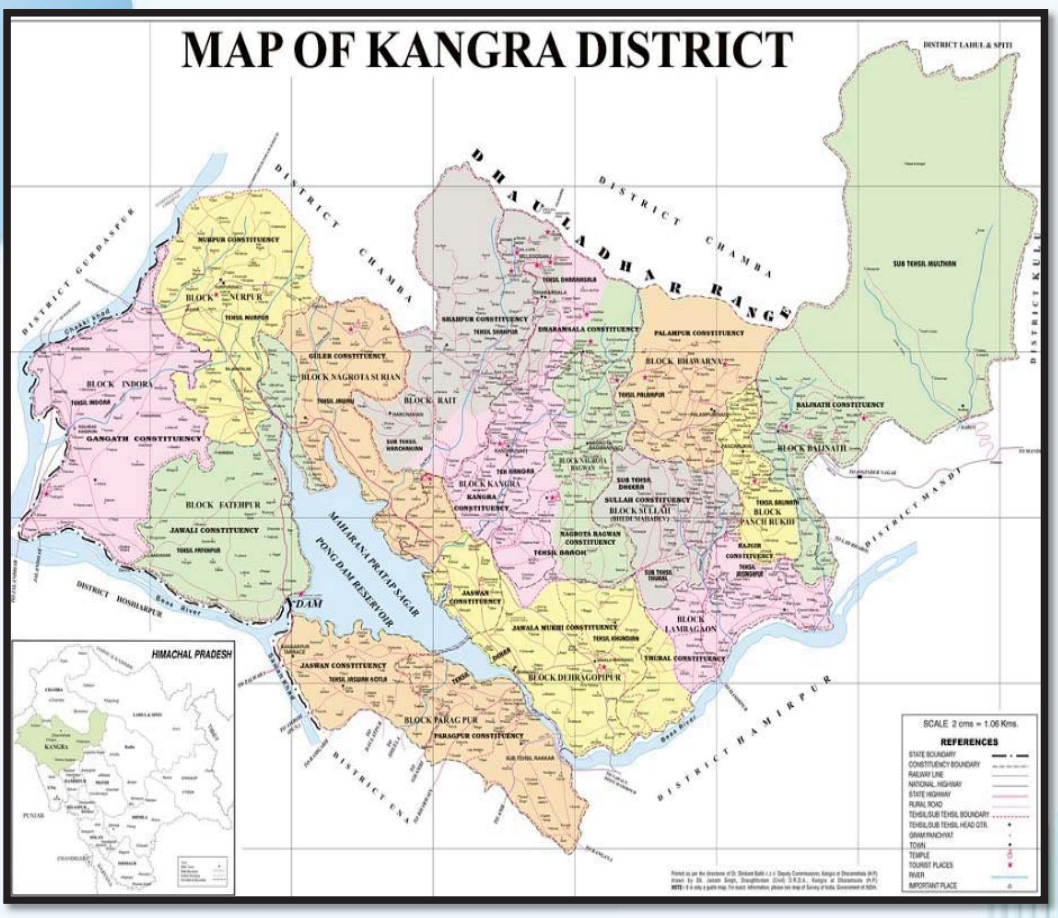
DISTRICT SURVEY REPORT-2024
District- Kangra Himachal Pradesh



DISTRICT SURVEY REPORT FOR SAND MINING OR RIVER BED MINING AND OF MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING

Prepared and submitted by Department of Industries, Himachal Pradesh

---

Finalized & approved by SEIAA, Himachal Pradesh in its 69th (A) meeting held on dated 20th August, 2024 vide Agenda Item No. 1.

Executive Summary DSR

District Survey Report (DSR) is a comprehensive document prepared to regulate riverbed and hill slope mining activities within the district. This report is essential for sustainable management of riverbed mining, ensuring that the extraction of minerals is conducted in an environmentally sound and socially responsible manner. The preparation of DSRs is mandated under the Sustainable Sand Mining Management Guidelines, 2016.

District Survey Report of riverbed mining are indispensable tools for the sustainable management of riverine mineral resources. They offer a structured approach to resource assessment, environmental protection, regulatory compliance, and stakeholder engagement. By fostering sustainable mining practices, DSRs contribute significantly to environmental conservation, socio-economic development, and the overall well-being of communities dependent on river ecosystems.

As per the EIA Notification, 2006 and its subsequent amendment vide S.O. 3611(E) dated 25th July, 2018 issued by MoEF&CC, GoI, the main objective of the preparation of District Survey Report (as per the Sustainable Sand Mining Guideline) is to ensure the identification of areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area.

- Key Aspects of District Survey Report

1. Assessment of Resources: DSR provide a detailed assessment of available mineral resources in the riverbeds within the district. This includes data on the quantity, quality, and distribution of sand and other minor minerals. By accurately estimating these resources, the report aids in preventing over-extraction and depletion of minerals.
2. Environmental Impact Analysis: The report include an analysis of the environmental impact of riverbed mining. This encompasses the effects on river morphology, hydrology, aquatic ecosystems, and biodiversity. Understanding these impacts is crucial for mitigating adverse environmental effects and preserving riverine ecosystems.
3. Regulation and Compliance: DSR serve as a regulatory framework for riverbed mining operations. They outline guidelines and standards for mining practices, ensuring compliance with national and state environmental laws. This helps in curbing illegal mining activities and promoting legal and regulated mining.
4. Sustainable Mining Practices: By recommending sustainable mining practices, DSR help in minimizing environmental degradation. These practices may include controlled mining depths, restricted extraction zones, and periodic replenishment studies to maintain the ecological balance of river systems.
5. Socio-Economic Considerations: The report also takes into account the socio-economic aspects of riverbed mining, including the impact on local communities. This includes evaluating benefits such as employment generation and revenue for local governments, as well as addressing negative consequences like displacement and loss of livelihoods.
6. Data-Driven Decision Making: DSR provide a scientific basis for decision-making regarding riverbed mining. The inclusion of geospatial data, remote sensing images, and field surveys enhances the accuracy and reliability of information. This data-driven approach supports informed policy-making and resource management.
7. Stakeholder Involvement: The preparation of DSR involves consultation with various stakeholders, including government agencies, local communities, environmentalists, and industry representatives. This inclusive process ensures that multiple perspectives are considered, leading to balanced and equitable mining practices.

- Benefits of District Survey Report

1. Environmental Protection: By identifying and mitigating the environmental impacts of riverbed mining, DSR play a crucial role in protecting river ecosystems, reducing erosion, and maintaining water quality.
2. Resource Management: Effective management of mineral resources is achieved through regulated extraction, preventing over-exploitation and ensuring the longevity of resources for future use.
3. Legal Compliance: DSR help in ensuring that mining activities adhere to legal requirements, reducing the incidence of illegal mining and associated environmental damage.
4. Community Welfare: By considering the socio-economic impacts, DSR help in safeguarding the interests of local communities, ensuring that they benefit from mining activities without suffering undue harm.
5. Sustainable Development: The integration of sustainable practices in mining operations contributes to the broader goals of sustainable development, balancing economic growth with environmental stewardship.

- While issuing any fresh permission for mining activity in the district the same is permissible only when the identified stretch is reflected in the DSR with its geo coordinates, quantity and geological profiling.
- The SEIAA/ SEAC while considering the cases for grant of EC need to assess with the help of DSR the proposed mining activity is within the identified stretches of river/ streams/ khads, matching the geo coordinates of proposed site and river stretch where the mineral is available by using ***kml*** files.
- In the DSR 'No Mining Zones' are also listed which clearly give a view of stretches where no mining activity will be allowed and remain restricted.

"*No Mining Zones*" (NMZs) are critical areas identified within riverbeds where mining activities are strictly prohibited. These zones are delineated based on various environmental, ecological, and social criteria to ensure the protection of sensitive areas. The identification of NMZs is a key component of District Survey Report (DSR) for riverbed mining in India, aimed at promoting sustainable and responsible mining practices.

Criteria for Identifying No Mining Zones in DSR

1. Ecological Sensitivity: Areas with high ecological value, such as habitats for endangered species, breeding grounds for aquatic life, and regions with significant biodiversity, are designated as NMZs. Protecting these areas is crucial for maintaining ecological balance and biodiversity.
2. Hydrological Importance: Zones critical for maintaining river flow and groundwater recharge are marked as NMZs. This includes regions near riverbanks, floodplains, and areas prone to erosion. Preserving these areas helps in sustaining water quality and quantity.
3. Proximity to Infrastructure: Areas close to infrastructure such as bridges, roads, dams, and human settlements are identified as NMZs to prevent structural damage and ensure the safety of human life and property.
4. Cultural and Archaeological Significance: Regions with cultural, historical, or archaeological importance are protected as NMZs to preserve heritage sites and prevent any damage due to mining activities.
5. Community Dependence: Areas that are vital for the livelihood of local communities, such as regions used for fishing, agriculture, and other traditional activities, are designated as NMZs. This ensures the sustenance of community livelihoods and social well-being.

Sl. No.	PP Details	Location with khasra Nos.	River/ Stream location	Coordinates (Lat Long)	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease	
						From	To	Form	To
1	2	3	4	5	6	7	8	9	10

Details of River/ Stream

S. No.	Name of the River or Stream	Total Length in the District (in Km)	Place of origin	Altitude at Origin
(1)				
(2)				

Portion of the River or Stream Recommended for Mineral Concession	Length of area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)

Mineral Potential

Boulder (MT)	Bajari (MT)	Sand (MT)	Total Mineable Mineral Potential (MT)

S. No.	River or Stream	Portion of the river or stream recommended for mineral concession	Length of area recommended for mineral concession (in kilometer)	Average width of area recommended for mineral concession (in meters)	Area recommended for mineral concession (in square meter)	Mineable mineral potential (in metric tonne) (60% of total mineral potential)
(1)						
(2)						
Total for the District						

Contents

1 INTRODUCTION

The Ministry of Environment, Forests & Climate Change (MoEF&CC), Government of India, made Environmental Clearance (EC) mandatory for mining of minerals through its Notification dated 27th January, 1994 under the provisions of Environment Protection Act, 1986 which was applicable only for the category of Major Minerals having lease area more than 5 hac. In the year 2004, the State of Himachal Pradesh issued the "River/Stream Bed Mining Policy Guidelines for the State of Himachal Pradesh, 2004" for regulation and control of mining operation, wherein, a survey document of existing River/Stream bed mining in each district of the State was required to be prepared. In the said policy guidelines, it was provided that the District level river/stream bed mining action plan shall be based on a survey document of the existing river/stream bed mining in each district and also to assess its direct and indirect benefits and identification of the potential threats to the individual rivers/streams in the State.

This survey shall contain: -

a) District wise detail of Rivers/Streams/Khallas; and
b) District wise details of existing mining leases/ contracts in river/stream/khalla beds.

Based on this survey, the action plan shall divide the rivers/stream of the State into the following two categories; -

a) Rivers/ Streams or the River/Stream sections selected for extraction of minor minerals and
b) Rivers/ Streams or the River/Stream sections prohibited for extraction of minor minerals.

Thereafter, in order to cover the minor minerals also into the preview of the Ministry of Environment, Forests & Climate Change (MoEF&CC), the Ministry, came out with statutory order bearing Notification No. SO 1533 (E), dated 14th September 2006 wherein Environmet Clearance was made mandatory for Major & Minor Mineral having area of mining lease more than 5 hac. However, the Hon'ble Supreme Court in its Judgment dated the 27th February 2012 in I.A. No.12- 13 of 2011 in Special Leave Petition (C) No.19628-19629 of 2009, in the matter of Deepak Kumar etc. Vs. State of Haryana and Others etc. made prior Environment Clearance mandatory for mining of minor minerals irrespective of the area of mining lease. In order to comply with the judgment of Hon'ble Supreme Court, the Ministry issued S.O.141 (E) dated 15.01.2016 vide which the District Level Environment Assessment Committee (DEAC) and District level Environment Imapact Assessmenyt Authority (DEIAA) were constituted. In the said Notification at point No.7 (iii) the procedure to prepare the District Survey Report (DSR) was laid down providing that a survey shall be carried out by the DEIAA with the assistance of Geology/Irrigation/Forest/PWD etc. departments. As, per the aforesaid, Notification dated 15.01.2016 the Geological Wing, assisted the DEIAA in the preparation of District Survey Report during the year 2016 and the said District Survey Report prepared for District Kangra was approved by the DEIAA, after following the procedure laid down in the aforesaid Notification. It is also provided in the Notification No. S.O. 141 (E) dated 15th January, 2016 that the District Survey Report (DSR) shall form the basis for application for Environment Clearence, preparation of reports and appraisal of Projects.The report shall be updated once every 5 years.

However, it is also important to mention here that the Hon'ble National Green Tribunal in O.A. No.520/2016 vide order dated 13.09.2018 and Executive Application No. 55/2018 dated 11.12.2018 suspended the operation of the Notification dated 15.01.2016 and directed the Ministry of Environment, Forests & Climate Change (MoEF&CC) to take appropriate steps to revise the procedure laid down in the impugned Notification dated 15.01.2016.

In the meanwhile, the Ministry of Environment, Forests & Climate Change (MoEF&CC) came out with Enforcement and Monitoring Guidelines for Sand Mining wherein, it has been provided that

District Survey Report for sand mining shall be prepared before the auction/e-auction/grant of the mining lease/Letter of Intent (LoI) by Mining department or by the department dealing the mining activity in respective states. It is also important to mention here that a Civil Writ Petition No.2077 of 2017 titled as Amrik Singh V/s State of Himachal Pradesh was filed in the Hon'ble High Court of Himachal Pradesh, wherein the issue of updation of District Survey Report was raised by the petitioners and the Hon'ble Court directed the Respondent Department to update the District Survey Report pertaing to District Kangra .

In the aforesaid notification dated 15.01.16, the Hon'ble High Court of Jharkhand at Ranchi in its orders dated the 11th April, 2018 and 19th June, 2018 in W.P. (PIL) No. 1806 of 2015, in the matter of Court on its Own Motion Versus the State of Jharkhand & Others with W.P. (PIL) No. 290 of 2013, in the matter of Hemant Kumar Shilkarwar Versus the State of Jharkhand & Others, has inter-alia directed the preparation of District Survey Report for the Sand mining or riverbed mining and for minor minerals other than Sand and bajri or delegation of the powers for preparation of format of District Survey Report of minor minerals other than sand and bajri to the State Government and/or District Environment Impact Assessment Authority and District Expert Appraisal. Thereafter, the Ministry of Environment, Forests and Climate Change (MoEF & CC) vide notification dated 25.07.2018 provided the procedure for the preparation of the District Survey Document. Accordingly the survey report for district Kangra has been updated. This District Survey Report has been updated by covering the mineral bearing areas and overviews of mining activities in the district with all the relevant features pertaining to geology and mineral wealth in replenish-able and non-replenish-able areas of rivers, stream and other sources. The mineral potential has been calculated based on field investigations taking in to consideration the geology of the catchment area of the river/streams and other sources.

a) Geomorphological studies:
   - i) Place of origin.
   - ii) Catchment area.
   - iii) General profile of river stream.
   - iv) Annual deposition factor.
   - v) Replenishment.
   - vi) Total potential of minor minerals in the river bed.

b) Geological Studies:
   - i) Lithology of catchment area
   - ii) Tectonics and structural behaviour of rocks.

c) Climatic parameters:
   - i) Intensity of rainfall.
   - ii) Climate zone.
   - iii) Temperature variation.

2 OVER VIEW OF MINING ACTIVITY OF DISTRICT KANGRA:

Mainly three types of minor mineral constituents such as sand, stone and bajri are required for any type of construction apart from other material like cement and steel. In earlier times, the houses/ buildings were constructed in form of small dwellings with walls made up of mud plaster, stone and interlocking provided with wooden frames and there were negligible commercial as well as developmental activities resulting in less demand of building material. However, with the passage of time, new vistas of developmental activities were started. As such the demand of minor minerals in the district started an increasing trend. In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds. The demand of sand is mainly met through by river borne sand whereas the demand of bajri/grit is either met through river borne collection or through manufactured grit by stone crushers. The demand of dressed or undressed stone is met through the broken rock material from the hill slope.

The local residents used to lift gravel etc. from the river beds to meet out their bonafide requirement; however, after coming into force the Himachal Pradesh Minor Mineral Concession Revised Rules, 1971, and thereafter Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015, the mining is regulated in accordace with the rules.

At present about 79 Nos. of mining leases/ mineral concession have been granted/executed under the ibid rules in the different parts of the District, the detail of which, is tabulated below in Table A:-

3 LIST OF MINING LEASES/MINERAL CONCESSION GRANTED FOR COLLECTION OF STONE, BAJRI AND SAND IN DISTRICT KANGRA ON RIVER BED.

