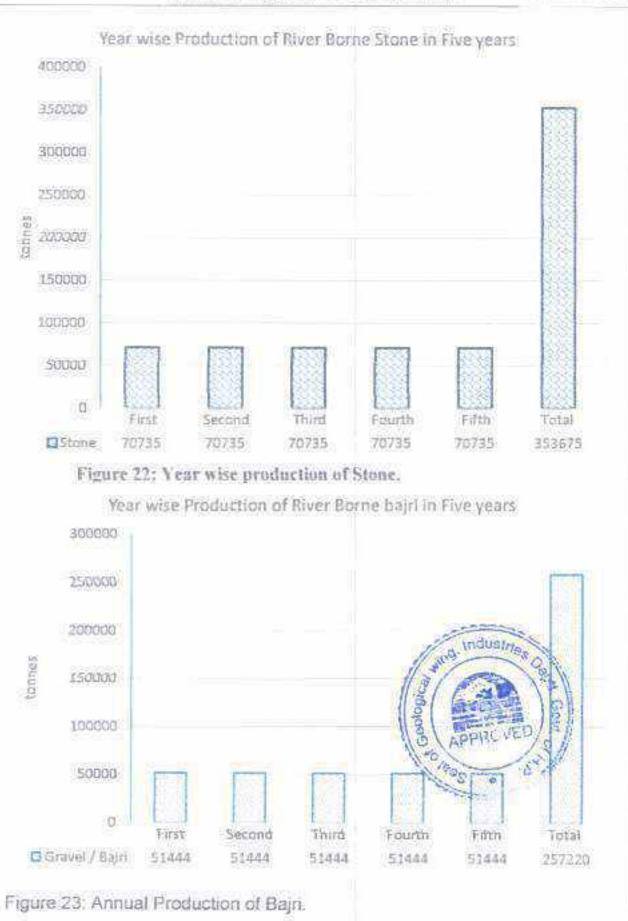
The extracted mineral stone, sand and Bajri for will consumed in the Project construction activities. Annual production of stone, bajri and sand is shown in figures 22, 23, & 24. MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

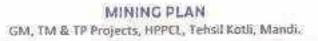
Thedu Khad Quarry

-8

-8

i)





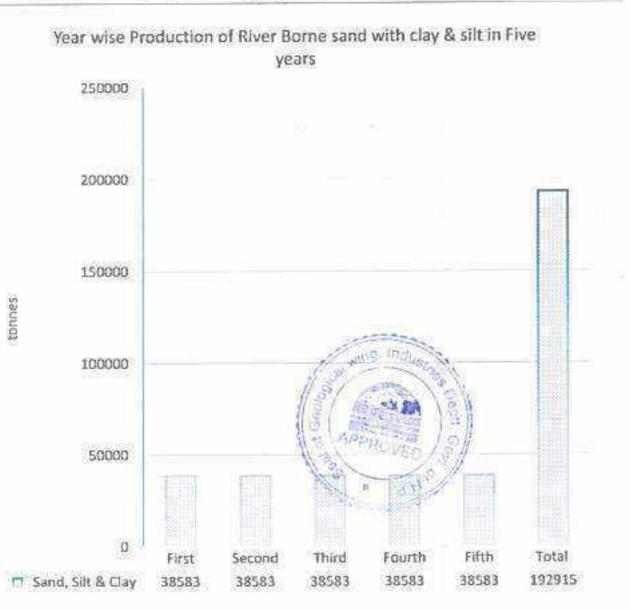


Figure 24: Annual production of sand along with silt & clay.

# 4.4 Detail of road Transport

ø

ß

D

ø

D

C

The maximum total extraction of minerals stone, sand and bajri for use in the Project would be 160762 tonnes or 595 metric tonnes per day, considering 270 working dry days. Thus, about 66 tipper truck trips would be required to move the material from quarry to crusher / construction sites. The track through River is about 200 metres along the leased area to rural roadside. The evacuation route is shown in figure 25.

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

 Evacuation Route from Quarry site

 Google Earth



戗

-8

ġ.

.0

Thodu Khad Quarry

Plige 38

Figure 25. Evacuation route Map

#### PARTH

#### **Environment Management Plan**

#### 1.0 Base Line Data

Any development activity, including mining, is likely to have adverse or beneficial impact on existing environment. The various environmental parameters generally impacted are as given below:-

- Change in Topography& land use pattern.
- Effect on Flora & Fauna
- Ground Vibrations and Fly Rocks:
- Effect on Hydrology

Effect on Climate

- Temperature Rainfall
- Wind Speed
- Air Quality
- Noise level
- Visual Impact
- Socio- economic Impact

Accumulation of Scree Mine Waste.

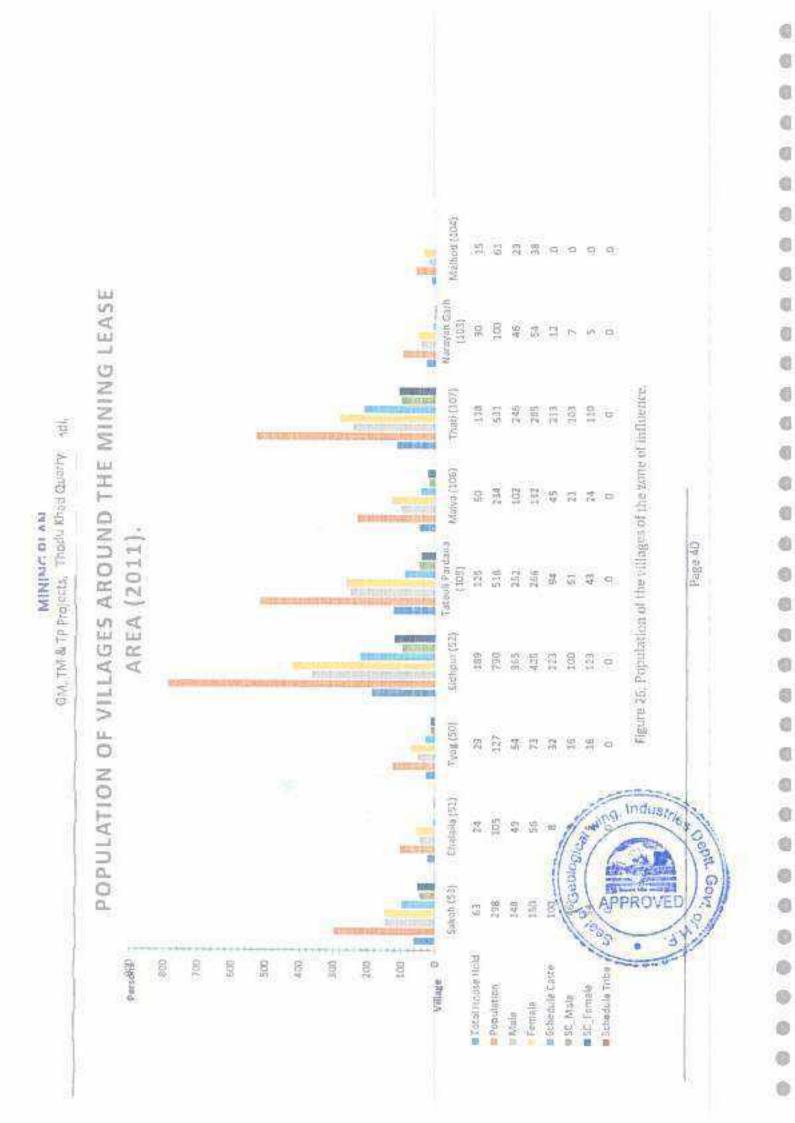
The base line information of the existing environment was collected from various sources such as

- Census Department, Government of India.
- Department of Economics and Statistics, Government of Himachal Pradesh.
- Directorate of Land Records, Government of Himachal Pradesh
- Directorate of Horticulture. Government of Himachal Pradesh
- Fishery Department, Government of Himachal Pradesh
- ✓ Forest Department Government of Himachal Pradesh.
- Animal Husbandry Department, Government of Himachal Prodesh
- Survey of India, Government of India
- Metrological Department Government of India

to have in depth understanding of the existing environment and ta stress the likely impact of mining activity in the Area

# 1.1. Demography of the area

The total population of the surrounding area, as per the 2011 Censor is given below in the figure 26. Education wise and employment wise break of population in surrounding villages is given in figure 27. The population details of Mandi District and son tensil Dharampur is given in figure 28.



	orking C	Working Categorisation of Population of surrounding villages o Tehsil Dharampur, District Mandi - (Census 2011).	in of Pol	pulation o	ation of surrounding villages of lease area, District Mandi - (Census 2011).	ding villa Census 2	iges of lea 011).	ase area,		
700 500		-357-18								
400 300										
200			an Li		1					
10	// Sakoff [53) 7	Calibria (52)	Type (50)	Sidhpur (52)	Pardana (105)	Malva (106)	Thedd (107)	(103) (103)	Mathod [154]	
a Total Literate	204	10 4 2 M	316	593	384	131	186	53	n tr	
Male Literate	1. 105, 1	11/ 18/	36	105	20.4	63	191	32	8E	
Ernale Literate	- 0.86 ····	1 32/35/21	9	287	180	96	1961	31	25	
Total Witterate	10	にいる	51	202	134	Es	144	37	BI	
<ul> <li>Maie! literate</li> </ul>	Gate	Coppell Gone	18	54	63	51	55	14	an	
Femple illiterate	24	17	5	138	86	80	8	52	ET	
Total Workers	36	11	F	139	63	65	12	17	4	
Male Workers	27	11	10	104	59	34	45	15	2	
Female Workers	6	0	÷	570	ID	10	22	2	0	
Marginal Workers	150	32	56	389	102	121	181	E.	37.	
Marginal Workers M	61	ň	20	131	60	315	25	1	11	
m Marginal Workers Fe	68	61	46	257	2.2	58	126	2,2	36	
II Non-Workers	112	62	20	262	347	74	280	22	12	
IN Math-Workers M.	8	25	24	621	E01	32	143	22	in	
Nan-Warkers Fe	25	37	26	133	214	42	137	10.02	13	

8

D

MINING PLAN GM, TM & TP Projects, HPPCL, Tensil Kotli, Mandi.

Thodu #Sad Quarty

Ø

-

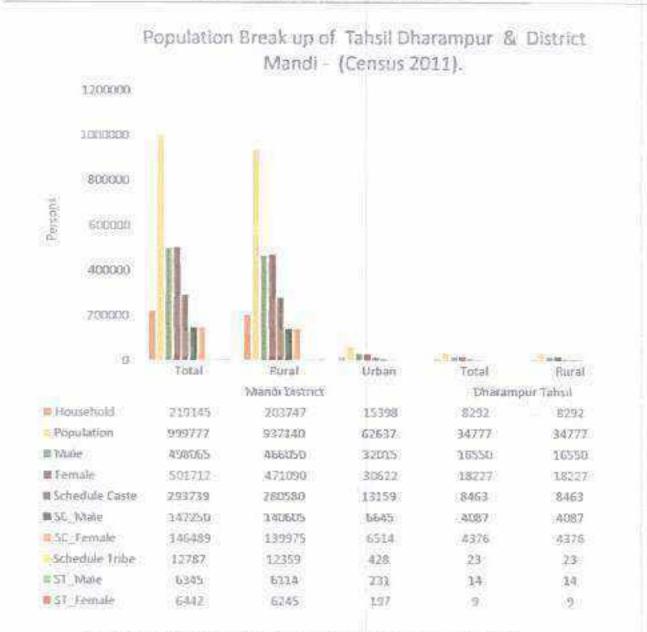


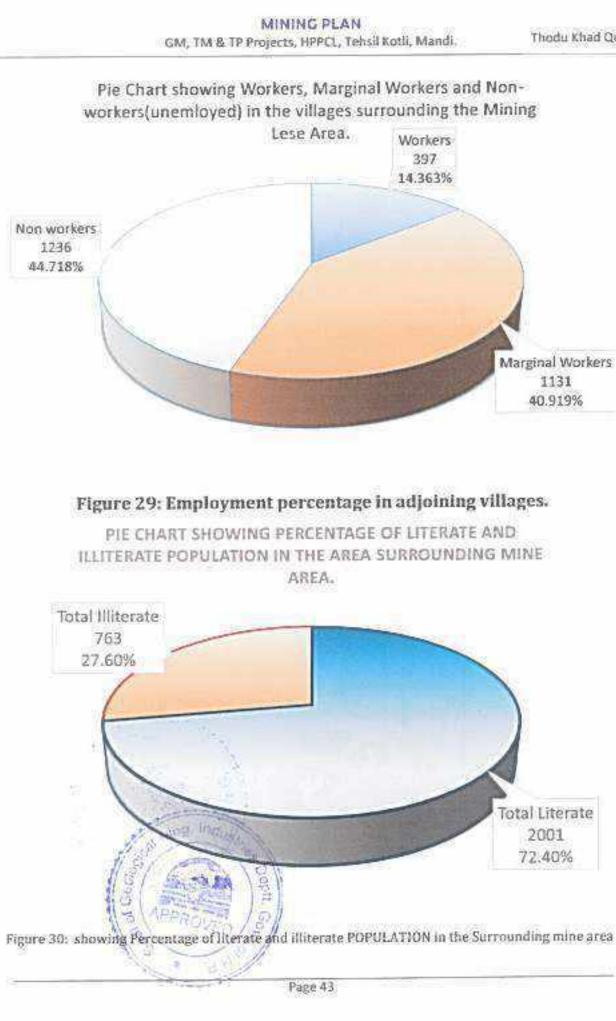
Figure 28: Population break up of District Mandi & Tehsil Dharampur,

#### 1.2 Socio Economy of the Village/Population.



No adverse impact on the socio-economic condition of the area is ea

The induction of mining sector development in and around predominantly, agricultural area is found to create its impact on the socio-economic life of the local inhabitancy. The impact is generally positive. As can be seen in figure 29 there is moderately high percentage of seenables (44.718%) and underemployed 40.919%) people in the area despite moderately high level at literacy. (72.40% literates, figure 30] of literacy.



D

Ð

Ô

#### MINING PLAN

#### Thodu Khad Quarty

8

0

0

0

0

0

0

63

0

10

Ø

6

0

8

61

63

8

8

0

8

0

0

0

8

8

0

8

63

0

0

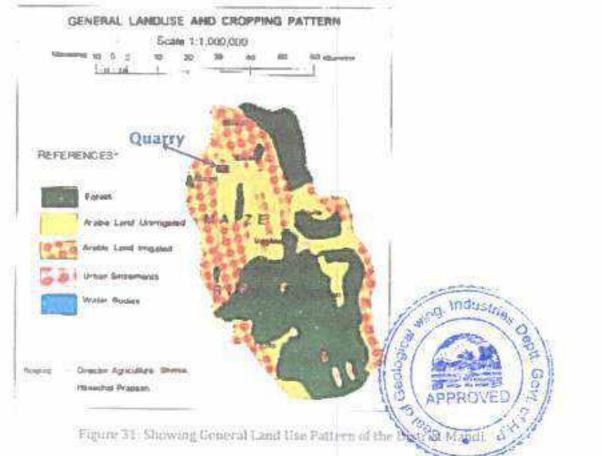
6

6

# 1.3. Land Use Pattern

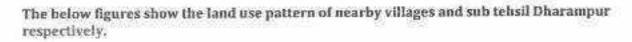
Primarily the land of the district can be classified in following 6 categories as shown in figure 31.

- i, Forest
- ii. Grass and Scrub Land (partially agriculture)
- .iii Water Bodies (Stream and corridor)
- IV. Agriculture land
- v. Waste land
- vi Urban Settlement
- The District Census 2011 classified the land available in surrounding villages into following nine categories
  - 1. Land under Miscellaneous tree crops
  - 2. Culturable waste land
  - 3 Fallows Lend other than Current Fallows
  - 4. Current Fallows net area sown
  - 5. Area under non-agricultural uses
  - 6. Barren and Un-cultivable land
  - 7 Barren & Un-cultivable Land.
  - 8. Permanent Pastures and Other Grazing Land
  - 9: Forest



Page 44

MINING PLAN	
GM, TM & TP Projects, HPPCL, Tehsil Kotli, Ma	ndi.



D

bð

D

9

9

Ð

B

D

B

9

5

D

D

D

3

3

樹

0

3

D

0

B

b

3

3

D

Ö

D

6

3

0

6

13

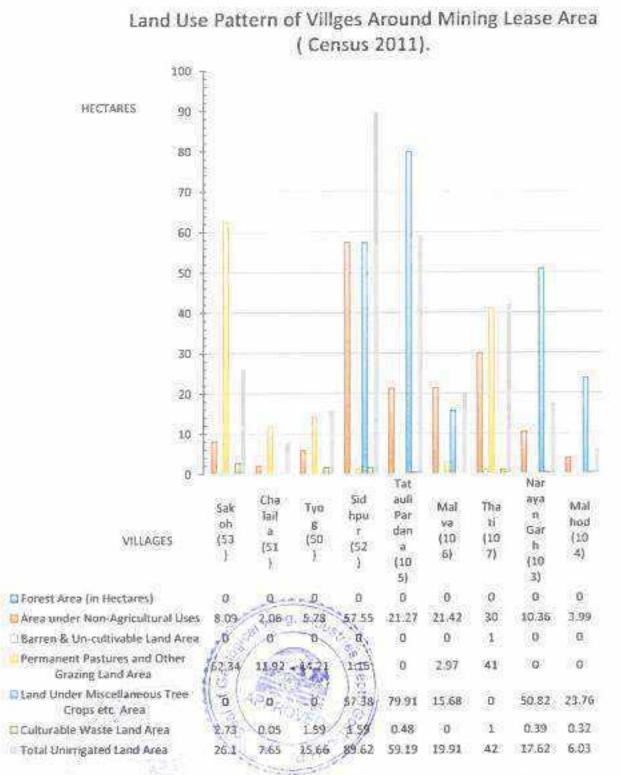
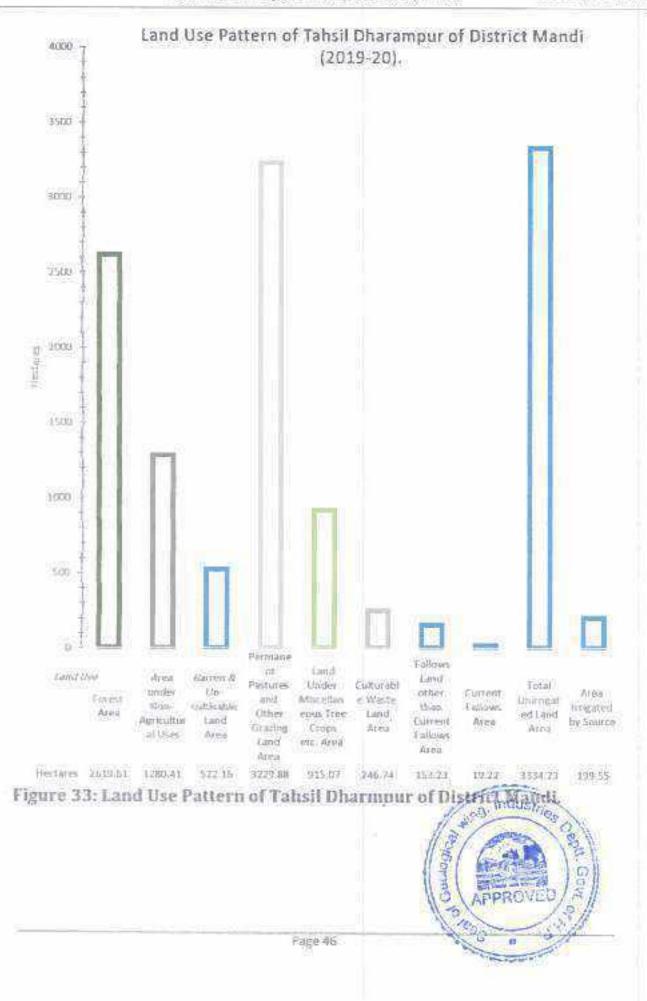


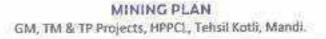
Figure 32: Showing Land Use Pattern of villages around the mining lease area.

Page 45

MINING PLAN GM, TM & TP Projects, HPPCI., Tehsil Kotli, Mandi.