Table*: -A.*

	Name of the Party	Area (in Hects.)	Period of mining lease.	Location	Annual Production of lease area assessed in Mining Plan (In M.T)
1	Sh. Kushal Rana VPO Molag Tehsil Jaisinghpur Distt Kangra.	22-78-04	30.09.2015 to 29.09.2030	31^{0}53'27.1"N 31^{0}53'24.4"N and 76^0 34'30.2"E 76^{0}34'21.5"E .	3,37,550
2	Sh. Sanjay Pathania VPO Jagroop Nagar Tehsil Jaisingpur, Distt Kangra.	04-81-86	23.10.2015 to 22.10.2030	31^{0}51'39.62"N 31^{0}51'37.62"N and 76^0 31'12.1"E 76^{0}31'12.2"E	50,000
3	Sh. Sanjay Rana VPO Kangain Tehsil Jaisinghpur Distt Kangra.	3-85-00	Under renewal		45,000
4	Sh. Bikram Rana VPO Chenchri, Tehsil, Palampur Distt Kangra.	4-80-04	1.02.2022 to 31.03.2027	31^o 53'4 68" N 31^o 53'0 22" N and 76^{o}32' 55.17" E 76^{o}32' 56.78"E	54,000
5	Sh. Anil Sharma M/s Mata Ashapuri SCU VPO Bardam, Tehsil Jaisninghpur Distt Kangra	2-97-25	10.01.2017 to 9.01.2032	31^o 53' 4.68" N 31^{o}53'022" N and 76^{o}32'55.17" E 76^{o}32'56.78"E	66,881
6	Sh. Sanjeev Syal VPO Alampur Tehsil Jaisninghpur, Distt Kangra	3-89-75	21.06.2017 to 20.06.2022	31^{o}51'9.75" N 31^{o}51'0.65 N and 76^{o}31'3.74" E 76^{o}31'10.34" E	87,304
7	Sh. Vijay Kumar S/o Sh. Sher Singh M/s Vijay SCU VPO Tiara tehsil and Distt Kangra	4-65-85	21.02.2024 to 20.02.2029	31^{o}53'51 82" N 31^{o}53'49 99" N and 76^{o}34'18.02" E 76^{o}34'18.81" E	27,330
8	Sh. Shamsher Katoch M/s Mahadev Enterprises VPO Bhulana Tehsil Baijnath Distt Kangra	11-60-66	6.03.2019 to 5.03.2024	31^{o}53'21.06" N 31^{o}53'20.25"N and 76^{o}37'17.72" E 76^{o}36'20.25" E.	1,00000
9	Sh. Shivam Pathania & Sanjay Rana S/o Sh. Ranjeet Singh & Milap Chand Vill. Thapkaur and Kangain PO Bhadroya & Bardam Tehsil Nurpur & Jaisinghpur Distt Kangra	12-75-68 (Auctioned Site)	2.12.2019 to 1.12.2029	31^{o}53'24.8" N 31^{o}53'25.1" N and 76^{o}33'50.5" E 76^{o}33'00.2"E	2,36,250

10	Sh. Rahul Singh & Virender Rana S/o Sh. Ranjeet Singh & Hari Singh Vill. Thapkaur and Alampur PO Bhadroya & Alampur Tehsil Nurpur & Jaisinghpur Distt Kangra	11-18-69 (Auctioned Site)	Govt. Land	.31º53'14.8" N 31º53'9.6" N and 76º33'47.7" E 76º34'10.5"E	2,47,500
11	Sh. Surinder Singh Prop. Shankar Stone Crusher VPO Dulak Teh. Palampur Distt Kangra.	14-90-22	16.11.2017 to 15.11.2032.	31º53'28 4" N 31º53'32 92" N and 76º28'26.66" E 76º28'40.34" E	2,97,053
12	Sh. Anchal Rana S/o Sh. Anant Ram Village Upper Chullah Post Office Bairghatta, Tehsil Thural.	2-67-42	26.04.2022 to 25.04.2027	76º29'15"E 31º54'17"N	25,000
13	Sh. Mehtab Singh S/o Late Sh. Moti Singh VPO Thakurdawara Tehsil Palampur Distt Kangra	8-92-02	11.01.2017 to 10.01.2032	31º57'53" N 31º57'52.87" N and 76º26'10.72" E 76º26'13.46" E	94,500
14	Sh. Anchal Rana S/o Sh. Anant Ram Village Upper Chullah Post Office Bairghatta, Tehsil Thural.	4-60-67	27.04.2022 to 26.04.2032	31º54'13.35" N 31º54'11.07"N and 76º27'48.05" E 76º27'58.13" E	99,450
15	Sh. Rajinder Singh S/o Sh. Dhani Ram VPO Haloon Tehsil Thural.	1-28-43	13.06.2023 to 12.06.2028	31º55'27.53" N 31º55'30.58" N and 76º27'1.07" E 76º27'3.84" E	26,008
16	Smt Kamlesh Thakur Prop. M/S Kamla enterprises VPO and Tehsil Palampur.	14-43-76	26.04.2022 to 25.04.2027	31º53'53.2"N 31º53'11.70"N and 76º29'22.80" E 76º29'30.60" E	2,43,000
17	Sh. Manbir Singh S/o Sh. Lada Ram Village Padhiarkar PO Sungal Tehsil Palampur.	02-55-47 (Auctioned Site)	06.12.2021 to 5.12.2031	32º08'10.1"N 32º08'16.9"N and 76º31'00.7"E 76º31'58.8" E	45,980
18	M/s Sai Stone Crusher through its partner / GPA holder Sh. Suman Rana VPO Lunj Sub Tehsil Harchakkian Distt Kangra	4-16-87	12.08.2022 to 11.08.2027	32º5'51.1" N 32º5'51.45" N and 76º7'45.9" E 76º7'44.35" E	54,000
19	Sh. Pritam Singh S/o Sh. Gopi Ram Prop. M/s Kathla Stone Crusher VPO Gaggal Tehsil and Distt Kangra	4-93-47	13.09.2022 to 12.09.2027	32º7'27.8" N 32º7'31.1" N and 76º10'29.4" E 76º10'25.35" E	39,375
20	Smt. Malkeet Kaur W/o Sh. Dinesh Singh VPO Soldha Tehsil Jawali Distt Kangra.	16-48-18 (Auctioned Site)	1.01.2020 to 31.12.2029	32º08'31.3" N 32º07'22.1" N and 76º15'26.9" E 76º15'16.4" E	1,37,660
21	Sh. Rajeshwar Singh S/o Lt Sh. Nanak Chand VPO Sakoh Tehsil Dharamshala.	02-36-37 (Auctioned Site)	19.09.2022 to 18.09. 2032	32º04'12.4" N 32º04'28.3" N and 76º13'50.7"E 76º13'59.5" E	42,525
22	Sh. Kamlesh Kumar S/o Mast Ram VPO and Tehsil Baroh Distt Kangra	3-13-47	12.09.2022 to 11.09.2027	32º0'21.36" N 32º0'22.93" N and 76º18'40.64" E 76º18'39.88" E	23,977

23	Sh. Rajesh Kumar S/o Sh. Angat Ram VPO Dehan Tehsil Palampur Distt Kangra	2-41-61 (Auctioned Site)	19.11.2019 to 18.11. 2029	32º01'39.72" N 32º01'30.36" N and 76º21'30.84" E 76º21'3.30" E	35,775
24	Sh. Dharamveer Singh S/o Lt. Sh. Swadesh Singh VPO Kandwal Tehsil Nurpur.	04-77-01 (Auctioned Site)	31.01.2023 to 30.01. 2033	32º05'38.78" N 32º05'32.67" N and 76º20'15.27" E 76º19'43.43" E	76,500
25	Sh. Pancham Singh Prop. M/s Pancham Stone Crusher Unit VPO Tiara Tehsil and Distt Kangra	4-80-23	22.03.2017 to 21-02-2032	32º8'56.05" N 32º8'56.00" N and 76º11'7.79" E 76º11'4.73"E	37,125
26	Sh. Jitender Guleria Prop.M/S Jitender Stone crusher unit GPA Sh. Rajinder Singh VPO Kandwal, Tehsil Nupur	3-31-73 (Auctioned Site)	26.12.2022 to 25.12.2032	32º11'30.58" N 32º11'40.94" N and 76º13'13.6"E 76º13"26.6" E	67,500
27	Sh. Gian Chand S/o Sh. Chunni Lal VPO Bharmoti Tehsil Nadaun Distt Hamirpur.	4-94-52	27.07.2022 to 26.07.2027	31º50'11.9" N 31º50'10.5" N and 76º11'17.4" E 76º11'21.9" E	23,200
28	M/s Sada Shiv Stone Crusher V.P.O. Kuhna Tehsil Dehra Distt Kangra .	4-29-94	12.05.2016 to 11.05.2031	31º48'49.00" N 31º48'50.20" N and 76º17'2.98" E 76º17'8.73" E	90,125
29	Sh. Rajesh Shama VPO Bankhandi Tehsil Dehra Gopipur.	4-45-09	10.10.2017 to 09.10.2032	31º44'5.53" N 31º44'17.77" N and 76º16'8.45" E 76º16'16.09" E	63,315
30	Sh. Ankit Sharma S/o Sh. Naresh Kumar Vill. Malout PO Bhojpur Tehsil Indora Distt Kangra	14-24-98	25.09.2017 to 24.09.2032.	31º51'8.76" N 31º51'8.64" N and 75º57'2.93" E 75º57'4.02" E	1,20,870
31	Sh Sanjay Butail V.P.O. Paragpur Tehsil Dehra	13-37-86	15.02.2022 to 14.02.2027	31º48'51.87" N 31º48'42.39" N and 76º13'6.72"E 76º13'9.28" E	94,400
32	Sh. Bhavesh Jaswal Prop. M/s V.B. Stone Crusher VPO Badoh Tehsil Amb Distt Una	4-87-00	23.12.2017 to 22.12.2032	31º50'26.73" N 31º50'41.62" N and 76º11'26.00" E 76º11''34.43" E	51,075
33	Sh Satish Walia S/o Sh. Nathu Ram V.P.O. Bhadoli Tehsil Jawalamukhi Distt Kangra	01-07-42	Private Land	31º47'9.18"N 31º47'7.98" N and 76º20'15.61" E 76º20'19.57" E	21750
34	Sh. Gian Chand S/o Sh. Chunni Lal VPO Bharmoti Tehsil Nadaun Distt Hamirpur.	4-68-52	19.03.2021 to 18.03.2026	31º48'40.77" N 31º48'44.60" N and 76º17'20.36" E 76º17'28.83" E	1,00260
35	Smt Seema Devi & Bheem Singh VPO Kandwal and Badoh Tehsil Nurpur & Una	16-20-54 (Auctioned Site)	28.07.2021 to 27.07.2031	31º52'41.8" N 31º52'29.1" N and 76º08'11.2" E 76º07'56.2" E	1,29300
36	Sh. Rajinder Singh S/o Sh. Sant Singh VPO Kandwal Tehsil Nurpur.	04-96-99 (Auctioned Site)	26.12.2022 to 25.12.2032	31º45'24.21" N 31º45'24.21" N and 76º13'56.63" E 76º14'15.76" E	67,500
37	Sh. Rakesh Kumar &Ajay Singh S/O Sh. Gian Singh and Sh.	24-86-93 (Auctioned Site)	22.03.2023 to 21.03.2033	31º52'49.7" N 31º53'10.2" N and 76º08'17.4" E	3,69,000

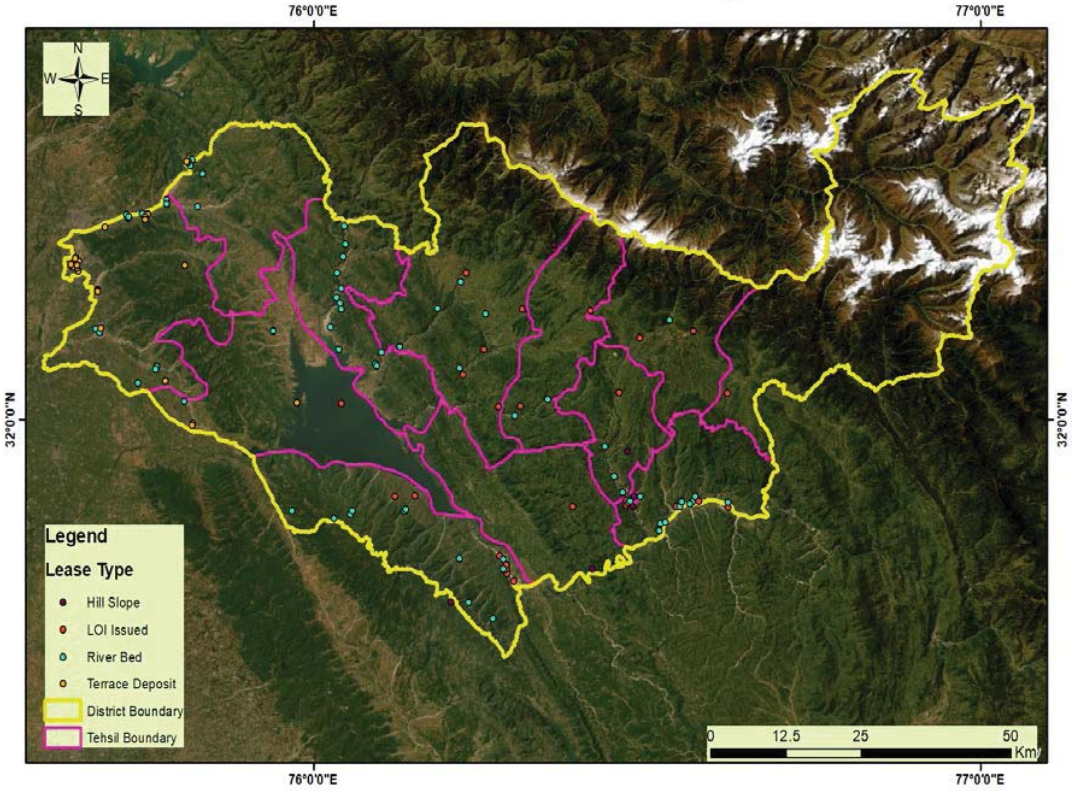
	Yogeshwar Singh VPO Ladori Tehsil Nurpur and Indora.			76º08'36.8" E	
38	Shiv Shakti Stone Crusher Co-Operative Society VPO Trilokpur Tehsil Jawali Distt Kangra	13-59-06	5.9.2022 to 4.9.2027	32º14' 6.65"N 32"14' and 1.91: N 32" 13' 59.84" N 32" 76" 2' 51.2"E 76".2' 52.56" E 76"2' 54.96" E 76"2' 58.38" E .	72,000
39	Sh. Dinesh Singh S/o Sh.Buta Singh V.P.O Soldha.	4-69-43	7.8.2021 to 6.8.2026	32º15' 35.48"N 32"15' and 34.27" N 32"15 76° 2' 45.98" E 76º2' 52.56" E 76º2' 54.98" E . 76º 2' 55.81 E	73,935
40	Smt.Parveen Kalia W/o Sh.G.K.Kalia Near Sub Post Office Ramnagar Tehsil Dharamshala.	4-95-04	21.1.2016 to 20.1.2031	32º11' 46.55"N 32"11 27.08" N 76° º2' 05.10' E 76º2' 20.00" E	55,225
41	Smt.Parveen Kalia W/o Sh.G.K.Kalia Near Sub Post Office Ramnagar Tehsil Dharamshala.	4-54-75	14.9.2016 to 13.9.2031	32º13'07. 40: N 76° º2' 39.50" E	1,02,300
42	Sh. Jitender Singh Guleria S/o Sh. Karnail Singh VPO Thehar Tehsil Harchakkian.	11-19-18	8.5.2018 to 7.5.2023	32º10' 05.5"N 32º 10' 00.32"N 76º0 03.9" E 76.2 " 01' 59.7" E	1,20,710
43	Smt.Rupali Sharma W/o Sh. Vishal .Kalia Near Sub Post Office Ramnagar Tehsil Dharamshala.	2-17-34	21.1.2016 to 20.1.2031	32º10' 30.65"N 32"10' and 28.86" N 32"10' 23.75" N 76° 02' 27.93" E 76º 02' 28.54" E 76º 02' 19.02" E	23200
44	Smt.Rupali Sharma W/o Sh. Vishal .Kalia Near Sub Post Office Ramnagar Tehsil Dharamshala.	15-66-73	8.3.2019 to 7.3.2024	32° 09' 51" N 76° 02' 01" E	64990
45	Sh. Navneet Sharma S/o Sh. Roshan Lal VPO Gaggal,	04-97-69	17.6.2022 to 16.6.2027	32º09' 23.05"N 32º 09' 16.94" N32" 32º 09' 19.38" N 76° 2' 20.74" E 76º 2 19.46" E 76º 02' 18.50 E	80626
46	Vishal Kalia, Prop. Shiv Shakti Stone Crusher VPO Maira Tehsil Jawali,	2-22-16	29.2.2016 to 28.2.2031	32º 08' 24.92" N 32º 08' 53.8" N 32º 09' 4.35" N 75° 58' 29.38" E 75º 58' 19.17" E 75º 58' 38.57" E	23294
47	Sh. Rajeshwar Singh Guleria S/o Sh. Nanak Chand VPO Sakoh.	4-93-68	14.9.2022 to 13.9.2027	32º 04' 32.07"N 32º 04' 38.60" N 32º 04' 33.80" N 32º 04' 30.90" N 76° 05' 33.70" E 76º 05' 42.36" E 76º 05' 44.24" E 76º 05' 37.58" E	47250
48	Sh.Sukhvinder Singh S/o Sh.Kulwant Singh R/o Tikka Bani,PO Yol Tehsil Dharamshala	4-97-00	17.6.2022 to 16.6.2027	32º 5' 24.92"N 32º 5' 23.49" N 32º 5' 17.59 76° 6' 3.72" E 76º 6' 7.36" E 76º 5' 58.07" E	69332
49	Sh.Virender Singh	02-97-45	26.9.2018	32º 4' 19.33"N 32º 4'	66,926