Thodu Khad Quarry





0

8

B

B

9

D

3

3

2

3

B

0

8

3

0

Ð

D

1

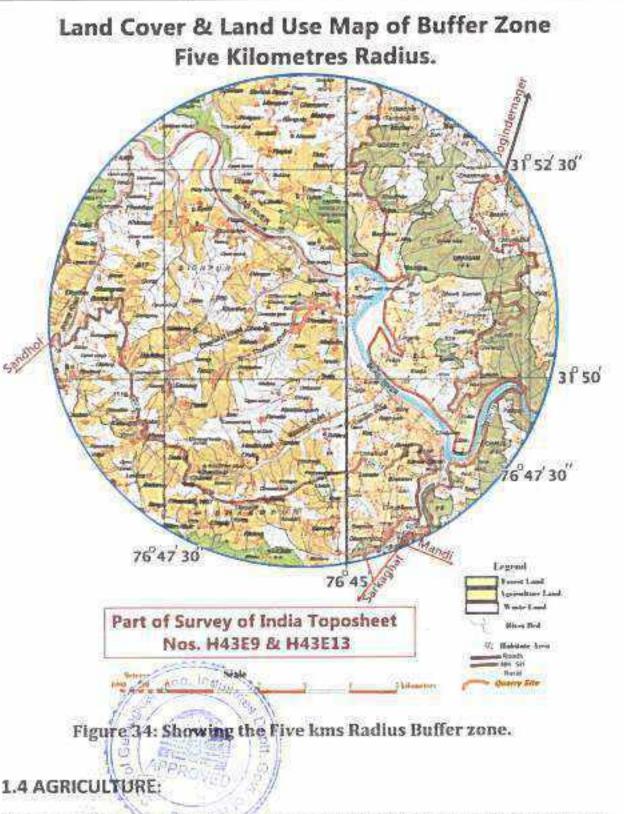
CB.

0

0

0

۲



The economy of Mandi district is predominately agrarian as around 80 per cent of the total population is dependent on agriculture and activities allied to it for earning their livelihood. The moisture retention capacity of the area is poor due mainly to the fact the bed rocks are argillaceous and the land the uneven. The crops usually face moisture stress during the remaining period of the year due to

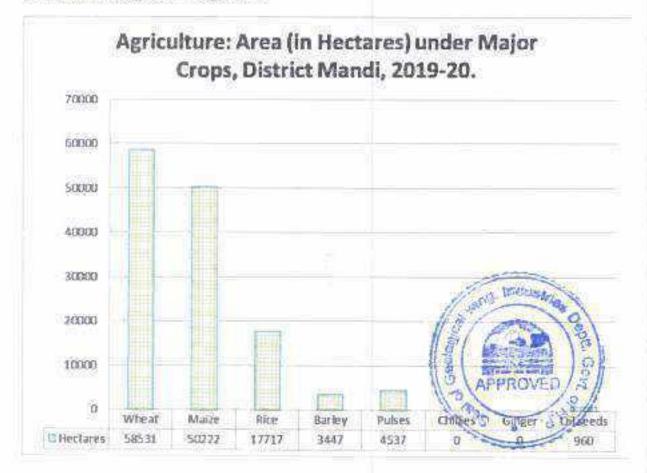
	MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.	Thodu Khad Quarry
\$1.000 (DrvC)	uate and irregular rainfall. The irrigation facilities are provided by lifting wate dug wells and medium to deep tube wells in the valley area.	er from steares.
The sou	urce of water and irrigation in district Mandi can be classified into following f	live classes
4.4	Lift Irrigation Scheme, Kuhls, Well used for domestic purposes, Well used for irrigation, Tube wells/ jor food crops are grouped into three categories:	
1111	Cereals, Pulses, Other food crops like Chilies, ginger, sugarcane, and turmeric. Non-food crop area is of two kinds; Oil seeds.	

e

- Other non-food crops such as cotton, tobacco, and fodder crop,

The area under each category of the crop is given below in figure: -35.

Figure: -36 show production of agriculture produces in district Mandi. The area under vegetables and their production is given in the figure: -37.



# Figure 35:: Showing area under different crops in Mandi District.

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi

10)

n

D

ß

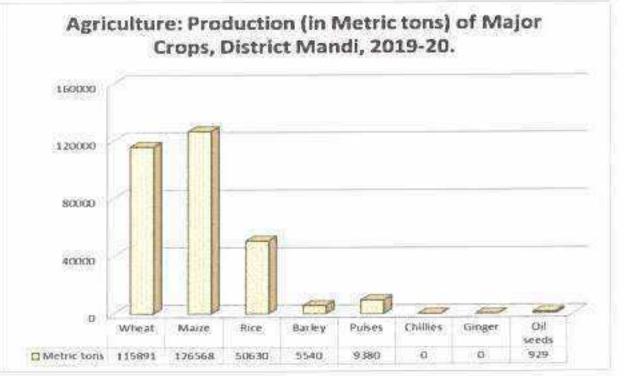
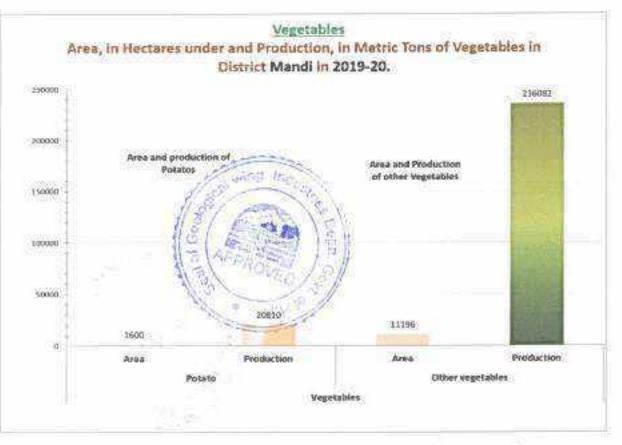


Figure 36 Showing production of each crop in District Mandi.



# Figure 37: Showing area under vegetable, in Hectare and Production, in Metric tons, of District Mandi.

Page 49

0

0

6

100

0

0

62

.

0

0

-8

0

61

0

0

0

8

0

0

1

0

0

8

8

0

63

6

8

0

۲

0

6

# **1.5 HORTICULTURE**

The topography and the egro- climatic conditions of the district are quite suitable to produce the various fruits. The topography of the district can be grouped into three categories namely high hill areas located at a higher elevation, mid hill areas and low-lying valley areas. Fruits of various kinds depending upon the terrain, climatic condition and soil are grown in the district.

The main horticulture produce of the area can be classified into following five categories.

- 1. Apple
- 2. Other temperate fruits
- 3. Subtropical fruits
- 4. Nota and the finits
- 5. Citrus fruits

The area under each fruit as well as the production of each fruit in district Mandi are shown in Table 6.

# Table 5; Area under each fruit and their production in District Mandi.

	itus of Hort trict Mandi.	
Fruit	Area (In Hectares)	Production (in Metric Tons)
Apple	16748	57158
Plum	2856	827
Peach	783	(443
Apricot	297	320
Pear	1272	1216
Cherry	24	8
Green Almonds	0	and industries R
Persimmon	252	18 CAN
Olive	298	APPROVED /
Kiwi	29	TO APPHOVED
		and the second s

#### MINING PLAN GM, TM & TP Projects, HPPCL, Tebsil Kotli, Mandi.

D

D

D

D

ò

•

Thodu Khad Quarry

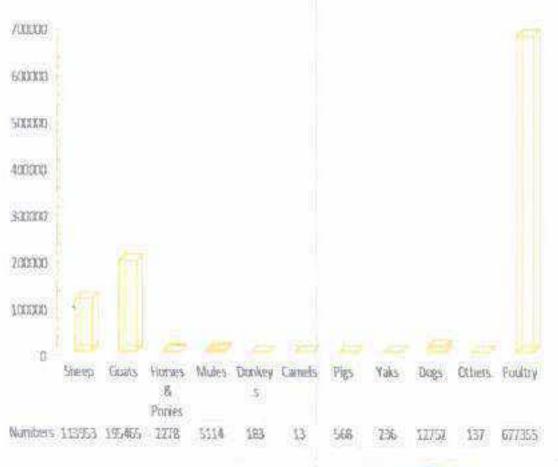
Strawberry	2	0
OTF	6313	2930
Almonda	1502	288
Walnut	1055	137
Piccanut	.392	22
Nuts & Dry Fruits	2949	447
Orange	730	255
Malta	196	0
K. Lime	2999	245
Galgal	538	345
Others	3	0
Citrus	4466	845
Mango	4964	2683
Litchi	590	701
Gauva		317
Рарауа	693 600 - 100 24 00 - 24 00 - 24	32
Loquat	3 Barrie	(2) (C
Aonala	TO APPROVISI	20 TO
Grapes	1 2	7
p-gmate	473	202
Jackfruit	215	32
Others	÷ 8	15
OSTF	7127	4059

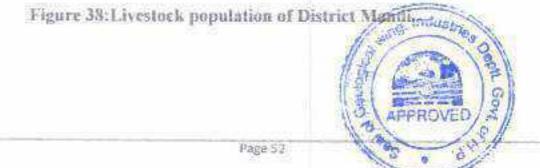
Page 51

# 1.6 ANIMAL HUSBANDRY

Economy of the district is predominantly agrarian, but role of Animal Husbandry is equally important as the farmers must keep the cattle for the purpose of ploughing the land and to obtain manure for maintaining fertility of the fields and to meet daily need of milk of their family. The total population of the livestock in District Mandi is given in the figure: -38. The population of the Buffaloes and Cattle in District Mandi is given in the figure: -39.

# Animal Husbandary: Population of Livestock, District Mandi, 2019-20.





MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

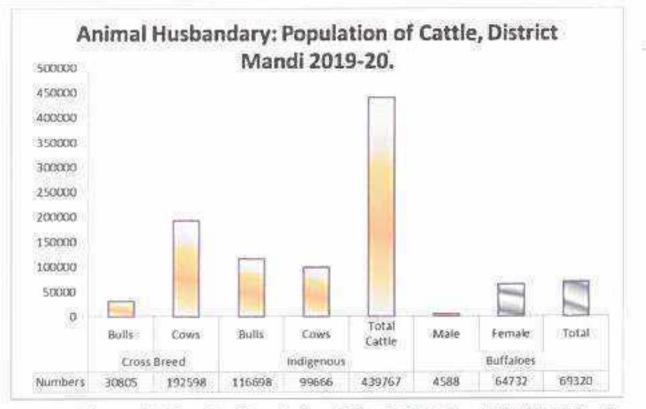


Figure 39: Showing Population of Cattle Buffaloes in District Mandi.

# 1.7 FISHERIES

100

0

0

B

0

1

0

13

13

100

105

B

Ð

10

10

There is a vast network of perennial rivers, khads and streams in the district. Following prominent of fish family are found in the rivers and streams of Mandi district:

Trout

Mahasir

Gid Seviyon

Dise Gugli and

Mirror Carps



The exotic trought fish species are found in Uhl, Lambadag and Tirthan. A trout hatchery is maintained at Barot. The Mahashir fish is found in river Sutluj near Dehar while Barbustor, Gid, Kuni and Himalayan Barble are found in Uhl and satluj tributaries. River Uhl, Pandoh, Mandi, Kunkatar, Sandhol, Dehar, Barot, Kamand, Balichowki are famous for trought fishing.

No perennial stream passes through the area under consideration.

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Guarry

8

0

8

10

10

6

8

0

0

6

đ

6

8

-

0

0

0

3

8

2

2

60

6

8

6

8

8

8

0

6

0

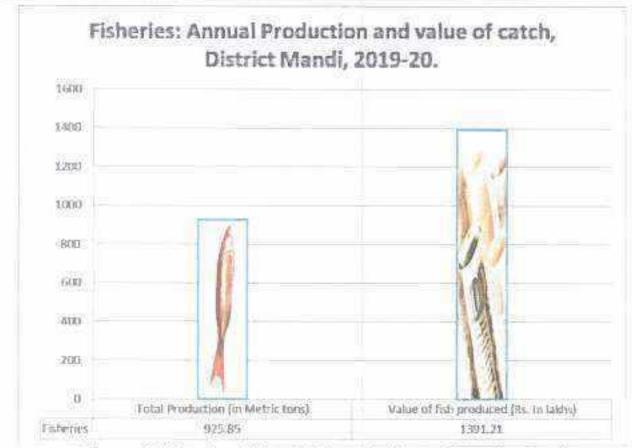


Figure 40: Showing Fish catch / production and its safe value in 2016-17.

# 1.8 FLORA AND FAUNA

#### 1.8.1 Flora

The Chill is considered the prevailing conifer up to about 1950 meter when it gives place to the Deoder and the blue pines. In Mandi district the forest range between scrub, sal and bamboo forest of the low hills to the fur and alpine forests of the higher elevation. Lowest point of the southern boundary of the district is 427 meter above sea level and highest range of is at an elevation of 2658 meters in the north. The forests grown between these two extremes vary as the elevation that is the

The most prominent vaneties of trees found in the estrict are

Simbal (Bombex malabaricum), Mango (Magniferaindica) Tun (Cedrela toana) Several species of acada and albizia the district of a construction of a construction

Salambra (Odina wodier) Termnalia Jamun ( Engenia jambolana Larger tour Bamboo

The common fruit trees are banana, apple, ber, jamun, mango, mulberry, almond, peach etc

### Shrubs

The most common shrub at the higher elevation is Barberis, indigopera and Desmodium and following other shrubs are also found

- 1. Vitex
- 2. Munj
- 3. Ber
- 4. Ipomea
- 5. Dodonea &
- 6. Bamboo.

The common fruit trees are banana, apple, ber, jamun, mango, pear, mulberry, apple, almond, cherry, peach etc.

### 1.8.2 Fauna

in a

0

ø

ß

B

50

ø

0

6

6

ø

0

0

3

B

0

D

13

60

13

63

0

0

0

### Animals

Due to wide variations in the attitude a large variety of fauna is available in the forests of the district. The black bears are common in the higher valley. The leopards are found throughout the district. Barking dears and gural are found at medium elevation the musk deer or Kastura and serao are found in the district. Common Mammals & Birds in the Mandi District is given in the Table :-7

# Table 7: Common mammals and birds in the Mandi District.

Table 6 Birds		
Zoological Name	English Name	Common Name
Milvus migrants	Vulture	Cheel, Gidh, Eell
Eudynamys scolopacca	Koel	Koel
Columbia livia	Pigeon	Kabuttar
Coracias bengalensis	Blue jay	Nilkantha

### MINING PLAN

GM, TM & TP Projects, RPPCL, Tehsil Kotli, Mandi.

Thodu Khad Guarry

οŬ

-0

-0

.0

.0

.0

.

.0

....

CalumsIivia	Hawk	Baj
Francolius francolinus	Wack partridge	Kalia Witan
Francolius pondicertans	Grey partridge	Safed Tittar
Paya crisslatus	Peacock	Mor
Coturnis columis	Common quall	Bater
Alectoris graeca	Chakor	Chakor
Cravus spieridens	Crow	Kanwa
Prottacula Kameri	Parrot	Totta
Trogopan melanocephalus	Western horned Tragopan	Phulgar/Jujurana
Picoides macei	Fulvourbreasted Pied Woodpeck	er Kathfowra
Streptopelia decaocta	Ring dove	Gughi
Streptopelia chinesis	Spotted dove	Gughi
Accipiter badlus	Shikra	
Aquilo rapax vindhian	Tawny eagle	
Ducula bicolor	Green Pigeon	
Parus rufonucholis	Tits	
Picus canus	Black napped Woodpecker	Woodpecker
Drycocopus javensis	Woodpecker	
Muscicopa subrubra	Himalayan Fly Catcher	
Aradotheres thists	Соптор Мура	Ghatari
Terpsiphone paradisi	Paradise flycatcher	Choti-Pinja
Passer domesticus	House sparrow	1000402
Carduelis spinoides	Himalayan Green Finch	Chipte Industries
Table 7	Mammals in Mandi	11/00 11
Zoological Name	English Name	Compare WAPPROVED
Felis bengalensis	Leapard Cat	Miragi Ballon SV
Felis Cliane	Jungle Cat	Jangli Billi

Page 56

Muntucus muntisk	Barking Dear	Kakkar
/aulpes bengalensis	Fox	Lomari, Fohiki
Camis aureus	Jackal	Gidder
Macaca mulatta	Ressus monkey	Lal Bander
veshytes entellus	Languor	Languor
ius sacrofa	Boar	Suar
tystrix indica	Porcupine	Sehal
epus nigricoilis	Hare	Khargosh, Sherru, farru
Moschus moschifarus	Musk deer	Kastura
Capra ibex Ibex	lbex	
lemitragus jemlahicus	Himalayan Thar	Thar
elenarctos thebatanus	Black Bear	
Irsus arctas	Brown Bear	
Panthera unica	Snow leopard	
us scrofa	Wild Boar	
lais aais	Spotted deer	Chital
Cervus unicolor	Samber	
Hylopetes fimbriatus	Flying squittel	
Panthera pardus	Leonard 2	Cheetah
elis chous	lungle cat	
Paradoxurus hermaphroditus	Indian Civet	Sakralu
lipposideros armiger	The great Himalayan leafnosed Bat	Chamgadar

### MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

In the area surrounding the mining lease following are the common birds: -

- · Chakor
- · Crow

D

D

D

D

D

- · Red Jungle Fowl (Jangli Murga)
- · Black Partridge (Kala Titar)

- Grey Partridge (Safed Titar)
- Woodpecker

### MINING PLAN

GM, TM & TP Projects, HPPEL, Tehsil Kotli, Mandi.

Thodu Khad Quarry

### In the leased-out area and surrounding hills following are the common animals: -

- Leopard (Bagher)
- · Hare
- Wild Bors (Jangli Scor)
- Jackal
- Barking Deer (Kakkar)
- Mankey
- Sambar
- Fig

### 1.9 CLIMATE

The climate of district is hot in summer as it is situated in valley at lower altitude while surrounding mountains top experience pleasant weather and cold in winters. <u>Monsoon</u> brings plenty of rain from July to September. October to November is pleasant weather, during this time Lake is completely full. Hottest months are May and June when temperature usually hover around 37-38 degree Celsius and sometimes for few days jumping to above 40 degrees Celsius, the nights are comparatively cooler, and month wise temperature is given in figure 6.

The area anjoys monston rainfall from third week of June to mid-September.

The climatic information given is based on the data obtained from Revenue Department of Himachial Pradesh. The Indian Meteorological Department is maintaining a Meteorological Station at D.C. office Mandi, and at Sunderryger of Print Meteorological available indicates following seasons in the district.

Winter Summer/Pre-monston Monsoon Post Monsoon/ Autumn



Page SB



節

ø

D

(B)

ø

蘭

ø

ø

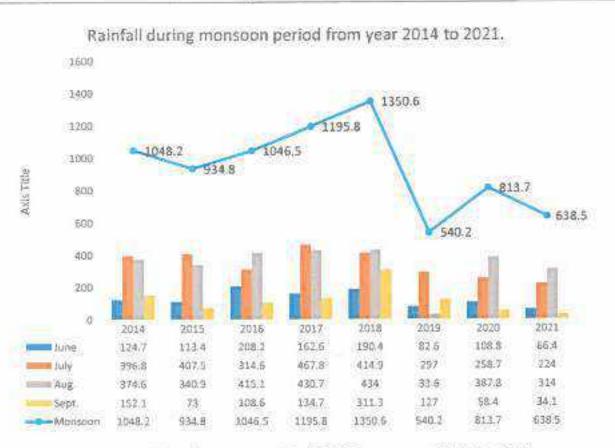


Figure 41: Yearly monsoon Rainfall from year 2014 to 2021.



-

1

10

10

-63

8

8

10

60

려

63

85

13

100

63

0

65

8

\$

18

8

8

0

颌

ŵ

6

123

33

3

(b)

### 2.0 ENVIRONMENT MANAGEMENT PLAN

The impact on environment due to mining operation is generally: -

- Change in Topography& land use pattern.
- Effect on Flora & Fauda
- Ground Vibrations and Fly Rocks.
- Effection Hydrology
- Effect on Climate
- > Air Pollution
- Noise Pollution
- Visual impact
- Socio-economic Impact
- Accumulation of Scree.