	Guleria Vill. Bassa PO Nagrota Surrian Tehsil Jawali Distt Kangra		to 25.9.2033	8.33" N 76° 5' 45.46" E 76º 5' 47.87" E	
50	Sh. Raghav Singh S/o Sh. Jagmohan Singh VPO Riyali.	13-00-76	16.3.2010 to 15.3.2025	32⁰ 1' 23.52"N 32º 1' 15.46" N 32º 1' 4.35" N 75º 58' 29.38" E 75º 58' 19.17" E 75º 58' 38.57" E	50,000
51	Sh. Parveen Kumar Sharma Partner Himachal Stone Crusher, VPO Riyali	18-45-97	15.1.2011 to 14.1.2026	31⁰ 59' 43.37"N 31º 59' 35.2" N 31º 59' 49.2" N 75º 49' 4.75" E 75º 49' 3.4" E 75º 48' 40.80" E	80,000
52	Sh. Devraj S/o Sh Chaman Lal Village Riyali PO Badukhar Tehsil Fatehpur Distt Kangra	12-18-16	20.11.2016 to 19.11.2031	32⁰ 1' 30.87"N 32º 1' 36.16" N 32º 1' 38.23" N 32º 1' 32.85" N 75º 48' 20.82" E 75º 48' 20.45" E 75º 48' 37.80" E 75º 48' 32.00" E	56,250
53	M/s Kajal Stone Crusher Sh. Ragjhubir Singh S/o Sh. Beli Ram, VPO Moch (Sunehat) Tehsil Fatehpur District Kangra H.P	4-87-36	25.7.2022 to 24.7.2027	32⁰ 7' 07" N 32º 7' 7.8" N 32º 6' 50.7" N 32º 6' 52.4" N 75º 56' 20.82" E 75º 48' 20.45" E 75º 48' 37.80" E 75º 48' 32.00" E	31,500
54	Sh. Yogesh Mahajan, Partner M/s S.L UdyogVill. Nagabari PO Raja ka Bag Tehsil Nurpur	04-61-00	19.4.2016 to 18.4.2021	32º 17' 08"N 32º 17 07.8" N 75º 49' 31.8" E 75º. 48' 27.2" E	49,700
55	Sh. Pawan Singh Prop. M/s Mahadev Stone Crusher VPO Kandwal	5-40-07	6.7.2019 to 5.7.2024	32º 20' 41.85" N 75º 48' 38.53" E	1,20,975
56	Sh. Dharamvir Singh Partner M/s New Shiva Scu V.P.O Kandwal, Tehsil. Nurpur	4-97-93	24.6.2016 to 25.6.2031	32º 20' 42.75" N 32º 20' 42.61" N 32º 20' 41.34" N 75º 48' 43.71" E 75º 48' 55.05" E 75º 48' 41. 02" E	47,200
57	M/s Shiva Stone Crusher Prop:- Sh. Ranbir Singh V.P.O Kandwal, Tehsil. Nurpur		13.10.2022 to 12.10.2027	32º 20' 22.77" N 32º 20' 20.49" N 75º 48' 53.15" E 75º 48' 53.28" E	87,232
58	M/S New Nurpur Stone Crusher Partner Sh. Parlahad Singh V.P.O Kandwal.	4-99-19	26.9.2022 to 25.9.2027	32º 20' 55.43" N 32º 20' 54.72" N 32º 20' 54.98" N 32º 20' 56.12" N 75º 49' 2.51" E 75º 49' 1.71" E 75º 49' 10.45" E 75º 9' 5.29" E	94,976
59	Sh. Sham Singh, S/o Sh Man Singh, VPO. Lahru, Tehsil. Jawali.	8-64-00	20.3.2020 to 19.3.2025	32º 1' 40.5" N 32º 17' 24.8" N 75º 46' 43.4" E75º 46' 31.4" E	1,35,000
60	Sh. Mohinder Pal S/o	4-11-18	8.2.2022	32º 16' 12.4" N	55,440

	Sh. Chaman Lal Prop. M/s Shivam Stone Crusher Vill. Barikahd P.O. Lodhwan.		to 7.2.2027	32º 16' 21.3" N 32º 16' 12.4" N 75º 43' 18.4" E75º 43' 26.1" E 75º 43' 18.4" E	
61	Sh. Ashok Indoria Prop M/s Ankur Stone Crusher Vill Jenera PO Dainkwan.	4-50-20	17.9.2022 to 16.9.2027	32º 17' 20.15" N 32º 17' 22.94" N 32º 17' 17.09" N 75º 46' 43.36" E 75º 46' 00.07"E75º 46' 58.87" E	56,593
62	Sh. Vishal Chambial Prop. M/S. J.V.Stone Crusher, VPO Lodhwan.	4-25-33	18.1.2022 to 17.1.2027	32º 16' 25.94" N 32º 16' 20.94" N 32º 16' 24.63"N 75º 43' 8.85" E 75º 43' 4.47" e 75º 43' 58.73" E	28,724
63	Sh Harsaran Singh Maini GPA M/s Om Stone Crusher VPO Lodhwan,	18-96-73	21.11.2016 to 20.11.2021	32º 16' 33.26" N 75º 44' 33.79" E	40,800
64	Sh Harsaran Singh Maini GPA M/s Om Stone Crusher VPO Lodhwan,	04-05-88	29.10.2019 to 28.10.2034	32º16'33.26" N and 75º44'33.79" E	86,580
65	Sh. Pawan Kumar, S/o. Sh. Harbhan Singh,M/s Bhandral Stone Crusher, Vill. P.O. Bhadroya.	2-05-34	5.3.2022 to 4.2.2032	32º 15' 26.67" N 32º 15' 25.15" N 32º 15' 26.78" N 32º 15' 29.77" N 75º 41' 12.54" E 75º 41' 9.77"E 75º 41' 3.54"E 75º 41' 7.90" E	52,290
66	Pawan Kumar, S/o. Sh. Harbans Singh, Prop. M.s Bhandral Stone Crusher, Vill. Gagwal, P.O. Bhadroya, Tehsil. Nurpur, Distt. kangra	3-71-27	6.3.2024 to 5.3.2034	32º16'16.22" N 32º16'14.21" N and 76º43'19.54" E 76º43'19.79" E	45,900
67	Pawan Kumar, S/o. Sh. Harbans Singh, Prop. M.s Bhandral Stone Crusher, Vill. Gagwal, P.O. Bhadroya, Tehsil. Nurpur, Distt. kangra	02-03-34	5.7.2019 to 4.7.2022	32º15'26.67" N 32º15'25.15" N and 75º41'12.54" E 75º41'9.77" E	63,000
68	Sudhir Singh, Prop. M/s Gold Mine Stone Crusher, VPO.Lodhwan, Tehsil. Nurpur, Distt. kangra,	4-88-12	11.3.2022 to 10.3.2027	32º 16' 12.4" N 32º 16' 21.3" N 75º 43' 18.4" E 75º 43' 26.1" E	51,745
69	Rameshwer Guleria Partener Mahabir Stone crusher Dhangu Majra Road, Damtal.	4-64-50	29.5.2017 to 28.5.2022	32º12'11.9" N 32º12'09.3"N and 75º45'39.8"E 75º456'39.8" E	15,460
70	M/s New Randhawa SCU Sh. Daljeet Singh Dhangu Majra Road Tehsil Indora Distt Kangra	04-08-28	25.10.2016 to 24.10.2031	32º 12' 57.94" N 32º 12' 1.84" N 32º12' 00.64" N 75º 38' 48.42" E 75º 38' 46.30" E 75º 38' 54.60" E	72,460
71	Smt. Urmilla Devi, M/S, Jaishri Hari Gram Udyog Stone Crusher, VPO. Bain-Attarian.	4-77-92			59,075
72	Sh Surinder Singh SPA	4-85-01	18.7.2023	32º7'17.64" N	51,750

	M/s Jai Shankar Stone Crusher, Vill. Churpur, P.O. Kudsan, The. Indora,		to 17.7.2028	32º7'8.09" N and 75º40'21.59" E 75º40'21.62" E	
73	Sh Gagan Singh Prop:- M/s Shiv Shankar Industries Stone Crusher VPO Indora Tehsi	4-90-35	12.5.2016 to 11.5.2031	32º 7' 3.3" N 32º 7' 1.8." N 75º 40' 43" E 75º 40' 42.6" E	53,100
74	Sh. Vishal Deep Singh Prop:- M/s Jai Hari Stone Crusher VPO Indora Tehsil Indora Distt Kangra	4-66-47	7.12.2016 to 6.12.2031	32º 7' 21.40" N 32º 7' 20.37" N 32º 7' 14.36" N 32º 7' 13.69" N 75º 40' 48.9" E 75º 40' 59.38" 75º 40' 48.84" E 75º 40' 59.00"E	36,565
75	M/s Jai Maa Chintpurni Stone Crusher, V.P.O. Majhwan The. Indora,	4-91-05	24.11.2015 to 23.11.2025	32º 41' 36" N 32º 41' 06" N 75º 41' 68" E 75.41' 88" E	1,03,500
76	Sh KartikPathania And Kunal Pathania S/o Sh Karan Singh Pathania VPO Bain Attarian Tehsil Indora Distt Kangra	4-90-35	7.9.2016 to 6.9.2031	32º 2' 59.1" N 32º 2' 55.7" N 32º 2' 58.3" N 75º 44' 8.7" E 75º 44' 12.2" E 75º 44' 9.5" E	78,478
77	Sh.Gaurav Singh Prop:- M/s Shivam Stone Crusher Vill Mand Bhogrwan PO Bhogrwan Tehsil Indora Distt Kangra	4-25-56	17.7.2017 to 16.7.2027	32º 4' 16.24" N 32º 4' 16.14" N 32º 4' 11.56" N 32º 4' 11.52" N 75º 45' 52.38" E 75º 45'52.38" E 75.45' 52.38" E 75º 45' 52.38" E	56,700
78	Sh.Kartar SinghGPA Partner M/s Shivam Stone Crusher Vill Mand Bhogrwan PO Bhogrwan Tehsil Indora Distt Kangra	4-92-32	25.5.2016 to 24.5.2031	32º 4' 4.1" N 32º 4' 3.61" N 32º 4' 3.61" N 32º 4' 12.64" N 32º 4' 12.75" N 75º 45' 45.1" E 75º 45' 50.17" E 75º 45' 50.77" E 75º 45' 45.79" E	36,000
79	Sh. Ambar Mahajan VPO Nurpur Tehsil Nurpur Distt Kangra	4-70-99	10.11.2015 to 9.11.2030	32º 3' 8.06" N 32º 3' 10.18" N 32º 2' 59.57" N 75º 46' 39.09" E 75º 46' 53.59" E 75º 46' 47.49" E	36,225

Leases In District Kangra



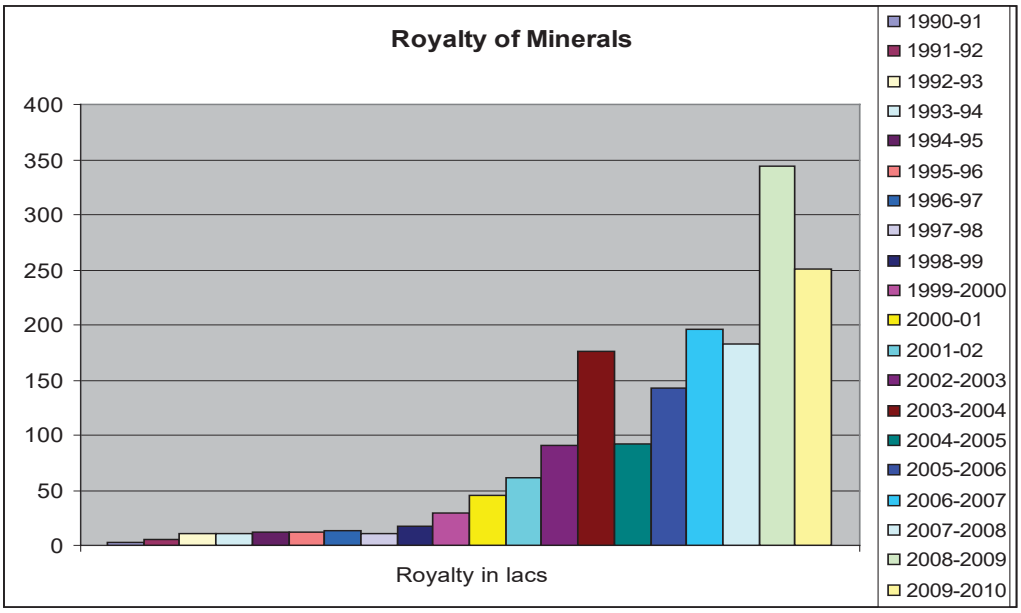
4 DETAIL OF ROYALTY AND PRODUCTION OF MINOR MINERALS OF KANGRA DISTRICT.

Mainly three types of minor mineral constituents such as sand stone and bajri are the main constituents required for the moderen construction/developmental activities apart from other material like cement and steel. As such the demand of minor mineral in the district started an increasing trend. In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds. The increase could be gauged from the fact that during 1993-94 the royalty receipt on minor mineral was merely 11.29 lacs which increased up to 2.51 crores in 2009-2010 and 13.82 crore in 2020-21. The royalty received since 1993-94 onwards is tabulated in the following table.

Table -B:

Fig-1 Showing trends of Royalty receieved from district Kangra from 1993-94 to 2009-2010.

Sr No.	Year	Royalty in lacs	Production of mineral (Approx.) (in Metric tonne)
1	1993-94	11.29	1,19,600
2	1994-95	12.63	1,49,966
3	1995-96	11.98	1,78,966
4	1996-97	13.38	1,78,115
5	1997-98	10.65	1,20,675
6	1998-99	17.68	1,37,730
7	1999-2000	29.39	1,50,140
8	2000-01	45.74	1,68,940
9	2001-02	61.79	7,36,422
10	2002-2003	91.10	9,87,696
11	2003-2004	176.08	6,42,541
12	2004-2005	92.28	4,70,950
13	2005-2006	142.99	4,28,712
14	2006-2007	196.14	6,92,303
15	2007-2008	182.72	6,09,842
16	2008-2009	343.42	16,63,906
17	2009-2010	250.88	11,98,402



Detail of Royalty and Production of Minor Mineral of Kangra District during last 5 years.

Similarly, the Royalty receieved for last 5 years is tabulated in the following table:

Table -C:

Fig-2. Showing trends of royalty and production of minor mineral receieved from district Kangra in last 5 financial Years (2018-19 onwards up to 2022-23).

Sr No.	Year	Royalty in crores (Approx.)	Production of mineral (Approx.) (in Metric tonnes)
1.	2018-19	6.23	10,39,091
2.	2019-20	6.38	10,63,675
3.	2020-21	13.82	16,32,989
4.	2021-22	8.23	13,63,043
5.	2022-2023	16.34	19,58,626

5 PROCESS OF EROSION, TRANSPORTATION AND DEPOSITION IN THE RIVER BED:

EROSION, TRANSPORTATION AND DEPOSITION:

Water flowing through a stream performs three kinds of geologic actions. Moving water erodes material from the bed and sides of the channel; it transports the eroded material to a new location, and then deposits it. Material deposited by streams is called alluvium. The ability of a stream to do work is a function of stream velocity and discharge.

EROSION:

Stream erosion is the detachment of material from the bed or sides of the channel. Approximately 95% of a stream's energy is used to overcome frictional effects imposed by the channel and internal molecular friction. This leaves only 5% of the stream's energy for vertical and lateral cutting. Flowing water erodes in three ways. First, flowing water dissolves materials from the channel contributing to stream's dissolve or, Solution load. Secondly, the impact of water, or Hydraulic action on the sides and bed of the channel dislodges materials and makes them available for transport as part of the stream load. Materials too heavy to suspend, scoot and roll across the bed, eroding the channel by Abrasion as a river winds its way from its source to its mouth. A number of processes of erosion take place such as:

Corrosion – This is the wearing away of the river channel by water + load (load = material carried in the river e.g. boulders, pebbles, sand etc)
Attrition – As the load is carried by the river, bits collide and these are further broken up.
Solution – This is where certain rocks (e.g. limestone) are dissolved by the river.

TRANSPORTATION:

A river moves its load by:-
- Rolling large stones and boulders. (Stream load).
- Carrying sand, mud and silt in suspension. (Suspended load).
- Carrying minerals in solution. (Solution).

Transportation is the movement of earth material, by water. The material transported through the stream is it's stream load. Stream load is composed of dissolved or solution load, suspended load, and bed load. The dissolved load comes primarily from ground water seepage into the stream. Suspended load is comprised of sediment suspended and transported through the stream. Turbulent flow suspends clay and silt in the stream. Suspended load comes from material eroded from the surface bordering the channel and deposited in the stream, as well as, erosion of the channel itself.

The stream capacity is the maximum load of sediment a stream can carry for a given discharge. As one might expect, stream capacity increases with increasing flow velocity. Increased water velocity imparts a greater frictional drag on bed to erode it. Turbulent flow occurs under higher velocity, thus increasing the water's ability to dislodge material from the bed or sides of the stream. Stream competence is the largest size material, the stream can move under a given discharge.

Bed load is that which is moved across the bed of the channel. Bed load is transported in two ways, traction, which is a scooting and rolling of particles along the bed. The second is saltation, a bouncing-like movement. Saltation occurs when particles are suspended in the stream for a short distance after which they fall to the bed, dislodging particles from the bed. The dislodged particles move downstream a short distance where they fall to the bed, again dislodging particles upon impact.

DEPOSITION:

Deposition is the opposite of erosion. Deposition is where a river lays down or drops the sediment or material that it carryies. Rivers carry lots of different sediments, including rocks, boulders, silt, mud, pebbles and stones. Normally, a river has the power to carry sediment. If the force of a river drops, the river cannot carry sediment. This is when the river deposits its sediments.

TYPES OF DEPOSITION:

There can be much evidence of deposition in a river. Some examples are:

1. Areas of pebbles, gravels, and stones.
2. Areas where mud and sand are deposited.
3. Large boulders and stones in the middle of a river.
4. Tree branches and trees in the river.
5. Pollution like cans, bottles, crisp wrappers and other rubbish.

Upper Course: In the upper course,
The river channel is small, narrow and rough and usually shallow.
The stones and rocks increase wetted perimeter.
The volume of water is low as there are very few tributaries flowing into it.
Features such as:-

Interlocking Spurs, Pot holes and water falls or Gorges are developed in the upper course of a stream.

Interlocking Spurs:

Interlocking spurs are alternate hills in the river valley. The river does not have a high water volume at this point and even though it is fast flowing, the river cannot laterally erode (sideways) to remove the spurs. Because of this, the river has to flow around the spurs, eroding vertically.

Potholes:
As the river is vertically eroding in the Upper Course, potholes are created when larger pieces of load that the river cannot remove by traction are twisted around by eddy currents. The river is not strong enough here to pull the large boulder, and the obstruction creates a swirling motion in the water. Eventually, the boulder creates a pothole, by abrasion on the river-bed.

Waterfalls and Gorge:

In the Upper Course, the river is not only eroding vertically (down) but towards its source The river erodes the softer rock underneath the harder rock on top faster, and this means the level of the land along the river's course becomes lower over time and the waterfall retreats back towards the source.

Middle Course: In the middle course:

The river channel is wider and deeper.
Its cross-section is asymmetrical.
A steep river cliff develops on the concave bank and a gentle slip-off slope on the convex bank.
Features such as:
Meanders are developed in the middle course of the stream.

Meanders:

In the middle course, the amount of water and material in the river increases as more tributaries join in. The bed widens, its slope becomes gentler, and the water flows much more slowly as the river flows out of the mountains. As a slow-moving river cannot keep heavy material moving, piles of gravel form along the banks. At this stage, the river carries its load of sand, mud, and small stones suspended in water. It also begins to swing from side to side, cutting into some banks and drifting away from others. As there are no obstacles such as rapids, the river's course becomes smoother and more regular.A floodplain is a wide and flat plain. It is built up by alluvium laid down on the river banks during repeated flooding.When there is a flood, the river overflows its banks. When the flood subsides, there is a decrease in the volume of water and the river starts to deposit its load. Most of the alluvium is deposited on the banks close to the river. With repeated flooding, the materials that are deposited on the river banks accumulate to form floodplains.The path of the middle river is always changing as it cuts sideways into the land and starts to deposit its load. Loops, called meanders and oxbow lakes are typical features of this part of the river. During a storm, meanders stop river water flowing easily. This cause water to build up in places, and may lead to flooding.