### 2.1 CHANGE IN TOPOGRAPHY,

### No affect.

- The area is riverbed and mined out pit will be filled during rainy season hence there would be no change. It is part of a Riverbed.
- The highest point of the Lease area is at 721 metre above mean sea level.
- The lowest point is at 630 m above MSL.
- Mine Area is proposed in the entire safe area.
- The block would be completely replenished during monsoons Boads.
- · The mining shall be confined to well within the riverbed corridor.
- Mining shall be undertaken to a depth of one metre or water level whichever is less.
- · The Lease area is and shall remain riverbed.
- \* Thus, the topography or landform of the Riverbed perse will not be changed.
- The land use of the mining Lease area is defined in the Revenue record as 'Gair-Mumkin khad'
- The land under active mining would always remain riverbed, during as well as post mining.

### 2.2 Effect on Climate

- The mining Lease area is small.
- Mining will be confined to 71450 square 1.4
- The mining depth will be up to one metre of up to water level, this lever is less, thus water regime will not be disturbed.

Non

- The mining will be confined from within the rivesbanks.
- Some micro level impact near the freshly exposed surface may happen for short duration as some humid material may be exposed
- The impact will need no mitigating measures.

### 2.3 Impact on Air

No blasting material is to be used.

6	
	MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi. Thodu Khad Quarry
	<ul> <li>The major contributors of air pollution in open cast mining are excavation, loading and transportation, generating dust, which leads to momentary rise in the suspended particulate matter (SPM).</li> </ul>
Þ	<ul> <li>The mining activity will be limited to excavation of about 595 metric tons of stone, Bajri and sand with silt-clay per day.</li> </ul>
2) 2)	<ul> <li>66 tipper truck trips will be able to move the required material from mine to crusher / Project sites.</li> </ul>
E.	<ul> <li>This activity would generate limited disturbance to air quality.</li> </ul>
Þ	2.4 Impact on Noise Level and Mitigation Measures
	<ul> <li>The mining area represents calm surroundings.</li> </ul>
3	<ul> <li>The mining shall be manual causing hardly any noise.</li> </ul>
9	<ul> <li>The noise would be generated by the movement of trucks / tractor trolleys engaged in the transportation of the mined material.</li> </ul>
	<ul> <li>About 38 trucks trips would be required for transporting mined material per working day from mining area to destination.</li> </ul>
	<ul> <li>The dedicated tipper truck would be properly and regularly undergoing maintenance to create minimum noise.</li> </ul>
5	<ul> <li>Care would be taken to properly maintain the silencers of the vehicles.</li> </ul>
6	<ul> <li>No use of horn shall be allowed in or near the mining area.</li> </ul>
	<ul> <li>A thick belt of broad leaf trees, bushes and shrubs would be planted near the banks of River to screen the noise, if permitted by the private land holders.</li> </ul>
	2.5 Effect on Flora & Fauna
63	<ul> <li>The mining Lease area is riverbed.</li> </ul>
ļα.	<ul> <li>There is hardly any flora or fauna on the riverbed to attract any protective or mitigating measures</li> </ul>
<u>e</u> s -	and many market
	The mining will be sontine to Riverbed
ļ	<ul> <li>It has no soil cover as the drea gets frequently flooded during monsoons.</li> </ul>
)	<ul> <li>Thus, there shall he no impact on any natural soil cover.</li> </ul>
0	
2	2.7 Impact on Hydrology
	<ul> <li>The mining area is part of riverbed.</li> </ul>
3	<ul> <li>The mining depth will be up to one metre or up to water level whichever is less, thus</li> </ul>
6	water regime will not be disturbed
612 612	<ul> <li>The mining will be confine to central part of riverbed, away from banks.</li> </ul>
	<ul> <li>Thus, mining would be dredging the riverbed and reducing the silt burden downstream.</li> </ul>
02	<ul> <li>The ground water (undercurrent of the river) will not be disturbed as mining will be undertaken above Water table.</li> </ul>
- C	HILLEFLENCH GLOVE TRACE LODIC.

.

.

0

.

8

0

1

8

0

0

0

0

0

۲

۲

.

0

10

0

65

63

曲

3

00

### 2.8 Waste disposal Management

The area is in a regular course of the Khad, and silt triay is the only waste likely to be produced. As the silt and clay are inseparable from sand at the quarry site, the sand along with silt & clay would be mined excavated and transported to the Project sites. The waste generated if any will be used as backful where separable.

### 2.9 Socio- Economic Impact

- No adverse impact on the socio-economic condition of the area is envisaged.
- The induction of mining sector development in and around predominantly agricultural area is bound to create its impact on the socio-economic life of the local inhabitants. The impact is generally positive. The mining activity though with small direct employment potential but would create jobs for at least 120 persons (if part mining in recorded to) directly and indirectly, in mining, transportation, and crushing unit. However, to avoid congestion and to improve mining efficiency mechanical mining is recommended if permitted to.

### 2.10 Transport of Mineral

From Quarry to Road heads towards Dharmpur - Seeh rural road is about 200m through the Khad track. The mined material is transported through tracks made in the Rhad. About 595 metric tonnes of material shall be transported per day with an average of 66 tipper truck trips. The movement of 66 tipper truck trips would not have much impact on traffic on rural road and would cause negligible environmental impact.



	MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi. Thodu Khad Qu
	PART III
1.Pro	gressive Mine Closure Plan/Reclamation Plan
1.1 R	eclamation
	The mined area being part of the river course cannot be reclaimed for any other purpo
	The land under active mining would always remain riverbed, during as well as p mining.
10	The highest point of the Lease area is at 721 metre above mean sea level.
	The lowest point is at 630 m above MSL.
٠	The mining shall be confined to well within the riverbed corridor.
	No mining near the banks up to 1/10% of its width is to be undertaken as per guideling
	i.e. 5 to 12 metres, from banks.
٠	The mining depth will be up to one metre or up to water level whichever is less, the water regime will not be disturbed.
	The entire quarried area will be replenished and reclaimed by the river during monso
	floods.
	The Lease area is and shall remain riverbed.
	Thus, the topography or land use of the Riverbed per se will not be changed.
	As such no reclamation work of mined area is required to be undertaken.
1.2 N	tine Waste Disposal:
	a) Year wise generation of mine waste and soil cover.
	As explained earlier the following category of the waste is generated during riverbe
	mining.
	Silt/ Clay Mixture
	The silt and clay are generally being inseparable from sand and extracted along wi
	it.
1	As such no waste will be generated during the mining of stone, sand and ajri.
1.3	The arrangements made for topsoil utilization, if any
1.9	As the mining area is part of riverbed, having no topsoil cover therefore, no topsoil
	required to be removed, or disposed of
320	
1.4.	- AND THE THE VENT METERS AND THE PROPERTY AND A DESCRIPTION OF A DESCRIPT
	Considering the rocky condition of riverbanks, only a few check walls are required be constructed at some vulnerable sites. H.P.P.W.D. link road passes along the
	lease area. For the protection of link road check/retaining walls have been suggest
	to be erected at vulnerable points mainly at C1 to C5. The total length may extend
	200 metres costing about Rs.80000/=.
1.5 P	Iantation work
0925772	As far as the order of Apex court in writ petition(s)No(s) 114/2014 titled as Commo
Caus	e Vs Union of India & others is concerned, the riverbed which suffer frequent foods
	g monsoon period and where no grass growth is possible, as such mining area cann
Constraint a	

### MINING PEAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

6

8

0

-83

0

8

-

63

6

6

0

0

8

8

6

۵

6

ð

ad in

6

73

to apper truck

scalegory of

be re-grassed after termination of mining operation. There is some space outside/above the HFL, within the lease area, where no mining operations can be undertaken and as such is suitable for plantation.

Year	Area to be covered (In Sq. Metres)	Number of trees to be planted	Cost of Plantation & Maintenance				
First	50	7	3000				
Second	50	8	4000				
Third	150	15	8000				
Fourth	150	15	10000				
Fifth	200	20	15000				
Total	£00	ES.	45000				

### Year wise survival rate.

The survival rate is about 30 percent in the area because of the rocky nature of the site. However, after yearly review it will be ensuing that the plants are properly looked after and in case of failure of some plants to survive, these will be promptly replaced. Thus, though cost of maintaining the plants will be remarkably high but by the end of five years, the survival rate will be ensured. to be at least 90 percent.

#### 2 STRATEGIES FOR PROTECTION OF POINT OF PUBLIC UTILITY etc.

There is a rural road passing along the Khad at places. No mining has been proposed up to ten metres for its protection. There is no other point of utility within radius of 100 metres of the mining lease periphery, which may need any kind of protection. Industries Wilt

#### MANPOWER DEVELOPMENT 3

The mining activity will be mainly manual. Workers nverbed mining for extraction and loading draver a and tractor trolleys. Drivers for tippers and the workers. Thus, employment potential is as given

Supervisor Drivers and JCB operators Unskilled workers

MINING PLAN GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.	Thodu Khad Quan
Thus, total generation of Employment will be to a tune of 80	) both skilled and

USES OF MINERAL 4

107

8

00

e

ß

ß

0

101

10

03

6

ED

8

600

8

10

6

63

0

6

The stone, sand and Bajri will be consumed in the dedicated crushing unit of the

Project and product grif and sand will be used in construction activities of the project.

#### 5 DISASTER MANAGEMENT & RISK ASSESSMENT:

The mining lease area part of Riverbed which is prone to some risk hazards but there will not be any major risk hazard associated with the process. The possible scenarios selected for this project are as below.

- Inundation / Flooding
- Drowning

unskilled workers.

- Accident during mineral loading, transporting, and dumping
- Accident due to vehicular movement
- Earthquakes

### Inundation/Flooding

The consequences of flooding/ inundation are catastrophic or fatal. The likelihood of occurrence of flooding is occasionally possible. As per mining plan the mining work will not be carried out during monsoon season. The likelihood of occurrence of drowning is rare due to dry season mining.

### Accident during mineral loading, transporting, and dumping

The consequences of this scenario are minor which may be taken care with ontho. first aid care.

### Accident due to vehicular movement

The consequences of this scenario are moderate and may result in hospitalization and day loss. The likelihood of occurrence is occasionally possible.

0

### Earthquakes

The area falls in seismic zone IV. The mining operations are open cast pit mining. The mining pits will be only of one metre depth. There won't be any structure in the area likely to cause risk to worker. The workers rest sheds, store building and toilets will be constructed of lightweight wood and tin sheets.

### 6. RECOMMENDATION FOR RISK REDUCTION

### Measures to prevent Inundation/Flooding/drowning

0

6

100

1

100

0

0

0

6

0

:63

100

0

0

0

0

0

8

6

8

0

0

0

63

۲

e

6

G

6

3

0

63

1

### MINING PLAN

GM, TM & TP Projects, HPPCL, Tehsil Kotli, Mandi.

- Being on riverbed thera should not be any mining operation during monsoon or rainy day
- · Formation of deep pits should not be allowed
- Whenever there is any alert of flooding the workers will be moved to safer area along the banks.

### Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during. Topding.
- Opening of the side covers would be done carefully and with warning to prevent injury to the loaders
- Operationa during daylight only.

### Measures to Prevent Accidents during Transportation

- Vehicles will be periodically checked and maintained in good condition.
- Overloading will not be permitted.
- To avoid danger of accident roads and ramp near embankment should be properly maintained
- The truck would be covered and maintained to prevent any spillage.
- The maximum permissible speed limit should be ensured.
- . The truck drivers with proper driving license would only be employed.

### Measures to Prevent Accidents during Earthquakes

 Occasional drills to create awareness for safety measures during mining operations and specially the measures to be adopted during earthquakes atc will be undertaken in consultation with experts.



## Declaration

107

0

0

0

8

9

B

0

0

0

1

B

66

0

EB

63

0

80

0

ø

0

Ð

8

0

This is to declare that the Mining Plan of Minor Mineral lease of part of Saklain Khad, for Stone, bajri and sand situated in Khasra No. 1/1, 1 /2, 5748/5595/1 & 5748/5595/2 measuring 9.5030 Hectares, falling in Mauza/Mohal Tatoli Pardana & Sidhpur, Tehsil Dharampur & District Mandi, has been prepared with our consent and approval and that we will abide by all commitments there under.

The 'Mining Plan and Progressive Mine Closure Plan' complies all statutory rules, regulation, orders made by competent authorities of State or Central Government or orders passed by courts have been taken into consideration and wherever specific permissions are required, shall be obtained.

We undertake to implement all measures proposed in the 'Mining Plan and Progressive Mine Closure Plan' in time bound manner.

We have deposited a sum of Rs. ...... with the competent authority of the State Government in form of fixed deposit Receipt as financial assurance of the same.

In case of default on our part, the approval of Mining Plan may be withdrawn, and aforesaid sum assured may be forfeited

Date Place

KOTLI

The General Manager Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corp.Ltd., Tehsil Kotli, Distt. Mandi.







## Certificate

0

0

0

0

0

0

6

0

13

0

0

0

10

8

0

0

0

0

0

0

Ô

0

3

108

0

1

Ð

0

126

0

B

Certified that the provisions of the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules 2015, Metalliferous Mines Regulation 1961 and other guidelines issued in this regard, from time to time, have been complied for, in the preparation of Mining Plan of Minor Minerals lease for Stone, sand & bajri, situated in Khasra No. 1/1, 1 /2, 5748/5595/1 & 5748/5595/2 measuring 9.5030 Hectares, falling in Mauza/Mohal Tatoli Pardana & Sidhpur Tehsil Dharampur & District Mandi, of The General Manager, Triveni Mahadev & Thana Plaun HEP's, Himachal Pradesh Power Corporation Ltd., Tehsil Kotli, District Mandi.

While preparing the 'Mining Pan' including progressive mine closure plan all statutory Rules, Regulations, Orders made by competent authorities of State or Central Government or orders passed by Courts have been taken in consideration.