Lower Course

In the lower course:

- The river channel is the widest and the deepest.
- It has the largest volume of water and load because of the numerous tributaries flowing into it.
- There is lateral erosion along this course.
- Features such as Leves, Braided Channels, Deltas and oxbow lake are developed in the upper course of a stream.

Levees

In the monsoon, when the river volume is at its highest, the river is prone to flooding. As the river overflows its banks, friction with the floodplain slows down the flow. The loss of energy means load is deposited. The deposition is graded - this means that the larger particles are dropped first (being the heaviest) near the river bank edge and the smaller particles are taken further along the floodplain. The larger particles build up over repeated floodings to create a leveé, which increases the capacity of the river.

However, after Monsoon when the river volume and energy is at its lowest, deposition occurs in the river channel, raising the bed. This means that the capacity of the river is lowered and flooding again will occur in the monsoon months, creating bigger leveés. This cycle raises the river higher than the landscape over time.

Braided Channels:

Braided channels are formed in the summer months when the river volume and energy are lowest. Deposition occurs in the channel of the load carried and these build up to form obstructions. The river has to divert its flow around these obstructions and this is called a braided channel. In the monsoon, when the river is at a higher level, the silt may either be removed or the river will be high enough to flow over the top of the obstructions.

Ox-bow Lake:

Ox-bow lakes are formed when two concave banks of the meanders erode and become joined together. The river would then flow straight. Deposition takes places and cuts the river from the meanders loops. As more Deposition takes place, the meander loop becomes independent and is

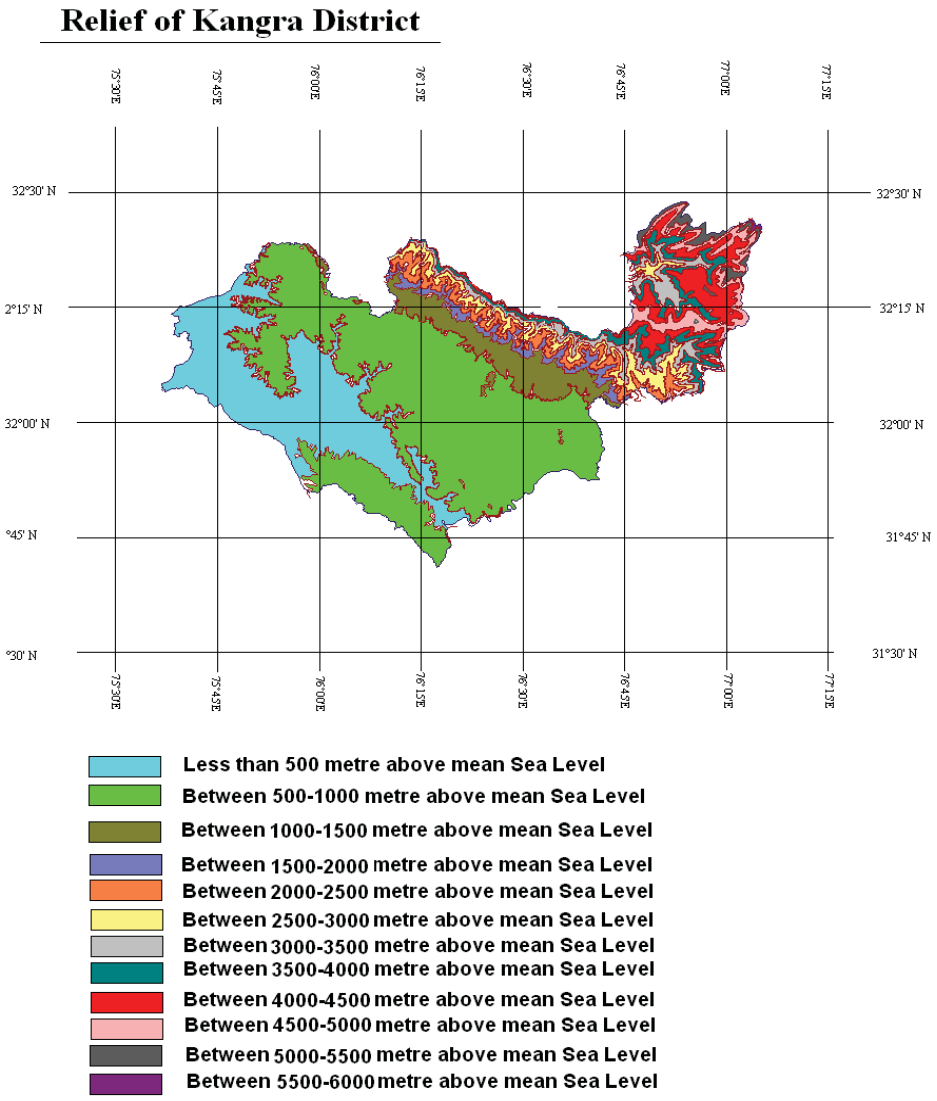
called an ox-bow lake. An ox-bow lake is a horseshoe shaped or crescent shaped lake.

6 GENERAL PROFILE OF THE DISTRICT:

Kangra district derives its name from Kangra town which was called Nagar kot in the ancient times. Kangra, originally was a part of the ancient Trigartha (Jullundur) which comprises of the area lying between the river "Shatadroo" (probably Sutlej) and Ravi. A tract of land to the East of Sutlej which probably is the area of Sirhind in Punjab also formed a part of Trigratha. Trigratha had two provinces. One in the plains with headquarters at Jullundur and other in the hills with headquarters at Nagarkot (the present Kangra).

The present Kangra district came in to existence on the 1st, September 1972 consequent upon the reorganization of districts by the Government of Himachal Pradesh. It was the largest district of the composite Panjab in terms of area, till it was transferred to H.P. on the 1st November 1966.

Relief of Kangra District: Map-1



7 LAND UTILIZATION PATTERN AND SOCIAL ASPECT OF THE AREA:

Kangra District is spread over deep small valleys and ridges and cultivation is possible only in small terraces of holdings along the hill slope as contour farming in the basins of streams/khads. Slopy areas are most suitable for cultivations.

FORESTS:

The forests play a vital role in shaping the characteristic conditions of an area. Besides, these also influence the economic and social life of the people considerably. The forests provide valuable timber, medicinal herbs, and raw material for industries and also provide employment and play a vital role in conserving the soil and ensure timely rains. The forests of Kangra district have a great variety of vegetation due to variations in altitude, geological formations and climatic factors. The vegetation varies from dry scrub forests at lower elevation to alpine pasture at higher altitude. In between two extremities occur distinctive vegetation zones of chil, ban-oak, mixed coniferous (kail, spruce. fir) and kharsu, oak forests. Kangra forests have a large number of aromatic and medicinal plants which can be utilized for the pharmaceutical and ayurvedic medicines like dhoop, karu/kour, brahmi, kuth/khuth, bankakni etc.

The forests of Kangra can be classified into seven main groups.

(i) Ban-Oak Forests:

These forests occur at elevation from 1,600 metres to 2,300 metres. There are, however, a few exceptions like the oak forests of Dhalun near Yol Cantonment, Shahpur, Manjgran and Khaniara where these forests have gone down to about 800 metres elevation.

(ii) Chil Forests:

The chil forests occur between elevations of 800 metres to 1,700 metres. The best growth is, however, between 1,200 metres to 1,700 metres.

(iii) Deodar Forests:

Deodar forests are only found in Dharamkot forests near Mcleodgang town and are exclusively of artificial origin.

(iv) Kharsu Oak Forests:

These forests are found between the altitudinal zone of 2,300 metres to 3,800 metres, the upper most limit of tree growth. This oak generally occurs as a pure crop spruce and fir is found scattered individually or in small groups of sites suitable for these species.

(v) Mixed Coniferous (Kail, Spruce and Fir):

These forests are only patchy between 2,100 metres to 3,000 metres elevation. Kail forests are practically absent. Towards the upper most extremities Kharsu Oak is found intimately mixed with fir and spruce. The common associates are walnuts, horse chestnut, dun, acar species, ulmus species etc.

(vi) Alpine Scrub and Alpine Pastures:

This type extends in this division above 3,800 metres elevation and is represented by extensive alpine meadows with a few scattered patches of ever green branchy scrub of juniperus acurva and rhododendron. The meadows are mostly composed of perennial herbs and grasses.

(Vii) Miscellaneous Scrub Forests:

These forests are mainly found between 600 and 1,200 metres elevation and are composed mainly of tree/scrubs of khâir, kachnar, sins, kakrain, thingan, bil, etc. The under-growth consists of garna, mander. basuti, gandla etc. The forests are generally open, degraded due to over grazing and excessive exercise of various rights.

ANIMAL HUSBANDRY:

Livestock is the main wealth next to agriculture of the predominant population of the district. The entire terrain in the district is mountainous with high slopes and deep valleys. The development of agriculture, therefore, broadly depends upon the development of animal husbandry. Animal husbandry has several direct and indirect uses for a farmer and so it is an almost integral part of agriculture. To improve the fertility of the soil and to plough the fields, they need animals. Besides this milk and wool is also the need of the people. The people keep the following kind of animals:-

1 Cow
2 Buffalo
3 Sheep/goat
4 Horse and Ponies
5 Mules
6 Donkey
7 Camel
8. Pigs
9. Dogs
10 Poultry.

Fisheries:

Kangra District is blessed with vast and variegated fisheries resources in the vast network of perennial rivers, streams, Khuds and fast flowing cold waters, harboring wide variety of tropical species of fish. River system in the District constitutes river Beas and tributaries of river Gaj, Neugal, Manjhi Bener and many other perennial Khads. The following prominent varieties of fish family are fond in the river and streams of Kangra District.

Mahaseer
Gid
Trout
Mirror carp

The main source of fishery cultivation is in the Pong Dam reservoir. Fishing in this water is regulated by fisheries legislation under the Himachal Pradesh Fisheries Act, 1976. Fisheries development in Pong reservoir has helped in rehabilitation of the families of displaced due to inundation. Small fishes are spotted in the Dehar Khad where the water is deep and stagnant.

AGRICULTURE:

Agriculture is the main occupation of the people in the District, having different types of soil and agro-climate conditions which are quite suitable for the growing of various types of cereals, vegetables, fruits and other crops. The major crops grown in the district are Wheat, Paddy, Maize, Barley, and Millet. Besides these, potato and a variety of vegetable like green-peas, cauliflower, cabbage, spinach tomatoes, etc. are also grown in the district. The economy is mostly agrarian and majority of population is depending on agriculture and activities allied to it for earning their lively hood. The most of the land is un-irrigated and depended upon the rainy season for irrigation. Soil in the district varies from sandy loam to clay.The part of the lands are irrigated and the irrigation facilities are provided by lifting water from streams, shallow, dug wells and medium to deep tube wells in the valley area.

HORTICULTURE:

The topography and agro-climatic conditions of the district are quite suitable for the productions of various fruits. The topography of the district can be grouped into three categories namely, High hill areas located at the 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 four categories.

1 Citrus Fruits
2 Sub-tropical Fruits
3 Nuts and dry fruits
4 Other temperate fruits

The following table shows the area under cultivations of each fruit in district Kangra.

Area under each fruit and their production :
Table-D:

Name of fruit	Approx. area in Hect.
Orange	5184
Malta	604
Lemon	2540
Galgal	482
Other	14
Mango	19580
Litchi	2302
Guava	655
Papaya	86
Grapes	16
Logat	45
Almonds	414
Walnuts	198
Pea nuts	169
Plums	414
Peach	209
Apricot	32
Pear	420
Kiwi	8

Fauna & Flora

Fauna

The district is rich in animals and birds which include some of the rare species. The animals and birds that are found in the district are- (1) Ghoral, (2) Kakar, (3) Kastura, (4) Aimu, (5) Ibex, (6) Blue mountain sheep, (7) Thar, (8) Black Bear, (9) Brown Bear, (10) Panther or Leopard, (11) Snow Leopard, (12) Wild Boar, (13) Spotted Deer of Chital, (14) Samber, (15) Porcupine, (16) Flying squirrel (17) Himalyan Pine Martin etc. Apart from the important game animals described above animals like Jackal, Monkey, Langoor, Fox etc. are also met within the area. There is a variety of birds in the district like Monal pheasant, Snow cock, Western horned tragopan, Juguriam, Pea-cock,

Ring dove, Spotted dove, shikara, parrot, tawny eagle, green pigeon, pigeon, gritton vulture, tits, nut cracker, Pies, Wood peaker, Crow, Himalyan fly catcher, etc. which are found in the tract of this district.

Flora

This district is rich in flora. The following various species of plants and forest trees are generally found in Kangra district.

Table-E:

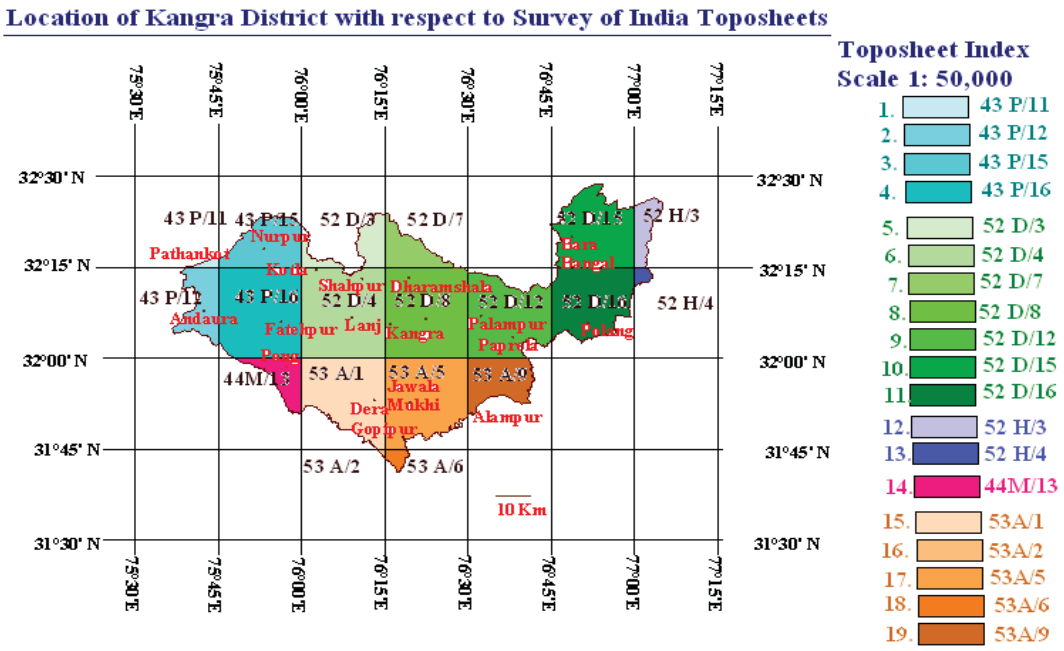
Vernacular Name	Botanical Name
Bil	Aegle marmelos
Neem	Azadirachta indica
Tun	Cedrela toone
Aam(cultivated)	Mangifera indica
Deodar	Mimosa rubicaulis
Kikar	Acacia arbaica
Khair	Acacia catech
Behera	Terminalia belerica
Harrer	Terminalia chebula
Kinu	Diospyross fomentosa
Toot(cultivated)	Morus alba
Palakh	Ficus rumphii
Pipal(cultivated)	Ficus religisa
Rumbal	Ficus glomerata
Khor, Akhrot	Juglans regia

8 PHYSIOGRAPHY OF THE DISTRICT:

The district lies between 31˚ 21' to 32˚ 59' N latitude and 75˚ 47' 55" to 77˚ 45' E longitude. East longitudes and is located in the Western part of Himachal Pradesh and is bounded in the North by Chamba district, on the North-East by Lahaul and Spiti district on the East by Kullu district, on the South by Mandi district and on the West by Panjab state.

The district has a geographical area of 5,739 Sq Km, which constitutes 10.31 per cent of geographical area of the State. The Kangra district is located on the 19 Survey of India Toposheets (1:50,000) as given below in the figure 1.

Map 2.



Map-2: Showing the location of Kangra District with respect to the Survey of India Topopsheets, on the scale 1:50000.

Total Population as Per 2011 census. 15,10,075		
Male Population	750,591	
Female Population	759,484	
Total Literates	1,152,640	
Male Literacy	606,443	91.49%
Female Literacy	546,197	80.02%
Geographical Area 5739 Sq. km.		
Major Rivers	Beas River	A Perennial river
Climate		
Rainy Season	From July to September	Temp. Approx. 32 degree C
Winter	October to February	Temp. Approx. 20-30 degree C
People & Culture		
Major Religions	Hindus, Sikhs and a number of Muslims also.	
Languages Spoken	Pahari(Kangri), Punjabi, Hindi	
Culture	Traditional and Pahari	
Traditions	Religious	

Art Forms	Kangra paintings and Art Gallery of Shobha Singh
Administrative Setup	
No. of Muncipal Corporation	1
No. of Tehsils and Sub-Tehsils	33
Panchayats	748
No. of Villages	3906

The district has varying altitude ranging from 427 to 6401m above mean sea level, with some plain areas touching Gurdaspur district of Punjab in the West and Una district of H.P. in the South. In the East it touches Mandi district, in North with Kullu and Chamba. The district has considerable diversity in its soils, physiography and land use pattern. On the basis of these, the district can be further divided into five-sub horizons i.e. Pir Panjal, Dhauladhar, Kangra Siwalik, Kangra Valley and Beas Basin. The monsoon rains are heavy and well distributed and 70 per cent of the total annual rainfall is received from July- September. The high hills of Dhauladhar and Pir Panjal receive heavy snow in winter. Summers are hot in low hill valley areas but mild in other hilly areas. The area between Beas River which forms the Southern boundary of the district and Chakki streams at the South-West are extensively cultivated.