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

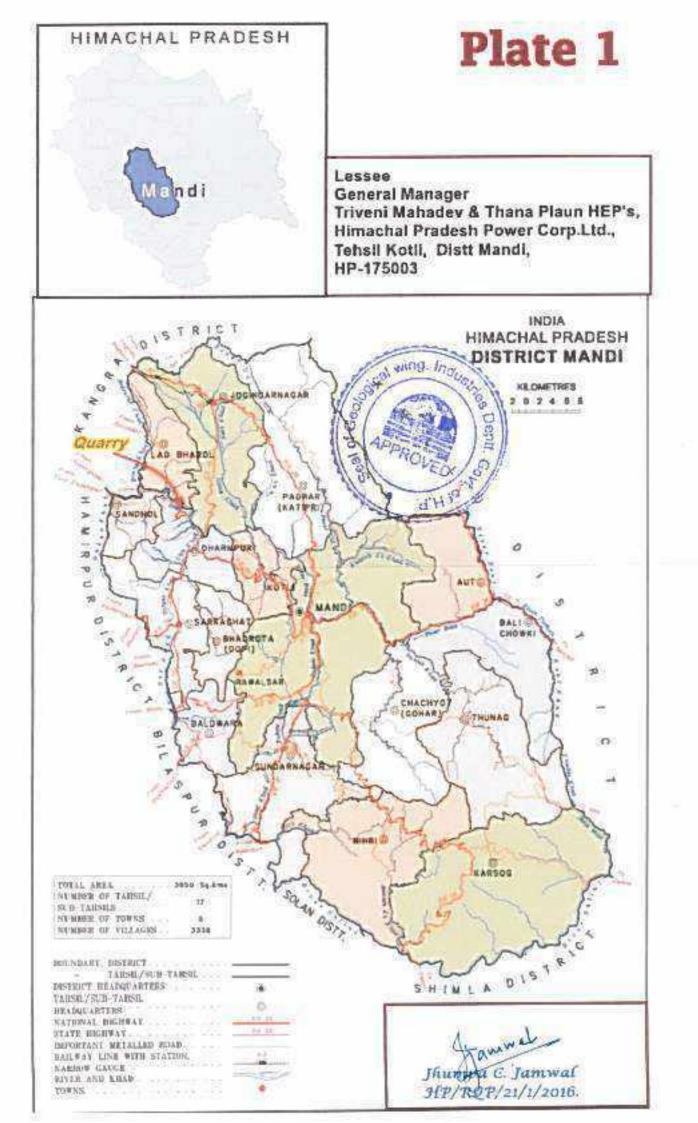
Date

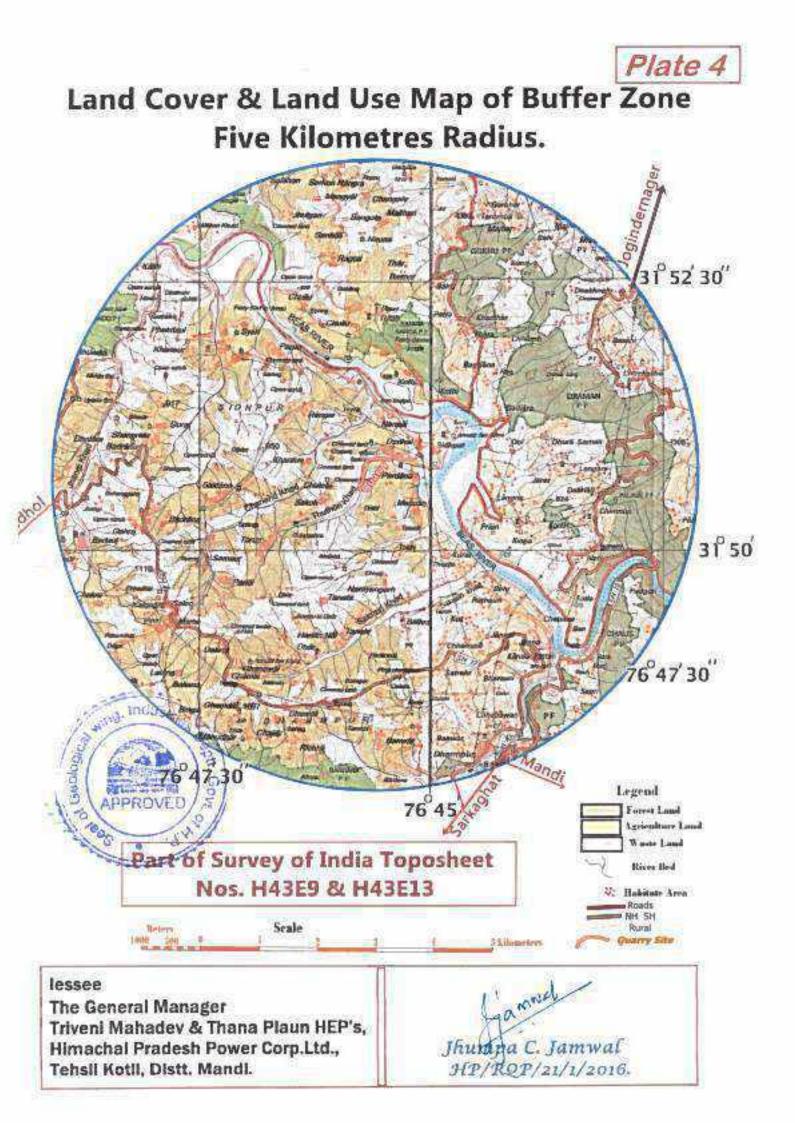
Place: Shimla

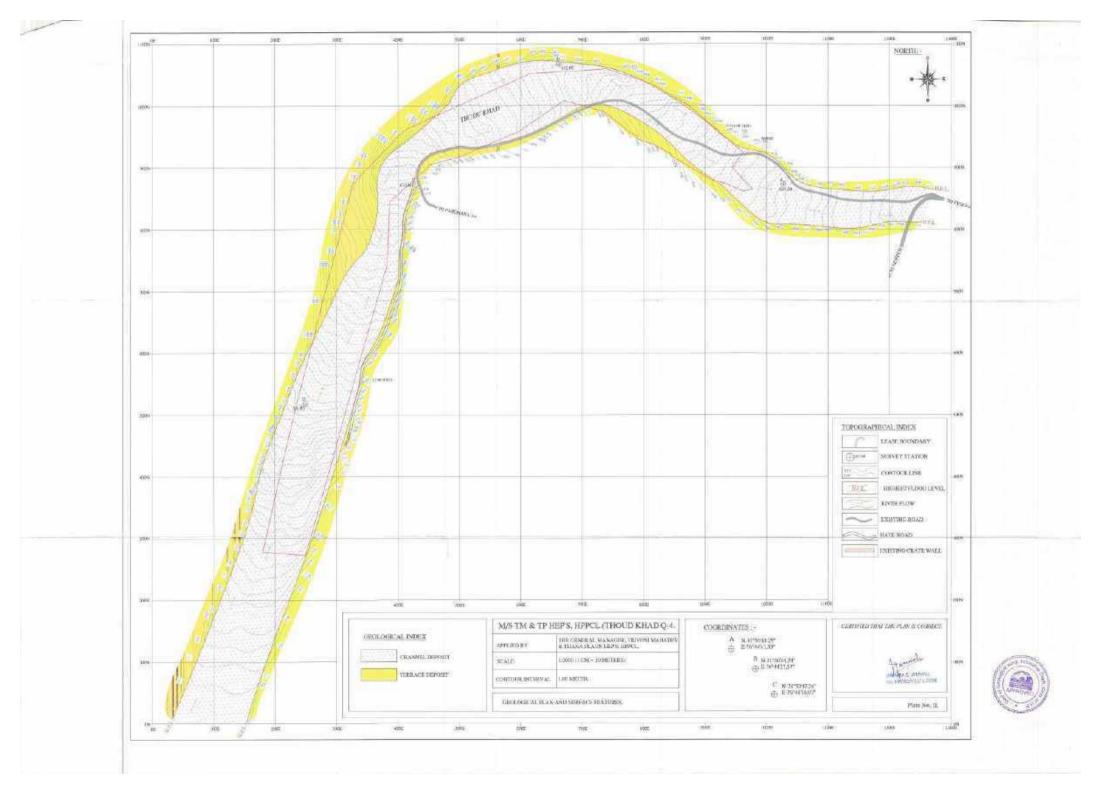
dustries A Goologica 5

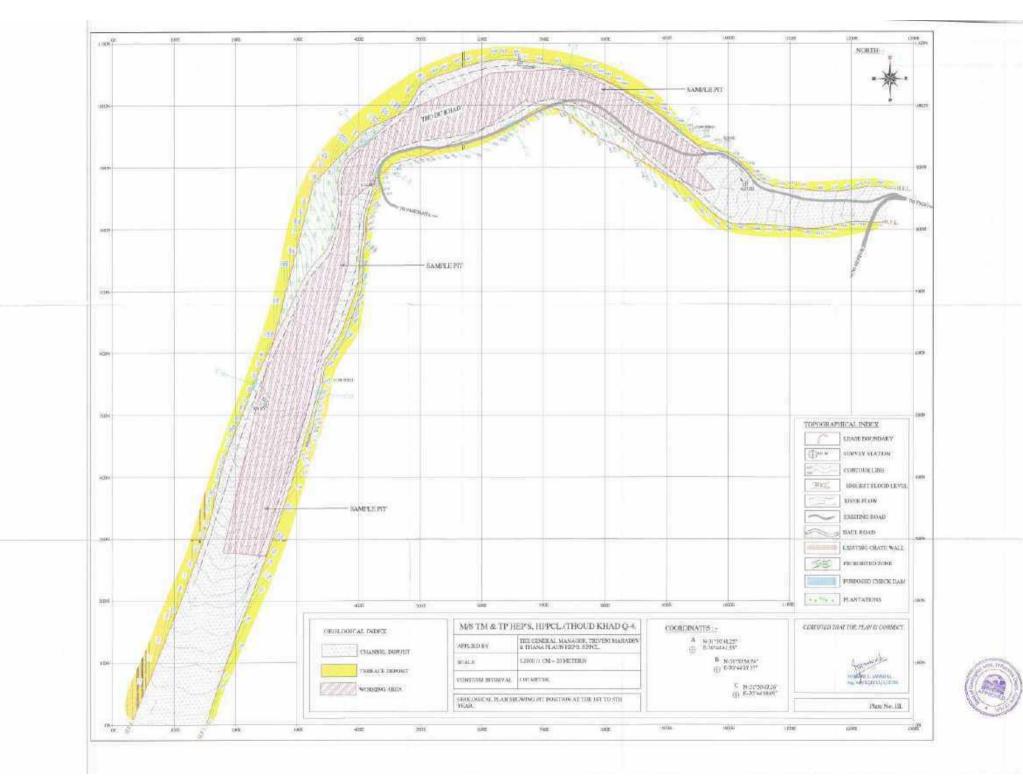
Ha marel

PPROVED / Jhumpa C. Jamwal Cottage No. 21, Type IV, HP Government Officers Residences, CPWD Colony, Bemloe, Himachal Pradesh RQP Registration No. HP/RQP/21/1/2016









## OFFICE OF THE DISTRICT COLLECTOR, MANDI DISTRICT, MANDI, H.P.

27

12

١٢

>> Dated:-

Non Availability Certificate

In view of recommendation of Sub-Divisional Officer (Civil) Jogindernagar, District Mandi H.P the non availability certificate of non forest land for the purpose of construction of Dumping Sites (Thana Plaun HEP (191 MW), HPPCL) in Tehsil Jogindernagar, District Mandi H.P. in respect of following land is hereby issued:-

Sr.No	Name of Muhal	Khasra Number	Area in Bighas/Hectare	Status of land	
1	Neri Kotla/226	3129/3103/1	11-07-0 Bighas (0.9183 ha.)	Jungle Mehfuja Mehduda	
	-do-	3131/3091/1	27-05-17 Bighas (2.2081 ha.)	-do-	
	-do-	3133/3097/1	79-17-15 (6.4634 ha.)	-do-	
	-do-	-do- 3134/3097/1 0-8 (0.032		Jungle Mehfuja Gair Mehduda	
	-do-	3132/3091/1	05-16-19 (0.4731 ha.)	Charagah Drakhtan	
	-do-	3179/3145/1	03-02-14 (0.2536 ha.)	-do-	
		Total Area	127-18-06 Bighas (10.3491 hectare)		

It is certified that there is no non forest land available in above muhal Neri Kotla/226 for the said purpose.

District Collector, Mandi District, Mandi H.P.

Endst. No. 176cc-c) Copy forwarded to:

Dated:-02-6-1023

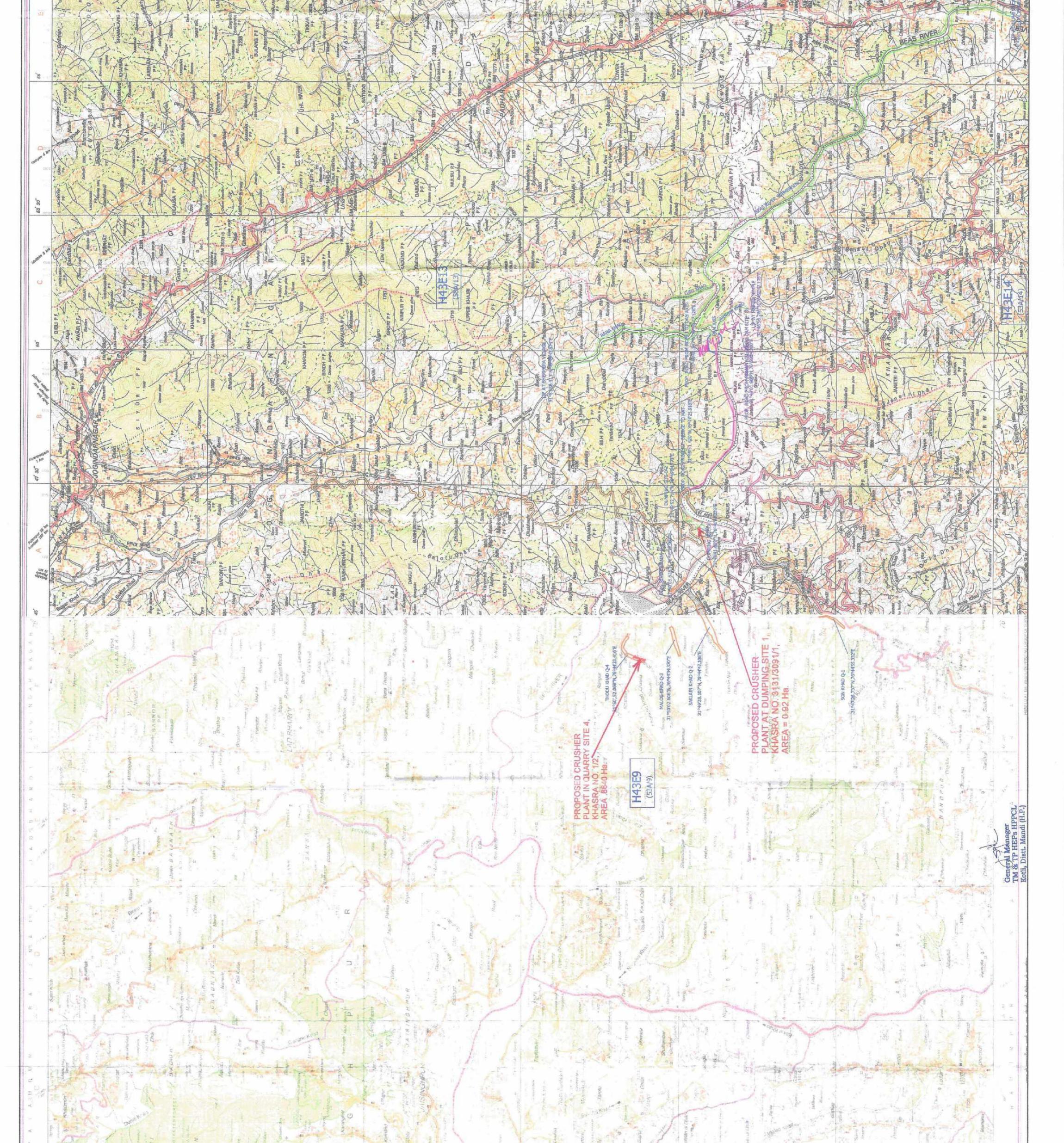
- 1) The Sub-Divisional Officer (Civil) Jogindernagar, District Mandi H.P. for
- information and necessary action.
  2) The General Manager, Triveni Mahadev & Thana Plaun HEPs, Kotli, District Mandi H.P. for information and necessary action.

District Collector,

Mandi District, Mandi H.P.