9 RAINFALL

The climate in the district unfolds four broad seasons. The winter generally spreads over from December to Feb. The period from March to June is summer. Hot and rainy season generally extends from July to September. October and November exhibit autumn. While the places at high altitudes are covered with deep snow during the winter month, the lower areas get plentiful of rains. The temperature during the winter months even in the lower areas is too cold because of the lashing cold breeze of the mountain ranges of Dhauladhar and Hathi dhar. The places lying at higher are too wet in the rainy season and Dharamshala, the headquarters of the District, receives plentiful rains. During the summer months in the valleys and southern parts of the district, the days are extremely hot and sultry. During the monsoon period, the landscape becomes fresh and green and the small water channeles in the beds of hill streams begin to swell which had dried up in the summer. Rainfall varies significantly with the altitude of the area. The catchment area receives rainfall due to western disturbances that pass over the northwestern part of the country during winter months. Significant precipitation in form of snow is received at higher altitudes and rainfall in valleys is received during the winter month. extends up to mid-September. During winter the rains are scarce and extend between 15th December to 15th February.

The following table shows the quantum of rainfall during the years 2013 to 2018 adjoining the auctioned area as per IMD.

Table -F, Showing monthwise rainfall in Kangra District

KANGRA DISTRICT RAINFALL IN MILLIMETERS (R/F)												
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	RAINFALL (in mm)											
2015	65.9	115.3	180.6	66.3	32.2	160.6	624.7	576.9	109.6	28.3	8.6	27.4
2016	7.6	36.8	98.8	13.2	89.8	132.6	529.6	585.4	111.5	3.9	0	3.4
2017	114.3	30.9	36.6	45.5	54.6	220.3	637.4	636.3	134.3	2.3	0.3	80.3
2018	14	40.7	33.3	48.8	39.5	214.2	554.9	924.8	428.8	7.9	25.6	6.8
2019	92.8	219.8	38.4	45.3	39.6	37.5	447.2	575.9	253.6	24.9	44.9	95
2020	124.2	12	226.8	53.7	80.2	149.3	390	620.5	57.5	0	23.9	40.3

10 GEOLOGY AND MINERAL WEALTH

Minerals:

Occurrence a number of economic rocks are found in the district but except limestone slate, and minor minerals like Sand, Stone and Bajri none have commercial significance. The availability of limestone, slate and other minerals having only the academic values in the district is as under:

Lime Stone:

Limestone is a calcareous sedimentary rock composed of mineral calcite ($CaCO_3$) which upon calcinations yields lime (CaO) for commercial use. Cement and Iron & Steel industries are the major consumers of limestone.

Himachal Pradesh has vast reserves of the limestone, spread over various locations. The limestone occurrences of Dharamkot, about 3 kilometers North of Dharamsala (32° 13': 76° 19') in District Kangra, studied by the Geological Survey of India have revealed 18.80 million tones of cement grade limestone. The district wise details of the limestone deposits of all grades (including cement grade) in Himachal Pradesh are as given below in Table No.-C

Table-G

Distirct wise details of Limestone Reserve
(In Million tonnes)

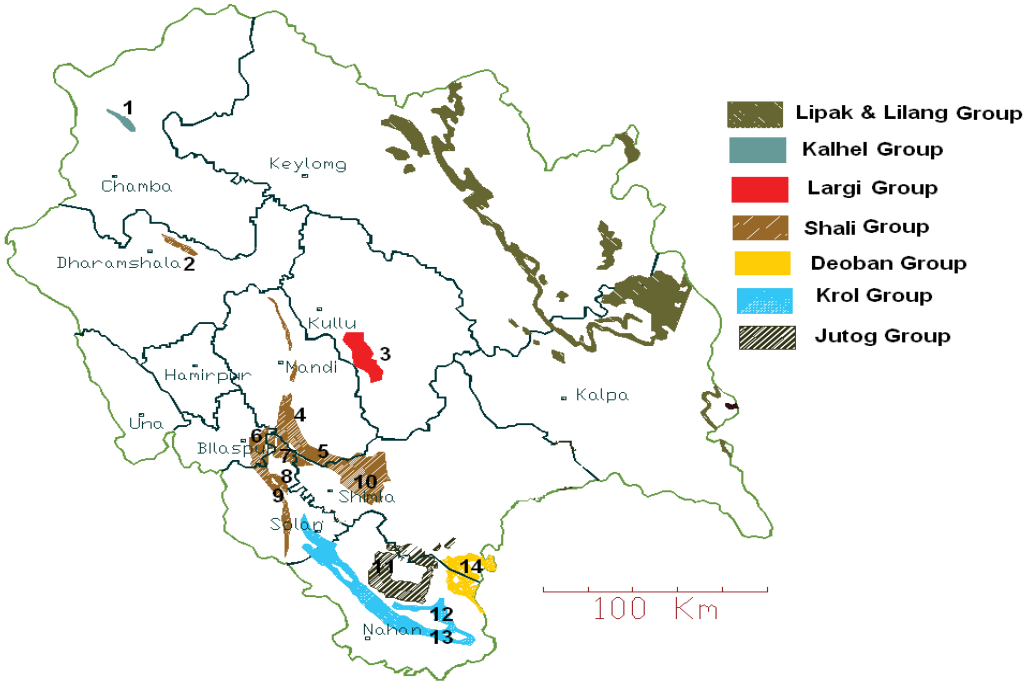
District	Proved	Probable	Possible	Total
Bilaspur	370	150	500	1020
Chamba	400	850	100	1350
Kangra	10	20	10	40
Kullu			120	120
Mandi	500	20	600	1120
Sirmour	150	200	1200	1550
Shimla		50	1600	1650
Solan	550	100	1000	1650
Lahaul & Spiti			1000	1000
Kinnauar			100	100
Total	1980	1390	6230	9600

As seen from above table, Himachal Pradesh possesses huge reserves of limestone of cement grade within the Lower Himalayan Zone. In addition, it has sizeable reserve of chemical grade limestone. Dolomite occurs extensively and can find application in metallurgical industries. The Shali, the Deoban and the Larji are the principal Mesoproterozoic carbonate belts of great potential. The other belts with carbonate lithounits are Meso to Neoproterozoic Mandhali, the Basantpur-Kunihar, the Krol and the Jutogh. In the Higher Himalayan sector of Lahaul-Spiti and Kinnaur, the Early Carboniferous Lipak Formation and the Triassic-Early Jurassic Lilang Group are the important carbonate belts. The Early Carboniferous Kalhel limestone of Chamba is also a good source. The Palaeocene-Eocene Kakara and Subathu Formations contain significant proportion of carbonate rocks.

The distribution of important limestone bearing Formations are as shown in Figure No. 3

Map-3.

Map Showing distribution of Limestone bearing horizons in Himachal Pradesh and also showing important limestone deposits of Himahcal Pradesh



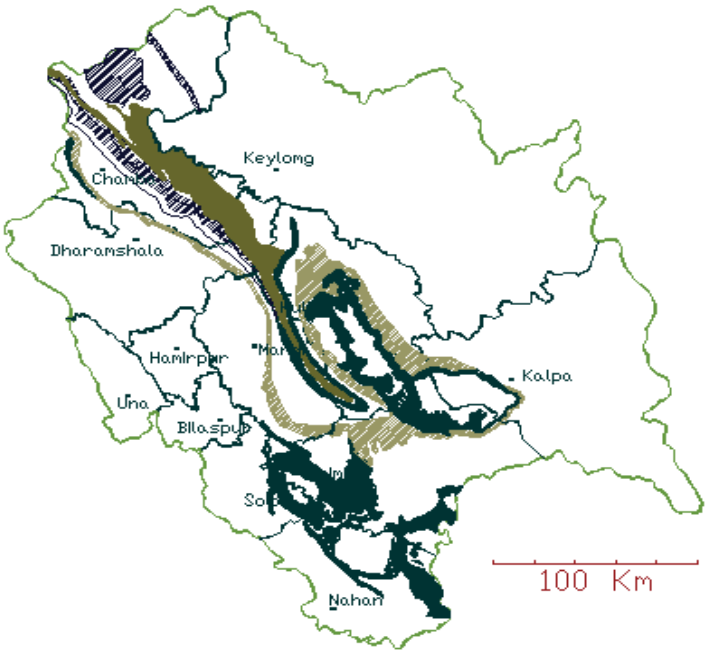
1. Baroh Shind Limestone
2. Dharamkot Limestone
3. Hurla Limestone
4. Sundernagar Limestone
5. Alsindi Limestone
6. Gaggal- Barmana Limestone
7. Bagga Bhalag Limestone
8. Kashlog Limestone
9. Arki Limestone
10. Kothi-Sal- Bag Limestone
11. Naura Limestone
12. Kamroo-Banor Limestone
13. Manal Limestone
14. Gumma- Rohana- Sugraithi Limestone

Slate:

Slate is a fine grained, hard compact, cleavable rock derived from microcrystalline metamorphic rocks of clays and shale and possesses a cleavage that permits it to split readily into thin smooth sheets. Himachal Pradesh is known in the country for its good quality of slate, which find place in foreign market also because of its pleasing colour, durability and uniformity in thickness. The art of extraction of slates is known to the local people of the area since generation. The good quality thick bands of slates occur in Districts of Chamba, Kangra, Mandi, Kullu and to some extent in district of Shimla, Sirmour and Kinnuar, & Solan. Slates are confined to Kullu Group, Shimla Formation, Chamba Formation, Jaunsaur Formation & Katargali Formation.The distribution of slate bearing rocks is as given below in the Map-4.

Map- 4

Figure Showing Slate bearing horizon of Himachal Pradesh



Occurrences of slate in District Kangra :

The important slate occurrences in district Kangra are as under:

(I) Dharmkot (32° 15'05": 76° 19'15") area: Here the slate horizon is 210 m thick extending over a strike length of 1750 m. The probable estimated reserves are of the order of 9,92,250 tonnes.
(2) Ab Got (32° 16'50" : 76° 17'35") area: The slate horizon in this area is 40 m thick and extends over a strike length of 200 m. The probable estimated reserves are of the order of 21,600 tonnes.
(3) Area north of Bhatti (32° 16'45": 76° 15' 15"): The 60 m thick slate belt extends over a strike length of 100m. The probable reserves are of the order of 1, 62,000 tonnes
The above area is known for important Khaniyara Slate Mining. Mining in this area was started along Manjhi and Manuni Khad in 1850. In 1867 Mr. R. W. Shaw established " Kangra Valley Slate Quarry" and worked till independence in 366 Acre (146 hectare area), 204 Acre in Manuni Khad and 162 Acre in Manjhi Khad}then it were worked by the Khaniyara Gabli Dar Slate Quarry Board.
Presently, the production of slates has also reduced with the decrease in the number of mineral concessions.

OTHER MINERALS:

The other of these minerals are of the academic value. The availvality of the minerals in the district is stated a below:

CLAY

(i) Yellow colored clay has been reported from 3kmt. west of Shahpur (32°13':76°12').
(ii) Light grey to whitish grey clay bands varying in thickness from 0.5-3m and having 90% clay content has been reported from the Middle and Upper Siwaliks, at Khajan (32°19'30": 75°54'05"), Indpur (32°09'30": 75°44'00"), Paliana (32°09'00":75°54'30") Kothar, (32°04'34": 75°52'10") and Hatli (32°05'05": 75°50'50") in Nurpur Tehsil. Reserves of white clay of the Kothar area are of the order of 15,000 tonnes. The clay is composed of montmorillonite, kaolin, quartz, carbonate and Fe-oxide (Singh,1984).

COAL:-

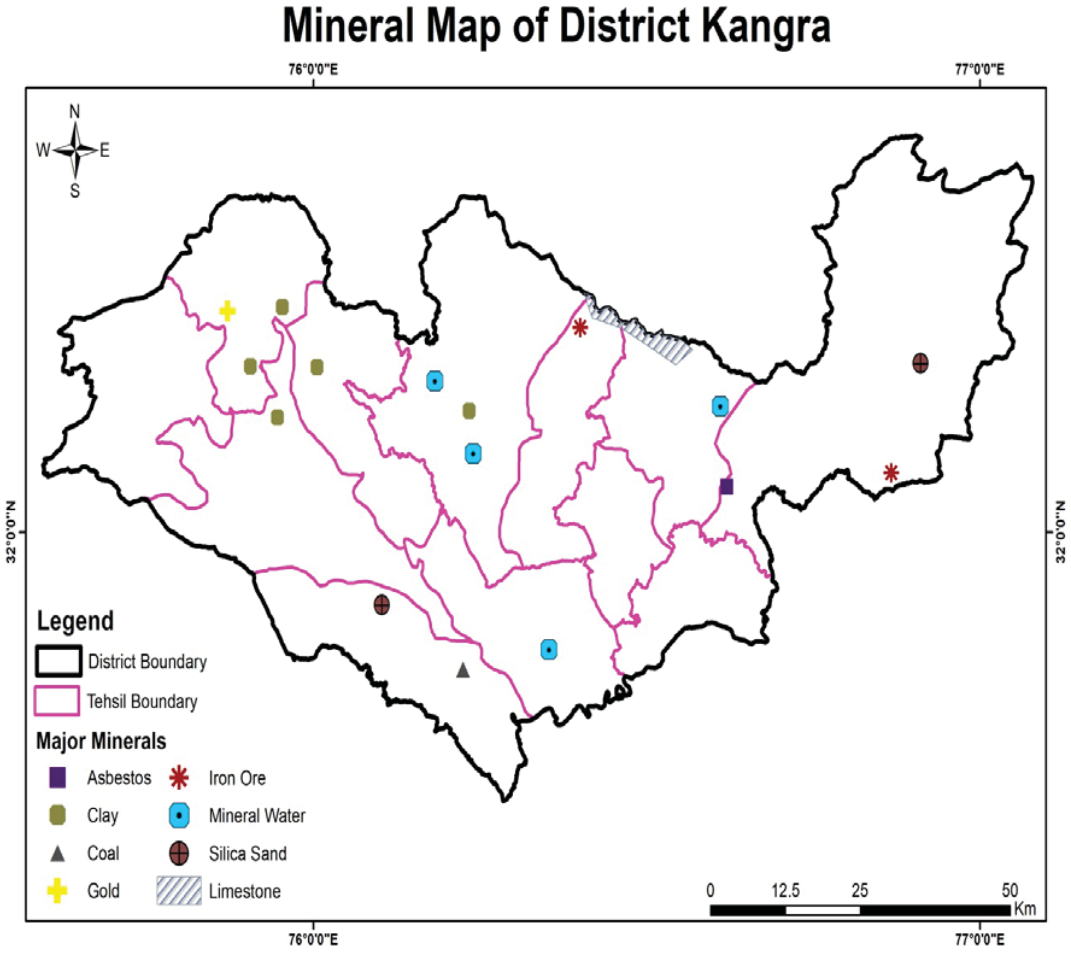
Coal occurs near Dera Gopipur (31°53':76°83') in the Pinjor sand rock of the Upper Siwalik Group and in the Nahan sandstone. The coal occurrence from this locality was based on two very small lenticular pockets and a few stringers of lignite in the northeastern cliff off the Beas River. The first pocket contains a few lenticulars remains of carbonised wood. The thickness of second occurrence varies from 1cm to 7cm with maximum length of about 30cm.

GOLD:-

Gold washing in the Beas River at Rai (32°10':75°55') and downstream has been recorded by Abbot. The yield is said to be at the rate of about 73 grains to the cubic yard.

IRON:-

Iron ores have been worked in the neighbourhood of Dharamshala (32°14':76°23'). These occur as magnetite particles disseminated in the talcose schist and require concentration by washing before being smelted. Iron-ore was reported to occur near Bir (32°03':76°47') and Kohad (32°05':76°52').



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). Kangra district lies in the Siwalik lesser Himalayan zone and its topography is well defined by a series of almost parallel hill ranges which rise in height towards North-East. The rocks of Shivalik group occur as several kilometers wide hill ranges with

steeper scraps towards the north and can be studied around Ranital, Nurpur, Kotla, Kangra, Jawalamukhi and Dehra Gopipur. The valleys are filled with alluvial sand, slate and recent boulder material. Besides, the rock facies commonly seen in the district are green shales and fossils rich limestone of Subathu formation, shale, clay and sandstone of Siwalik group, gneissic and granatic rock of Dhauladhar group, slate, phyllites, schist, quartzites, basic lava flows and dolomites belonging to Jutogh group of rocks.The sediments of the Dharamshala Group unconformably overlie the Subathu group. These sediments consist of claystone, siltslones, calcareous shales and sandstones. The Dharamshala group is divisible into Lower and Upper Dharamshala. The Lower Dharamshala sediments were deposited under transitional brackish water environment and upper Dharamshala mainly represent fluvial system. The equivalent of Dharamshala group is known as Murree Group in Jammu and Kashmir. The Jutogh formation is one of the oldest groups of rocks and is seen in the north of Bandla and in a long stretch from the east of Bir to Dharamkot.The Sundar Nagar formation is well exposed between Luni and Sansal khad and north of Tundi khad in Chakki nallha. The basic lava flows known as Mandi-Darla volcanics occur in small patches in Bir khad, Sansal khad and Luni khad. The cement grade limestone and salt grits of Dharamkot belong to Shalli formation. The rocks of majir formation can be seen between Bara Banghal and Kakrani Jot along the pedestrian track. The Saluni formation is exposed at Thamsar pass near Palachak bridge at Jalta and in the east of Kakrani Jot. The rocks of Sabathu formation are observed between Majir and Manuni near Rakh, Bhanjeri and Karti.

Tertiary Rocks:

SIWALIK SYSTEM:

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. Following this deposition, the sediments were uplifted through intense tectonic regimes (commencing in Upper Miocene times deposited by rivers flowing southwards from the Greater Himalayas, resulting in extensive), 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 has 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 earth-pillars, filled earth buttresses of conglomerate formations, semicircular 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 Siwalik Group comprisies conglomerates friable micaceous sandstone, siltstone and clay-stone.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 clay-stone 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 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.

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 subgraywacke 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 Shale. The total thickness is about1600 Meters.

Middle Siwalik: -

The Middle Siwalik Sub group comprises of large thickness of coarse micaceous sandstone along with some inter-beds of earthy clay and conglomerate. It normally succeeds the Lower Siwahik 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 Meters

Upper Siwalik-

The upper Siwalik subgroup can be easily separated from the underlying Middle Siwalik on the basis of a distinct lithological change.In the Kangra district, where the Middle Siwalik is overlain by massive conglomerats of Upper Siwalik, the conglomerates contain clasts of basic volcanic rocks of the Mandi-Darla volcanic with a very transitional zone between them which may even suggest a local break between Middle and upper Siwalik.The Siwalik sediments were primarily derived from the rising Himalayan front. The stages of elevation in the Himalayan provenance are reflected in the composition of the sediments and the size of the grains. Among the rock fragments in the Siwalik basin, sedimentary rock makes up the bulk. Lithological classification of the group is as follow.

Lithostratigraphy of Siwalik System in Kangra District.

Group			Lithology	Age
Newer Alluvium			Sand, silt, gravel and Pebbles	Quatenary
Siwalik Group	Upper Siwalik	B	Predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown calystone	Neogene
		A	Sandstone, clay and conglomerate alternation	
	Middle Siwalik	B	Massive Sandstone with minor conglomerate and local variegated claystone	
		A	Predominantly medium to coarse-grained sandstone and red clay alternation, soft pebbly with subordinate claystone, locally thick prism of conglomerate	
	Lower Siwalik	B	Alternation of fine to medium- grained sporadically pebbly sandstone, calcareous cement and prominent chocolate and medium maroon claystone in the middle part	

		A	Red and mauve claystone with thin intercalations of medium to fine grained sandstone	

Pre-Tertiary Rocks :

Jutogh Group: This group of rock consists of black, carbonaceous, garnetiferous phyllites, slates, quartzites and dolomites intercalated with biotite schists and hornblende gneisse. The exposures are known from Lesser Himalayas.

Simla Group: This group comprises of bluish grey slate, micaceous shale, sandstone, quartzites intercalated with microcrystalline and oolitic limestone. These rocks are exposed around Simla hills. At places in the field mapping, these have been clubbed together with Chail Group of rocks which represent slightly higher grade of metamorphism.

Shali Group:This is dominantly a carbonate sequence made up of dolomite, shale, stromatolitic limestone and occasional magnesite and quartzite. Rocks of Deoban Group and Bilaspur/ Bandla Limestone are considered equivalent to Shali Group. These rocks occur in tectonic windows under nappe of metamorphic rocks. At places thin Nummulitic outliers are found on these rocks. These rocks are broadly considered to be homotaxial to Simla slates. Bandla limestone forms the basement of Subathu sediments mapped in Bilaspur unit.

Jaunsar Group:This group of rocks is exposed north of Main Boundary Thrust (MBT). It is composed or low grade 32etamorphic such as slate, phyllites and quartzites.

Mandhali Formation:This formation consists of quartzites, shales, crystalline limestone and marble interbedded with slates, phyllites, gritty quartzites and boulder beds.

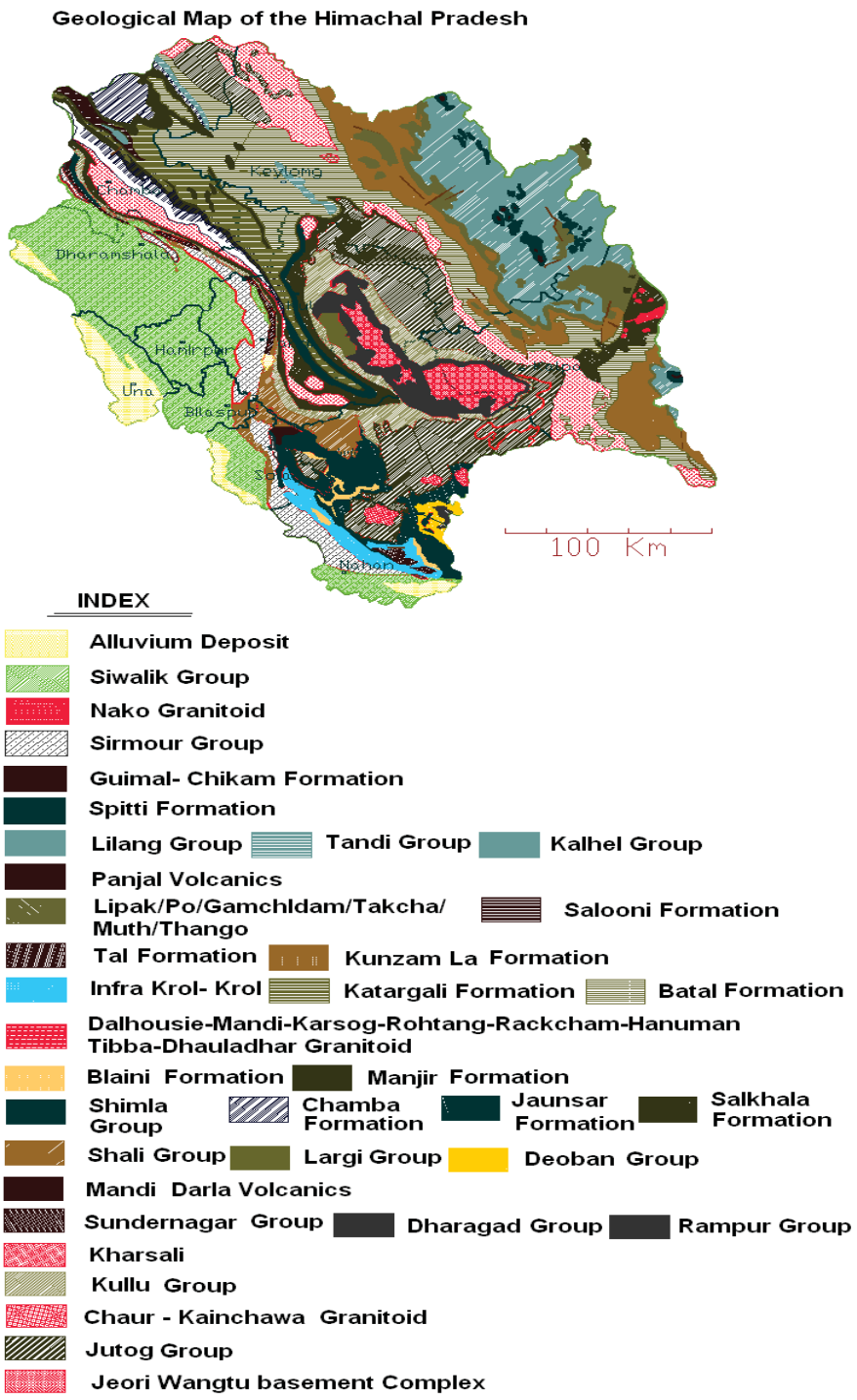
Nagthat Formation :This formation comprises sandstones, grits, quartzites, conglomerates, purple and green slates and phyllites. The top of the group represents a strong unconformity followed by a succession of rocks classified as Mussoorie Group.

Blaini Formation :It mainly consists of boulder beds, limestones and shale with characteristics of a glacial till. The boulder bed consists of dark grey to greenish grey clay matrix with pebbles of dark slate, greenish quartzite, grey sandstone and green siltstone. Limestones are characteristically pink, dolomitic and siliceous grade into pink and purple calcareous shale and slates. These rocks along with Infra-Krol and Krol are exposed north of MBT.

Krol Formation :Krol formation mainly consists of limestone, often stromatolitic, shale and sandstone. The limestone is grey to greyish white, dolomitic, cherty and at places microcrystalline. The shales are red, orange and dark gray in color. The sandstones are dirty white, poorly bedded with orange stained quartz grains.

Tal Formation:These rocks are composed of calcareous greywacke, carbonaceous shale, micaceous shale, arkosic quartzite and grey limestone.

11 GEOLOGICAL MAP OF HIMACHAL PRADESH.



12 DETAIL OF RIVER OR STREAMS AND OTHER SAND SOURCE:

River System of District Kangra:

Drainage:

Larger parts of district Kangra fall within the drainage basin of Beas River with little area under river Ravi. The drainage system in the Northern and Eastern part includes Uhl, Binu (Binwa), Awa, Neugal, Buner and Khauli Khads all of which drain into river Beas. On the Western end, the drainage system includes Chakki, Dehari khads and again drains in to river Beas. On the extreme north eastern part Ravi River also drains limited areas.

Ravi River System:

Ravi River System catchment covers almost 12 to 13% area of the Kangra District and the system can be further divided into following catchments:

Ravi River and its tributaries flowing in various parts of District Kangra:

Ravi River
Sisu Nala (Left Bank).
Tantgari Nala (Left bank)

Bhadal Nala (Right Bank)
Main tributaries of Bhadal Nala:

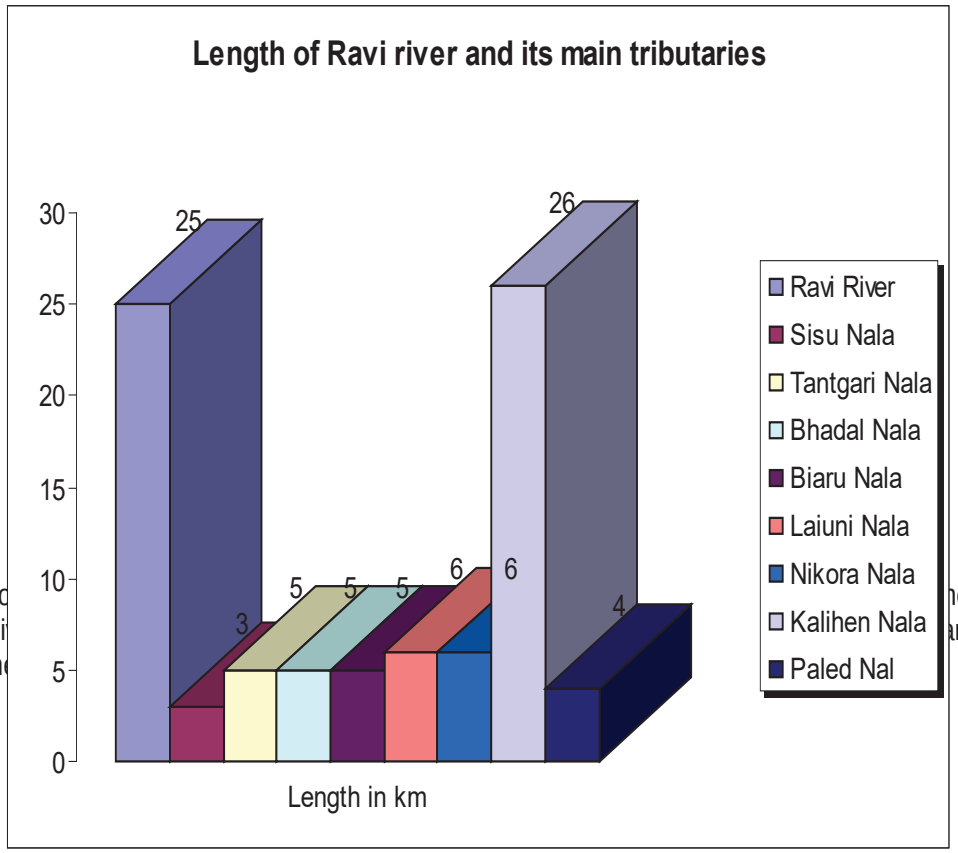
Kudi Nala (Right Bank)
Dhundi Nala (Left Bank)
Biaru Nala (Left Bank)
Laiuni Nala (Right Bank)
Main tributaries of Laiuni Nala:

Shau Nala (Right Bank) and its tributaries are
Bhadral Nala (Right bank)
Gau Nala (Left Bank)
Johari Nala (Left Bank)
Nikora Nala (Right Bank)

Kalihen Nala (Left bank) & its tributaries
Garthala Nala (Right Bank)
Lambapar Nala (Right Bank)
Tapni Ghamed Nala (Right Bank)
Makori Nala (Left Bank)
Suni Nala (Right Bank)
Chalah Nala (Right Bank)
Pandon Nala (left Bank) & its tributaries
Lambapar Nala (Left Bank)
Bangi Nala (Left bank)
Taneta Nala (Left Bank)
Thamsar Nala (Left bank)
Paled Nal (Right Bank)

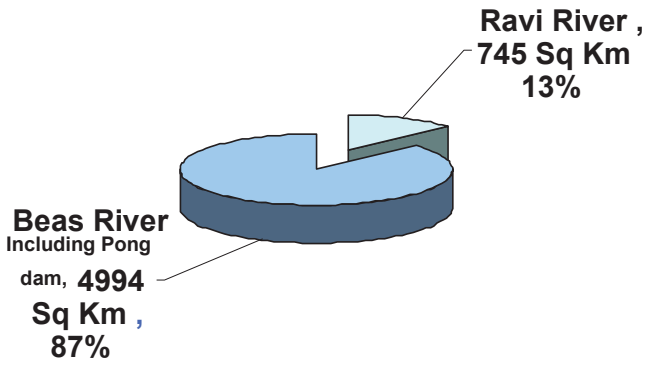
The length of the Ravi River and its main tributaries is given below in

Fig-3.



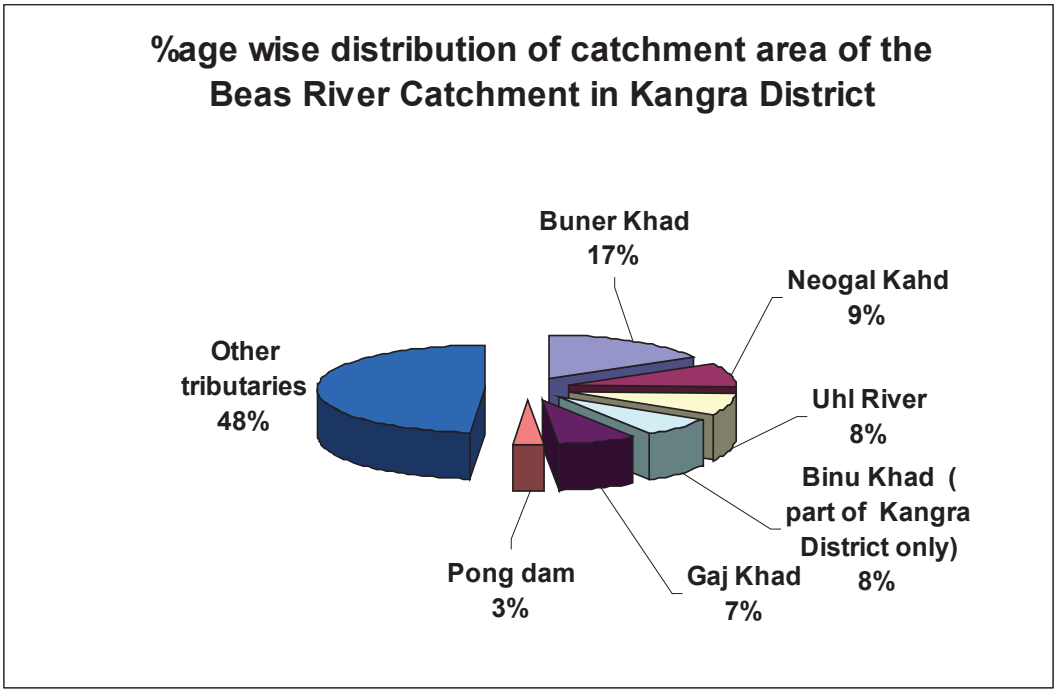
To ...ned by the Ravi Ri... ...area drained by th...

%age of Catchment shared by two major Catchment of Kangra District (Total area of Kangra District = 5739 Sq Km)



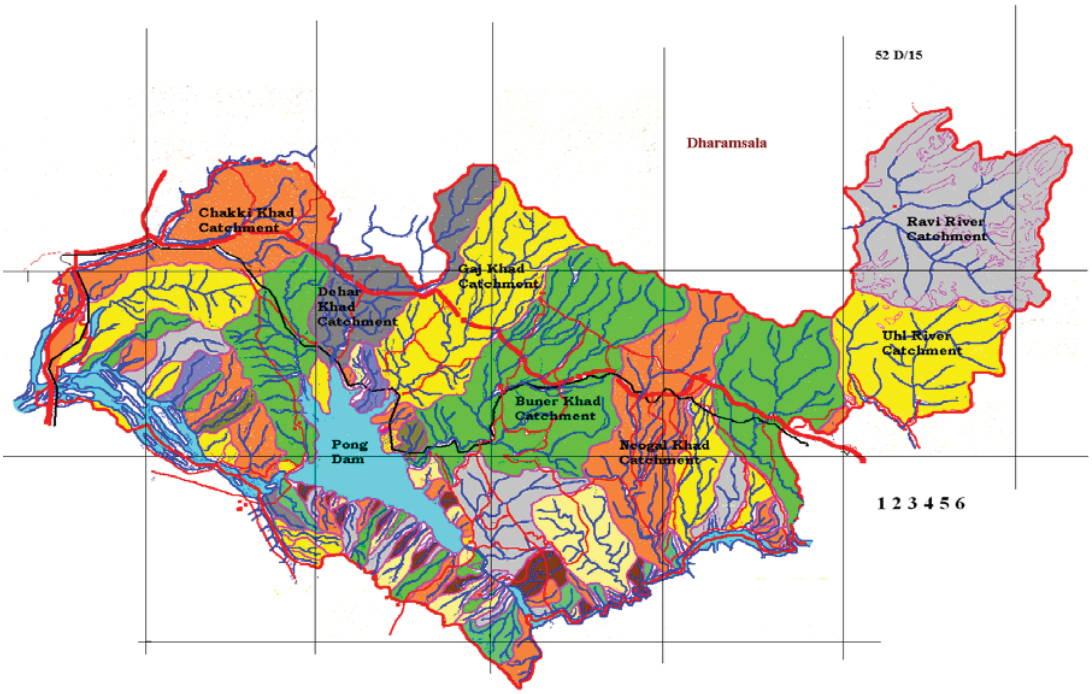
Beas Catchment is drained by about 58 major and another minor tributaries and the catchment of these is as given below Fig.9.

Figure-5.



Map-6, showing the Ravi river Catchment (in Kangra District)

Map-7, Showing Beas /Ravi river catchment in Kangra District.