						_			1			1 1 1 1	1 1 1 1 1															and the second se		
OREST LAND 80 FOR THE IT. MANDI(HP)							Longitude	76°44'43.600" 76°44'45.290" 76°45'02.090" 76°45'01.300"	76°44'21.690" 76°44'20.639" 76°45'14.284" 76°45'18.D03"	76° 44'17.681" 76° 44'16.931" 76° 44'49.138" 76° 44'51.026"	76° 44' 12.309" 76° 44' 09.601" 76° 44' 41.372"	76°45'19.268" 76°45'20.748" 76°45'35.807" 76°45'32.495"	76° 46' 36.742" 76° 46' 44.000" 76° 46' 45.000" 76° 46' 41.500"	76°46'47.994" 76°46'52.183" 76°47'02.013"	76°47'01.131" 76°47'25.918" 76°50'05.447"	76°50'02.128" 76°50'17.628" 76°50'34.300"	76°50'19.179" 76°49'58.680" 76°50'18.786" 76°50'10.933"	76°50'21.803" 76°49'43.874" 76°56'13.068" 76°50'13.068"	76°50'56.867"	DIVERSION 1 MW)	a Total Forest Land in Hect.	C OCC	228.2 63 21.6 1.12	16.64	18.75	3.85	6.5 10.35	4.1 20.5 7.72	9.5 4.12	406.79
T OF F CA, 19 N DIST	76110 KING)	(AH) ION				(H)	Latitude	1°47'19.600" 1°47'18.571" 1°47'41.300" 1°47'41.300"	1°49'14.272" 1°49'16.796" 1°49'41.943" 1°49'37.055"	1°49'57.201" 1°49'58.970" 1°50'07.761" 1°50'05.693"	1°50'33.386" 1°50'34.595" 1°50'48.422"	[°50'11.066" [°50'11.608" [°49'57.919" [°49'56.687"	31°49'40.044" 31°49'37.500" 31°49'39.800" 31°49'46.300"	L°49'50.229" L°49'47.552" L°49'53.051"	1°49'56.286" 1°49'51.420" 1°49'24.434"	[°49'40.747" [°49'27.567" [°49'01.900"	1°49'22.246 [°49'24,179" [°49'30.460" [°49'21.384"	[*49'21.875" [*51,56.513" [*44'37,211" *48'55 286"	°50'04.594"	ROPOSED FOR LAUN HEP (191 P)	Forest Area Proposed fo diversion	(Sq. mtr.)	2282000 630000 216000 11200	166400	187500 11900	38500	65000 103500	41000 205010 77200	94990 41200	4067900
PS MAP ON SOI SHEE DIVERSION UNDER F AUN HEP (191 MW) I N HEP (191 MW)	GER, R TIHRA, R, H.P 1 UNDERTA	R & MANE	ECTARE	(53A/13)	(53A/14)	Lcm = 500		<u>, , , , , , , , , , , , , , , , , , , </u>			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	<u>3</u> 3 3 3 3 3	<u>8</u> 8	MAT	c 12		31 31 31 31	31	T AREA PF THANA PL				i/c of take Pressure ransformer	site, near to	0 10 10 0	otal of 4		otal of 5	3 + 4 + 5
DG DG	AL MANA IP HEPs SUJANPU HAMIRPU TE GOVT.		406.79 HE	1. H43E9 (	3. H43E14	IN 50000 (3	uoj	Son Khad	aklain Khac	Malot Khad	Thodu Khao	Prain Khad	Yard-I	ard-II	P. Bridge to	n Ropru to Dam Mahan Village	e omponents	mergence	mergence	OF FORES	mponents	voir		s Complete n Tunnel, In or System, e Cavern T etc.	r to intake s			ad n Khad Khad	u Khad Chad T	1+2+3
DIGITAL/ POSED FU DF THANA THANA PL	GENERA GENERA TM & TF HPPCL,S DISTT. H	EST DIVISION: JOGIN		S01 :-		11	Descripti	arry Sites-I	ry Sites-II S	ry Sites-III	ry Sites-IV	ry Sites-V	Dumping Y	Dumping Y	ad from K.	OX E	E 00	s River Subn idi Khad Sub	Khad Subm	E DETAIL	ame of Co	ce / Reser	ad	Component n, Diversion iterConduct Power Hous Head Yard	oads Area unde & Dam Site	tes ard-I	qia-11	es-II Son Khi es-II Saklaii es-III Malot	es-IV Thod es-V Prain I	ss Total (1
FERANCE/ HECT. PRO RUCTION C	F USER AG	F FOREST I		ET NO. OF				Que	Quar	Quar	Quari	Quar			Prop. Ro	Prop. Road fr A Prop. Road fro	Dam	Beas	Luni	ACH ROADS/JOB RY SITES ING SITES ERGENCE ODY & COMP. VENT WIS FOR THE C	Ň	ubmergen River Reas	Rana Khac Arnodi Kh	Dam Body & C Diversion Dam Structure, Wat Shaft, Adits, P Cavern , Poth	i) Approach Roa ii) Job Facility A Power House &	Dumping Sit	umping r	Quarry Site Quarry Site Quarry Site	Quarry Sit	Gro
GEO-REFE 406.79 HE CONSTRU PROJECT:-	NAME O	NAME O		REF. SHEET		SCALE	S No.	1	2	ŝ	4	ъ	9	7	00	on 0	11	12	14	1. 4PRG 2. QUARP 3. DUMP 4. SUBNIT 5. DAM E 5. DAM E	S. No.	1 50		<u>దిదరురి</u> ~	3 () PC	4 0	s Qua		20	
°, 32°	K U L	Alicaum 2 km	67,30	U	T 4	aires.	Na ku		SS.			unautra unautra unautra unautra unautra una una una una una una una una una un	à.	62 30			4	in t uniques	101	sd	Jorta S		м	A 200 Lb		2	1 8	uchal -	31	ť
LA LA LA	A A	AND N	the lot PF	JS)	Later	1	A sas	HILS PE		philip (		II S	A STATE	Loin	ulimahir	- Mart	R	Appendia -	the state of the s	a sale	Joucheldin	ANT	and the second s	A REAL	X	The	No.	Here and the second	auna -	Y
	BINANG PR		Runder mann Aun FRÜNSERNAL. PF	X	ENUISAUHS		chand ra	and Brand		A State of the sta			Coleur Pr	A A A A A A A A A A A A A A A A A A A	Maha	MEHRAN P	in Manual in	Å.	And And		Ropa Danga	and the	P				A ME	IL FIELD POOL	12	111
parante a la l	mws no ann r on star	And	K			14	WÂNGAN PF	MARINE C		and in the second	A Marine	Ha Sol	The second	and the second s	PFE T	POST PARTY	A	Nundani - 1	1K	and the second s	Intrintion	ta Devi	X	Bornia Contraction	$\left( \right)$	X	Katindi Al	and land	doinghir /	- multimer
57 30" GARAMĀNGAH			- K			Tohn of the		12 m	ALL AND	Aburt Kash	Menia Ropa	AN AN	E. Land	in the	and a second	Athenbiat	Baugit	¥4	X		Partition of the second	Downer H	the start		1X		A Law	X	Distant in the	Annual Sal
	THE S	11	X	And Party	100	Similar State	Participant and		X	2 The	and interest	PER	KR	Pringel		AAGRUTPE	Chumistoria	KE	Kumhistol	Control Control	PE	a majo tamana	N/		America	Ratesia A	Alected	- And	A Runner	Senal 1
W I		C Inne		PFF N		No. Tran	station 2	X	Calinghant		T	Tall Porten	N.			D. H	- al	The Party	BE	Million Habin	Linna	to not	ALA ZO	a start		Palant	A	- A		then the

×.



32	а п	4 . N	d and the second se		· · · · · · · · · · · · · · · · · · ·		-1			р П <sup>22</sup> в		31
	3E9	имосное Римпани 143W/8 152008) 143W/8 152008) 143E5 143E5 143E9 153M/8 (53M/8) 1443E5 (53M/8) 1443E9 (53M/8) 1443E9 (53M/8) 1443E9 (53M/8) 1443E9 (53M/8) 1443E9 (53M/8)	H43E6 H43E10 H43E10 H43E11 H43E11	CONVENTION IN INTERNAL STATISTICS		and it data from the same same same same	An environment of the second secon	Add 25 16 per and 2 miles	ALCEN	1 borning A rectablished for ensure Souther is serie 2004(40).	Preparation of the Paratine 1903 statements in a second se	(Laren Pat Prachenb Car Spatial Data Cardine Marine A Deliver Spatial Data Cardine Marine A Deliver Spatial Collection (2014)

¥.

-

A REAL AND			
Mail Anti anti anti anti anti anti anti anti a	Total and the angle of the angl	Madron Alas Analas Alas Alas Alas Alas Alas Alas Alas	La plane de la catalació de la cat
		transmission to the state of th	Contraction of the Arma Management Contraction of the Arma Management Contraction of the Arma Management Arma Management of Arma Management of Arma Management Arma Management of Arma Management of Arm
	Antis Control of the second of	Anner Anne	Construction Const

HIMACHAL PRADESH PUBLIC WORKS DEPARTMENT

. PW-MD-II/WA/ N.O.C /2023-

ANNEXURE- V

8944-46 Dated: 7/8/2023

The General Manager Triveni Mahadev & Thana Plaun HEPs, Kotli, Distt. Mandi-175003. Tel. No. 01905-281081, Email: - <u>gmtmtpbnhppcl@gmail.com</u>.

Subject: -

N.O.C of Thana Plaun 191 MW Hydro Power Project on River Beas in Mandi. District of Himachal Pradesh by M/s Himachal Pradesh Power Corporation Ltd.

Reference: -

### Your No HPPCL/GM TM & TP HEP/TP-E & F/K-1/2023-625-31 dt 08.06.2023.

As per proposal of Thana Plaun 191 MW Hydro Power Project it is

intimated that this department may have no objection for the implementation of this scheme, if during the execution of this project whatever assets fall under the submergence of the reservoir basin are to be rehabilitated i.e. existing bridge situated on Sandhapattan Bharol Kun- Ka-Tar Kotli road at RD 70/600, due to the construction of the said project the reservoir level will rise to 724.00 mtrs resulting in the submergence of the bridge situated at level 665.00 mtrs as well as road length approximate 1.50 km between RD 70/600 to 72/0.

executive Engineer. Mandi Division No

Copy to the Superintending Engineer, 1st Circle, HPPWD Mandi

for kind information please.

Copy to the Assistant Engineer Mandi Sub Division III HP.PWD. Mandi for information and further necessary action w.r.t. his letter No. 299 dated 20.06.2023. He is requested to ensure the implementation of above condition/ instructions meticulously any laxity in the matter will be your responsibility & in case of any violation an immediate action may be taken immediately under intimation to this office.

Executive Engineer, Mandi Division No. II, HP.PWD. Mandi H.P.