Beas River:

The Beas is the principal river which receives almost the entire drainage of the district Kangra. The river rises from Pir –Panjal range near Rohtang pass at a height of about 13,500 feet from the mean sea level.This river while fulfilling the thirst of many local travlers also quenches the thirst of the fields of Punjab and Pakistan before flowing into the Arabian Sea. In ancient times, the river was not known as the river Beas, but as Arjiki and till the time of the Mahabharta, this remained its name. The world famous tourist resort of Manali is situated on the right banks of the river Beas. From Manali, this holly river after passing through dense evergreen forests reaches the town of Kullu. The Beas (Vedic Arjiki or Arjikiya and Sanskrit Vipasa) forms the world famous valleys of Kullu and Kangra.

The River after flowing through Kullu and Mandi district enters the Kangra district at Sandhol in Palampur tehsil. From this point the river takes a South-West course and enters the valley of Nadaun in Hamirpur district. Here the Jaswan chain obstructs its further passage to South and the river flows in the North-West direction almost parallel to the strike of the hills. In Kangra, it is joined by Binwa, Neugal, Banganga, Gaj, Dehar and Chakki from North, and Kunah, Maseh, Khairan and Man from the South. The Beas enters district Kangra at Sandhol and leaves it near Mirthal. Its flow is maximum during monsoon months. It has played a significant role in the development of peculiar hill culture which pervails over the life of hill people living in the towns and surrounding villages since ages. The important settlements on the bank of Beas River are Kullu, Mandi, Bajaura, Pandoh, Sujanpur Tihra, Nadaun and Dehra-Gopipur.

Important Tributaries of river Beas in District Kangra:

Catchment area of the Beas River and its tributaries along wIth their percentage to drain the District is givien below in Table-G.

Table-F

	Catchment area of the Beas River.		
Sr. No	Name of the Khad	Area in Sq. Kmtr.	%age of Total
1	Buner Khad (Right Bank Tribuatry of Beas River)	827	16.4
2	Neugal Kahd (Right Bank Tribuatry of Beas River)	453	9.1

3	Uhl River (Right Bank Tribuatry of Beas River)	389	6.7
4	Binu Khad (Right Bank Tribuatry of Beas River) (part of Kangra District only).	376	6.5
5	Gaj Khad (Right Bank Tributary of Beas River , Pong Dam)	365	6.3
6	Chakki Khad (Right Bank tributary of Beas River) (part of Kangra District only).	364	6.3
7	Dehar Khad (Right Bank Tributary of Beas River , Pong Dam) (part of Kangra District only)	239	4.1
8	Chhaunchh Khad (Right Bank tributary of Beas River)	190	3.3
9	Nakehr Khad (Right Bank Tribuatry of Beas River)	172	2.9
10	Tall Khad (Right Bank Tribuatry of Beas River)	171	2.9
11	Bhul Khad (Right Bank Tributary of Beas River, Pong Dam)	171	2.9
12	Pong Dam	152	2.6
13	Mandh Khad (Right Bank Tribuatry of Beas River)	133	2.3
14	Beas River Corridore (part of Kangra District only)	89	1.5
15	Other Small tributaried (73) directly draining into Beas River	78	2.3
16	Haroti Khad (Right Bank Tribuatry of Beas River)	53	.92
17	Jakhbari Khad (Right Bank tributary of Beas River)	50	.87
18	Sohan Nadi (Left Bank tributary of Beas River) (part of Kangra District only)	43	.74
19	Kheran di Khad (Right Bank tributary of Beas River)	41	0.7
20	Sard Khad (Left Bank Tribuatry of Beas River)	39	0.6
21	Gandhiri di Khad (Right Bank tributary of Beas River)	33	0.5
22	Ganunu Khad (Right Bank Tribuatry of Beas River)	31	0.5
23	Tara Khad (Right Bank tributary of Beas River)	28	0.48
24	Thor Khad (Left Bank Tribuatry of Beas River)	28	0.48
25	Kaloha Khad (Left Bank Tribuatry of Beas River)	28	0.48
26	Karoa Khad (Left Bank Tribuatry of Nalsoha Khad)	27	0.47
27	Saloha Khad (Right Bank Tribuatry of Beas River)	27	0.47
28	Tipri Khad (Left Bank Tribuatry of Beas River)	26	45
29	Basika Nala (Left Bank tributary of Beas River, Pong Dam)	25	43
30	Masihn Khad (Left Bank Tribuatry of Beas River) (part of Kangra District only)	25	0.43
31	Sanjuwan di Khad (Right Bank tributary of Beas River)	24	.41
32	Baliana Khad (Left Bank Tribuatry of Beas River)	24	.41
33	Nalsoha Khad (Left Bank Tribuatry of Beas River)	20	0.34
34	Dada Khad (Left Bank Tribuatry of Beas River)	19	0.33
35	Bhatoe Di Khad (Right Bank tributary of Beas River)	19	0.33
36	Ghamir Khad (Left Bank tributary of Beas River)	19	0.33
37	Paniala Khad (Right Bank tributary of Beas River)	16	0.27
38	Sukkar Khad (Right Bank Tribuary of Rana Khad)	15	0.26
39	Fatehpur Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	15	.26
40	Kalm Khad (Left Bank tributary of Beas River)	14	.24
41	Minnu Khad (Right Bank Tributary of Beas River , Pong Dam)	13	.22
42	Narad Khad (Right Bank Tribuatry of Beas River)	11	.19
43	Jamna Khad (Right Bank Tribuatry of Beas River)	11	.19
44	Lohara Khad (Right Bank Tribuatry of Beas River)	11	.19
45	Nagoe Khad (Right Bank tributary of Beas River)	10	.17
46	Hawri Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	10	.17
47	Chanan Khad (Right Bank Tribuatry of Beas River)	9	0.15

48	Bharwara Khad (Left Bank Tribuatry of Beas River)	9	0.15
49	Bargoalan Khad (Left Bank Tribuatry of Beas River)	8	0.13
50	Janate Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	8	0.13
51	Lohar Khad (Right Bank Tribuatry of Beas River)	7	0.12
52	Bagroli Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	6	.087
53	Gurhala Khad (Left Bank Tribuatry of Beas River)	5	.074
54	Kulhera Khad (Right Bank Tribuatry of Beas River)	4	.069
55	Dailiwali Khad (Right Bank Tributary of Pong Dam)	4	.069
56	Makor Nala (Left Bank tributary of Beas River, Pong Dam)	4	.069
57	Barla Di Khad (Initially Right Bank Tributary of Beas River), Pong Dam	3	.052
58	Mornika Khad (Right Bank Tributary of Pong Dam)	2	.034
	Total Beas River Catchment	4994	87.43

Irrespective of above, Kangra is drained by about 217 major and minor Rivers and tributaries of 3rd and more than 3rd order tributaries. In addition to this, about 4000 tributaries of 1st and 2nd order are also present.

The Drainage system wise length of 217 tributaries flowing in Kangra district in a descending order is given below in Table-H.

Table-G

Table showing length of Various Rivers and tributaries of Kangra District		
Sr. No	River system of the Kangra District	Length in KM
1	Beas River (63 Km before pong dam, 26 Km within Pong dam and 34 Km below Pong dam.)	123
2	Buner Khad (Right Bank Tribuatry of Beas River)	71
3	Gaj Khad (Right Bank Tributary of Beas River , Pong Dam)	54
4	Neugal Kahd (Right Bank Tribuatry of Beas River)	53
5	Binu Khad (Right Bank Tribuatry of Beas River)	52
6	Chakki Khad (Right Bank tributary of Beas River) (in Kangra District Only)	50
7	Khauli Khad (Right Bank Tributary of Gaj Khad)	49
8	Chhaunchh Khad (Right Bank tributary of Beas River)	31
9	Manuni Khad (Right Bank Tribuatry of Buner Khad)	30
10	Mandh Khad (Right Bank Tribuatry of Beas River)	30
11	Brahi Khad (Left Bank Tributary of Dehar Khad)	29
12	Kalihen Nala (Left bank tributary of Ravi River)	29
13	Ravi River (in Kangra District Only)	28
14	Bathu Khad (Left Bank Tribuatry of Buner Khad)	27
15	Lapiana Khad (Right Bank Tributary of Gaj Khad)	27
16	Chambi Khad (Right Bank Tributary of Gaj Khad)	27
17	Uhl River (Right Bank Tribuatry of Beas River) (in Kangra District Only)	26
18	Awa Khad (Right Bank tributary of Binu Khad)	26
19	Jabbar Khad (Left Bank tributary of Chakki Khad)	24
20	Dehar Khad (Right Bank Tributary of Beas River , Pong Dam) (in Kangra District Only)	24
21	Tall Khad (Right Bank Tribuatry of Beas River)	20
22	Nakehr Khad (Right Bank Tribuatry of Beas River)	20

23	Lambadug Nala (Left Bank tributary of Uhl)	20
24	Leond Nala (Right Bank Tributary of Gaj Khad)	20
25	Darun Khad (Right Bank Tributary of Buner Khad)	19
26	Manjhi Khad (Left Bank Tributary of Manuni Khad)	19
27	Iku Khad (Right Bank Tributary of Buner Khad)	18
28	Jogal Khad (Left Bank Tributary of Buner Khad)	17
29	Bhated Khad (Left Bank Tributary of Gaj Khad)	17
30	Gareli Khad (Left Bank tributary of Jabbar Khad)	16
31	Tara Khad (Right Bank tributary of Beas River)	16
32	Darugh Khad(Left Bank Tributary of Tall Khad)	15
33	Banol Khad (Left Bank Tributary of Gaj Khad)	15
34	Bhul Khad (Right Bank Tributary of Beas River , Pong Dam)	15
35	Sansal Khad (Left Bank tributary of Binu Khad)	15
36	Churan Khad (Left Bank Tributary of Manjhi Khad)	15
37	Bir Khad (Left Bank tributary of Sansal Khad)	14
38	Makori Nala (Left Bank tributary of Lambadug)	14
39	Gandhiri di Khad (Right Bank tributary of Beas River)	14
40	Gajeu Khad (Left Bank Tributary of Gaj Khad)	14
41	Sohan Nadi (Left Bank tributary of Beas River) (in Kangra District Only)	13
42	Sukhad Khad (Left Bank Tribuatry of Mandh Khad)	13
43	Pandon Nala (left Bank tributary of Kaihen Nala)	13
44	Kheran di Khad (Right Bank tributary of Beas River)	13
45	Parai Khad (Left Bank tributary of Binu Khad)	12
46	Ganunu Khad (Right Bank Tribuatry of Beas River)	12
47	Narehli Khad (Right Bank Tributary of Bathu Khad)	12
48	Masihn Khad (Left Bank Tribuatry of Beas River)	12
49	Ghamir Khad (Left Bank tributary of Beas River)	12
50	Janed Khad (Left Bank Tributary of Neugal Khad)	12
51	Karoa Khad (Left Bank Tribuatry of Nalsoha Khad)	12
52	Kotla Khad (Right Bank tributary of Sohan Nadi)	12
53	Tahal Khad (Right Bank Tributary of Neugal Khad)	12
54	Thor Khad (Left Bank Tribuatry of Beas River)	11
55	Doewala Nala (Left Bank tributary of Binu Khad)	11
56	Dhup Khad (Right Bank Tributary of Sukhan Khad)	11
57	Bhatoe Di Khad (Right Bank tributary of Beas River)	11
58	Nidal Khad (Left Bank Tributary of Darun Khad)	11
59	Baliana Khad (Left Bank Tribuatry of Beas River)	11
60	Hatli Khad (Left Bank tributary of Chakki Khad)	10
61	Tipri Khad (Left Bank Tribuatry of Beas River)	10
62	Girni Khad (Right Bank Tributary of Neugal Khad)	10
63	Haroti Khad (Right Bank Tribuatry of Beas River)	10
64	Kikbar Khad (Left Bank Tributary of Dehar Khad)	10
65	Dada Khad (Left Bank Tribuatry of Beas River)	10
66	Luni Khad (Left Bank tributary of Binu Khad)	10
67	Jakhbari Khad (Right Bank tributary of Beas River)	10
68	Lingti Khad (Right Bank Tributary of Neugal Khad)	10
69	Pun Khad (Right Bank tributary of Binu Khad)	10
70	Sanjuwan di Khad (Right Bank tributary of Beas River)	10
71	Umalkoru Nala (Right Banktributary of Makori)	10
72	Kaloha Khad (Left Bank Tribuatry of Beas River)	10
73	Nalsoha Khad (Left Bank Tribuatry of Beas River)	10
74	Sard Khad (Left Bank Tribuatry of Beas River)	10

75	Sukhan Khad (Left Bank Tributary of Neugal Khad)	10
76	Kher Nala (Right Bank Tribuatry of Nakehr Khad)	9
77	Ghuneri Khad (Left Bank Tributary of Manuni Khad)	9
78	Tatwani Khad (Left Bank tributary of Luni Khad)	9
79	Sari Nala (Left Bank tributary of Lambadug)	9
80	Manjui Di Khad (Right Bank Tributary of Bhul Khad)	9
81	Saleti Khad (Right Bank Tributary of Sard Khad)	9
82	Dundi Khad (Left Bank Tribuatry of Haroti Khad)	9
83	Sun Khad (Left Bank Tributary of Neugal Khad)	9
84	Paniala Khad (Right Bank tributary of Beas River)	9
85	Ghoralatinu Nala(Left Bank tributary of Makori)	9
86	Bargoalan Khad (Left Bank Tribuatry of Beas River)	9
87	Hawri Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	9
88	Balir Di Khad (Left Bank tributary of Chakki Khad)	8
89	Chachinyan Di Khad (Left Bank Tributary of Bhul Khad)	8
90	Oj Khad (Right Bank Tributary of Bathu Khad)	8
91	Harar Khad (Left Bank tributary of Jabbar Khad)	8
92	Narad Khad (Right Bank Tribuatry of Beas River)	8
93	Nad Khad (Left Bank Tributary of Bhugun Nala)	8
94	Saloha Khad (Right Bank Tribuatry of Beas River)	8
95	Bajgar Khad (Left bank tributary of Sukar Khad) (in Kangra District Only)	8
96	Fatehpur Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	8
97	Kharsa Khad (Right Bank tributary of Binu Khad)	8
98	Thangar Nala (Left Bank tributary of Lambadug)	8
99	Chanaur Khad (Right Bank Tribuatry of Tipri Khad)	8
100	Jamna Khad (Right Bank Tribuatry of Beas River)	8
101	Nod Khad (Left Bank Tributary of Manuni Khad)	8
102	Balh Khad (Left Bank Tributary of Manjhi Khad)	8
103	Thamsar Nala (Left Bank tributary of Kaihen Nala)	8
104	Dhial Ka Nala (Left Bank Tributary of Manjui Di Khad)	7
105	Kheni Nala (Rignt Bank tributary of Doewala Nala)	7
106	Meda Da Nala (Left Bank tributary of Kheran di Khad)	7
107	Barote da Nala (Left Bank tributary of Chhaunchh Khad)	7
108	Garthala Nala (Right Bank tributary of Kaihen Nala)	7
109	Lohara Khad (Left Bank tributary of Jakhbari Khad)	7
110	Mathan Nala (Left Bank tributary of Binu Khad)	7
111	Dhramman Khad (Left Bank Tributary of Brahi Khad)	7
112	Rehan Nala (Right Bank Tributary of Manjui Di Khad)	7
113	Bagroli Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	7
114	Banara Nala (Right Bank Tributary of Bashika Khad)	7
115	Laiuni Nala (Right Bank tributary of Ravi River)	7
116	Nikora Nala (Right Bank tributary of Ravi River)	7
117	Parauli Di Khad (Right Bank Tributary of Bhul Khad)	7
118	Kalm Khad (Left Bank tributary of Beas River)	7
119	Nain Khad (Right Bank tributary of Binu Khad)	7
120	Sarah Khad (Right Bank Tributary of Balh Khad)	7
121	Bari Khad (Right Bank Tributary of Bathu Khad)	6
122	Sukkar Di Khad (Left Bank tributary of Gandhiri di Khad)	6
123	Damni Di Khad (Left Bank Tributary of Bhul Khad)	6
124	Gharoli da Nala (Left Bank tributary of Chhaunchh Khad)	6
125	Tantgari Nala (Left Bank tributary of Ravi River)	6
126	Garari Ka Nala (Right Bank tributary of Chhaunchh Khad)	6

127	Phaluni Nala (Left Bank Tributary of Iku Khad)	6
128	Sukhad Khad (Right Bank Tribuatry of Buner Khad)	6
129	Bharwara Khad (Left Bank Tribuatry of Beas River)	6
130	Bhawanda Nala (Right Bank Tributary of Manjhi Khad)	6
131	Bhadal Nala (Right Bank tributary of Ravi River)	6
132	Gurhala Khad (Left Bank Tribuatry of Beas River)	6
133	Sahri Khad (Right Bank Tributary of Baliana Khad)	6
134	Sun Khad (Left Bank Tribuatry of Sukhad Khad)	6
135	Lohara Khad (Right Bank Tribuatry of Beas River)	6
136	Dargi Khad (Right Bank Tributary of Bathu Khad)	6
137	Dhado da Nala (Left Bank tributary of Chhaunchh Khad)	6
138	Ghangret Ki Khad (Right Bank tributary of Sohan Nadi)	6
139	Bhugun Nala (Left Bank Tributary of Bhul Khad)	6
140	Girgi Nala (Right Bank tributary of Kheran di Khad)	6
141	Sethu Nala (Right Bank Tributary of Neugal Khad)	6
142	Khawa Khad (Left Bank Tributary of Bathu Khad)	6
143	Kusnagar di Khad (Right Bank tributary of Jakhbari Khad)	6
144	Dev Nala (Right Bank tributary of Lambadug)	5
145	Makori Nala (Left Bank tributary of Kaihen Nala)	5
146	Kakrela Khad (Right Bank tributary of Binu Khad)	5
147	Paled Nal (Right Bank tributary of Ravi River)	5
148	Dibar Khad (Left Bank Tributary of Jogal Khad)	5
149	Jangled Khad (Left Bank Tribuatry of Sukhad Khad)	5
150	Nagoe Khad (Right Bank tributary of Beas River)	5
151	Chho Khad (Right Bank Tributary of Dehar Khad)	5
152	Bangi Nala (Left bank tributary of Pandon Nala)	5
153	Jamula Khad (Right Bank Tributary of Bathu Khad)	5
154	Diala Di Khad (Initially Right Bank Tributary of Barla Di Khad), Pong Dam	5
155	Nair Nala (Right Bank Tributary of Neugal Khad)	5
156	Tapni Ghamed Nala (Right Bank tributary of Kaihen Nala)	5
157	Bakkarkyara Nala (Right Bank tributary of Uhl)	5
158	Janate Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	5
159	Basika Nala (Left Bank tributary of Beas River, Pong Dam)	5
160	Katora Nala (Right Bank Tributary of Neugal Khad)	5
161	Satrao Nala (Left Bank tributary of Sukhar Di Khad)	5
162	Drug Nala (Right Bank tributary of Binu Khad)	5
163	Bari Khad (Left Bank tributary of Chakki Khad)	4
164	Sukhar Di Khad (Left Bank tributary of Chhaunchh Khad)	4
165	Chalah Nala (Right Bank tributary of Kaihen Nala	4
166	Johari Nala (Left Bank tributary of Laiuni Nala)	4
167	Lohar Khad (Right Bank Tribuatry of Beas River)	4
168	Obre Nala(Right Bank Tributary of Neugal Khad)	4
169	Sih Nala (Left Bank Tributary of Jogal Khad)	4
170	Bhargu Nala (Left bank tributary of Uhl)	4
171	Chanan Khad (Right Bank Tribuatry of Beas River)	4
172	Bankroli Khad (Left Bank Tributary of Parauli Di Khad)	4
173	Lambapar Nala (Left Bank tributary of Pandon Nala)	4
174	Suni Nala (Right Bank tributary of Kaihen Nala)	4
175	Roli Khad (Right Bank tributary of Sohan Nadi)	4
176	Bagh Nala (Left Bank Tributary of Neugal Khad)	4
177	Kulhera Khad (Right Bank Tribuatry of Beas River)	4
178	Rapare de Khad (Right Bank tributary of Chhaunchh Khad)	4

179	Gard Khad (Left Bank tributary of Gareli Khad)	4
180	Dailiwali Khad (Right Bank Tributary of Pong Dam)	4
181	Minnu Khad (Right Bank Tributary of Beas River , Pong Dam)	4
182	Bhadral Nala (Right bank tributary of Shau Nala)	4
183	Kala Chho Nala (Right Bank Tributary of Buner Khad)	4
184	Suana Di Khad (Left Bank Tributary of Thor Khad)	4
185	Patech Nala (Left Bank tributary of Awa Khad)	4
186	Badiali Di Khad (Right Bank Tributary of Fatehpur Di Khad)	4
187	Bhed Khad (Left Bank Tributary of Dehar Khad)	4
188	Dholera Nala (Right Bank tributary of Awa Khad)	4
189	Khopa Nala (Right Bank Tributary of Neugal Khad)	4
190	Shau Nala (Right Bank tributary of Laiuni Nala)	4
191	Raj Nala (Left Bank Tributary of Neugal Khad)	3
192	Lamba Nala (Left Bank tributary of Gard Khad)	3
193	Sisu Nala (Left Bank tributary of Ravi River)	3
194	Sannsar Nadi (Left Bank tributary of Chakki Khad)	3
195	Makroli Ka Nala (Left Bank tributary of Meda Da Nala))	3
196	Nal Nala (Left Bank tributary of Kalm Khad)	3
197	Barla Di Khad (Initially Right Bank Tributary of Beas River), Pong Dam	3
198	Gau Nala (Left Bank tributary of Laiuni Nala)	3
199	Kau Nala (Left Bank Tributary of Bhul Khad)	3
200	Sandharag Khad (Left Bank tributary of Tatwani Khad)	3
201	Garanda Nala (Right Bank tributary of Awa Khad)	3
202	Kudi Nala (Right Bank tributary of Bhadal Nala)	3
203	Kohar Nala (Right Bank tributary of Awa Khad)	3
204	Mangahial Nala (Left Bank Tributary of Rehan Nala)	3
205	Salar Nala (Left Bank tributary of Awa Khad)	3
206	Taneta Nala (Left Bank tributary of Kaihen Nala)	3
207	Dhundi Nala (Left Bank tributary of Bhadal Nala)	3
208	Sukala Khad (Right Bank tributary of Gard Khad)	2
209	Biaru Nala (Left Bank tributary of Ravi River)	2
210	Chutar Khad (Left bank tributary of Sukar Khad) (in Kangra District Only)	2
211	Paprud Nala (Left Bank tributary of Awa Khad)	2
212	Chandan Nala ((Left Bank tributary of Awa Khad)	2
213	Lambapar Nala (Right Bank tributary of Kaihen Nala)	2
214	Makor Nala (Left Bank tributary of Beas River, Pong Dam)	2
215	Mornika Khad (Right Bank Tributary of Pong Dam)	2
216	Bhadrehr Nala (Left Bank Tributary of Jogal Khad)	2
217	Sukkar Khad (Right Bank Tribuary of Rana Khad) (in Kangra District Only)	1

The Origin and confluence of all the major rivers/khals flowing in district Kangra is as given below in Table-I.

Table-I

Height at origin/entry at Kangra and confluence/ leaving point of Kangra.	Height in metre (above mean sea level)	
River system of the Kangra District	Origin	Confluence

Beas River	636 at entry at Kangra.	252 at the Kangra Border
Uhl River (Right Bank Tribuatry of Beas River)	4520	1825
Bakkarkyara Nala (Right Bank tributary of Uhl)	4280	3250
Bhargu Nala (Left bank tributary of Uhl)	3960	2510
Lambadug Nala (Left Bank tributary of Uhl)	4480	1825
Thangar Nala (Left Bank tributary of Lambadug)	4580	3010
Makori Nala (Left Bank tributary of Lambadug)	4560	2780
Ghoralatinu Nala(Left Bank tributary of Makori)	4410	3150
Umalkoru Nala (Right Banktributary of Makori)	4200	2980
Dev Nala (Right Bank tributary of Lambadug)	4280	2350
Sari Nala (Left Bank tributary of Lambadug)	3860	2020
Sukkar Khad (Right Bank Tribuary of Rana Khad)	1488	1360
Chutar Khad (Left bank tributary of Sukar Khad)	1810	1380
Bajgar Khad (Left bank tributary of Sukar Khad)	3120	1460
Binu Khad (Right Bank Tribuatry of Beas River)	4298	636
Kakrela Khad (Right Bank tributary of Binu Khad)	3160	2200
Parai Khad (Left Bank tributary of Binu Khad)	4180	1510
Nain Khad (Right Bank tributary of Binu Khad)	3170	1320
Kharsa Khad (Right Bank tributary of Binu Khad)	2800	1280
Luni Khad (Left Bank tributary of Binu Khad)	3380	1120
Tatwani Khad (Left Bank tributary of Luni Khad)	4440	2180
Sandharag Khad (Left Bank tributary of Tatwani Khad)	3200	2280
Drug Nala (Right Bank tributary of Binu Khad)	1460	1005
Sansal Khad (Left Bank tributary of Binu Khad)	3010	880
Bir Khad (Left Bank tributary of Sansal Khad)	3180	890
Pun Khad (Right Bank tributary of Binu Khad)	2020	860
Awa Khad (Right Bank tributary of Binu Khad)	4200	790
Garanda Nala (Right Bank tributary of Awa Khad)	3280	2520
Salar Nala (Left Bank tributary of Awa Khad)	3200	2280
Paprud Nala (Left Bank tributary of Awa Khad)	3310	2040
Dholera Nala (Right Bank tributary of Awa Khad)	3360	1640
Patech Nala (Left Bank tributary of Awa Khad)	3040	1940
Chandan Nala ((Left Bank tributary of Awa Khad)	2400	1620
Kohar Nala (Right Bank tributary of Awa Khad)	2160	1440
Mathan Nala (Left Bank tributary of Binu Khad)	1140	590
Doewala Nala (Left Bank tributary of Binu Khad)	1220	570
Kheni Nala (Rignt Bank tributary of Doewala Nala)	1228	740
Chanan Khad (Right Bank Tribuatry of Beas River)	990	554
Narad Khad (Right Bank Tribuatry of Beas River)	1140	548
Ganunu Khad (Right Bank Tribuatry of Beas River)	1180	536
Haroti Khad (Right Bank Tribuatry of Beas River)	1090	527
Dundi Khad (Left Bank Tribuatry of Haroti Khad)	1210	580
Mandh Khad (Right Bank Tribuatry of Beas River)	1297	492

Sukhad Khad (Left Bank Tribuatry of Mandh Khad)	1080	496
Sun Khad (Left Bank Tribuatry of Sukhad Khad)	1140	610
Jangled Khad (Left Bank Tribuatry of Sukhad Khad)	770	592
Neugal Kahd (Right Bank Tribuatry of Beas River)	4320	515
Katora Nala (Right Bank Tributary of Neugal Khad)	4320	2580
Obre Nala(Right Bank Tributary of Neugal Khad)	4240	2320
Nair Nala (Right Bank Tributary of Neugal Khad)	4010	2210
Khopa Nala (Right Bank Tributary of Neugal Khad)	3400	1960
Bagh Nala (Left Bank Tributary of Neugal Khad)	2800	1447
Sethu Nala (Right Bank Tributary of Neugal Khad)	3280	1430
Raj Nala (Left Bank Tributary of Neugal Khad)	2125	1347
Lingti Khad (Right Bank Tributary of Neugal Khad)	2800	1140
Girni Khad (Right Bank Tributary of Neugal Khad)	1488	1020
Tahal Khad (Right Bank Tributary of Neugal Khad)	1360	805
Sun Khad (Left Bank Tributary of Neugal Khad)	1140	815
Sukhan Khad (Left Bank Tributary of Neugal Khad)	1040	714
Dhup Khad (Right Bank Tributary of Sukhan Khad)	1020	720
Janed Khad (Left Bank Tributary of Neugal Khad)	1010	689
Lohar Khad (Right Bank Tribuatry of Beas River)	897	510
Tall Khad (Right Bank Tribuatry of Beas River)	1134	493
Jamna Khad (Right Bank Tribuatry of Beas River)	1010	491
Kulhera Khad (Right Bank Tribuatry of Beas River)	980	487
Lohara Khad (Right Bank Tribuatry of Beas River)	616	467
Darugh Khad(Left Bank Tributary of Tall Khad)	967	620
Masihn Khad (Left Bank Tribuatry of Beas River)	780	455
Sard Khad (Left Bank Tribuatry of Beas River)	890	453
Saleti Khad (Right Bank Tributary of Sard Khad)	780	490
Saloha Khad (Right Bank Tribuatry of Beas River)	978	450
Kaloha Khad (Left Bank Tribuatry of Beas River)	972	446
Baliana Khad (Left Bank Tribuatry of Beas River)	820	442
Sahri Khad (Right Bank Tributary of Baliana Khad)	886	558
Nakehr Khad (Right Bank Tribuatry of Beas River)	920	436
Kher Nala (Right Bank Tribuatry of Nakehr Khad)	810	470
Nalsoha Khad (Left Bank Tribuatry of Beas River)	879	435
Karoa Khad (Left Bank Tribuatry of Nalsoha Khad)	880	435
Bharwara Khad (Left Bank Tribuatry of Beas River)	846	435
Thor Khad (Left Bank Tribuatry of Beas River)	965	435
Suana Di Khad (Left Bank Tributary of Thor Khad)	880	970
Tipri Khad (Left Bank Tribuatry of Beas River)	1020	435
Chanaur Khad (Right Bank Tribuatry of Tipri Khad)	940	480
Bargoalan Khad (Left Bank Tribuatry of Beas River)	990	435
Dada Khad (Left Bank Tribuatry of Beas River)	1008	435

Gurhala Khad (Left Bank Tribuatry of Beas River)	670	435
Buner Khad (Right Bank Tribuatry of Beas River)	4440	435
Kala Chho Nala (Right Bank Tributary of Buner Khad)	4520	2080
Iku Khad (Right Bank Tributary of Buner Khad)	4220	890
Phaluni Nala (Left Bank Tributary of Iku Khad)	3810	1620
Jogal Khad (Left Bank Tributary of Buner Khad)	1135	695
Sih Nala (Left Bank Tributary of Jogal Khad)	1200	856
Bhadrehr Nala (Left Bank Tributary of Jogal Khad)	1020	850
Dibar Khad (Left Bank Tributary of Jogal Khad)	920	718
Darun Khad (Right Bank Tributary of Buner Khad)	2800	708
Nidal Khad (Left Bank Tributary of Darun Khad)	1120	718
Sukhad Khad (Right Bank Tribuatry of Buner Khad)	910	647
Manuni Khad (Right Bank Tribuatry of Buner Khad)	3104	560
Ghuneri Khad (Left Bank Tributary of Manuni Khad)	1755	940
Nod Khad (Left Bank Tributary of Manuni Khad)	4180	872
Manjhi Khad (Left Bank Tributary of Manuni Khad)	4200	629
Bhawanda Nala (Right Bank Tributary of Manjhi Khad)	4300	1620
Churan Khad (Left Bank Tributary of Manjhi Khad)	1765	833
Balh Khad (Left Bank Tributary of Manjhi Khad)	952	764
Sarah Khad (Right Bank Tributary of Balh Khad)	1270	805
Bathu Khad (Left Bank Tribuatry of Buner Khad)	1166	488
Jamula Khad (Right Bank Tributary of Bathu Khad)	1103	730
Oj Khad (Right Bank Tributary of Bathu Khad)	1120	657
Khawa Khad (Left Bank Tributary of Bathu Khad)	949	620
Dargi Khad (Right Bank Tributary of Bathu Khad)	910	595
Bari Khad (Right Bank Tributary of Bathu Khad)	911	580
Narehli Khad (Right Bank Tributary of Bathu Khad)	880	493
Minnu Khad (Right Bank Tributary of Beas River , Pong Dam)	779	435
Basika Nala (Left Bank tributary of Beas River, Pong Dam)	580	435
Banara Nala (Right Bank Tributary of Bashika Khad)	734	532
Gaj Khad (Right Bank Tributary of Beas River , Pong Dam)	4020	435
Gajeu Khad (Left Bank Tributary of Gaj Khad)	4588	1470
Bhated Khad (Left Bank Tributary of Gaj Khad)	4600	1420
Leond Nala (Right Bank Tributary of Gaj Khad)	4020	1220
Banol Khad (Left Bank Tributary of Gaj Khad)	1964	690
Chambi Khad (Right Bank Tributary of Gaj Khad)	1600	635
Khauli Khad (Right Bank Tributary of Gaj Khad)	3860	547
Lapiana Khad (Right Bank Tributary of Gaj Khad)	800	460
Dehar Khad (Right Bank Tributary of Beas River , Pong Dam)	1324	435
Bhed Khad (Left Bank Tributary of Dehar Khad)	560	490
Brahi Khad (Left Bank Tributary of Dehar Khad)	3219	482
Dhramman Khad (Left Bank Tributary of Brahi Khad)	2070	740

Chho Khad (Right Bank Tributary of Dehar Khad)	740	477
Kikbar Khad (Left Bank Tributary of Dehar Khad)	743	469
Bhul Khad (Right Bank Tributary of Beas River , Pong Dam)	605	435
Damni Di Khad (Left Bank Tributary of Bhul Khad)	725	580
Chachinyan Di Khad (Left Bank Tributary of Bhul Khad)	740	520
Kau Nala (Left Bank Tributary of Bhul Khad)	580	510
Bhugun Nala (Left Bank Tributary of Bhul Khad)	630	438
Nad Khad (Left Bank Tributary of Bhugun Nala)	610	449
Manjui Di Khad (Right Bank Tributary of Bhul Khad)	565	437
Dhial Ka Nala (Left Bank Tributary of Manjui Di Khad)	776	418
Rehan Nala (Right Bank Tributary of Manjui Di Khad)	645	450
Mangahial Nala (Left Bank Tributary of Rehan Nala)	648	580
Parauli Di Khad (Right Bank Tributary of Bhul Khad)	660	436
Bankroli Khad (Left Bank Tributary of Parauli Di Khad)	668	520
Hawri Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	610	435
Bagroli Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	566	435
Fatehpur Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	570	534
Badiali Di Khad (Right Bank Tributary of Fatehpur Di Khad)	540	464
Janate Di Khad (Initially Right Bank Tributary of Bhul Khad), Pong Dam	560	435
Barla Di Khad (Initially Right Bank Tributary of Beas River), Pong Dam	505	435
Diala Di Khad (Initially Right Bank Tributary of Barla Di Khad), Pong Dam	536	435
Dailiwali Khad (Right Bank Tributary of Pong Dam)	575	435
Mornika Khad (Right Bank Tributary of Pong Dam)	560	435
Makor Nala (Left Bank tributary of Beas River, Pong Dam)	500	435
Ghamir Khad (Left Bank tributary of Beas River)	710	334
Kalm Khad (Left Bank tributary of Beas River)	535	332
Nal Nala (Left Bank tributary of Kalm Khad)	575	331
Sohan Nadi (Left Bank tributary of Beas River)	452 (at entry lelvel in Kangra.	434
Roli Khad (Right Bank tributary of Sohan Nadi)	820	447
Ghangret Ki Khad (Right Bank tributary of Sohan Nadi)	845	409
Kotla Khad (Right Bank tributary of Sohan Nadi)	880	350
Jakhbari Khad (Right Bank tributary of Beas River)	480	323
Kusnagar di Khad (Right Bank tributary of Jakhbari Khad)	568	394
Lohara Khad (Left Bank tributary of Jakhbari Khad)	480	334
Nagoe Khad (Right Bank tributary of Beas River)	486	310
Bhatoe Di Khad (Right Bank tributary of Beas River)	590	307

Gandhiri di Khad (Right Bank tributary of Beas River)	610	298
Sukkar Di Khad (Left Bank tributary of Gandhiri di Khad)	560	370
Sanjuwan di Khad (Right Bank tributary of Beas River)	631	290
Kheran di Khad (Right Bank tributary of Beas River)	605	287
Meda Da Nala (Left Bank tributary of Kheran di Khad)	600	440
Makroli Ka Nala (Left Bank tributary of Meda Da Nala))	610	470
Girgi Nala (Right Bank tributary of Kheran di Khad)	520	350
Paniala Khad (Right Bank tributary of Beas River)	490	283
Tara Khad (Right Bank tributary of Beas River)	637	274
Chhaunchh Khad (Right Bank tributary of Beas River)	540	280
Sukhar Di Khad (Left Bank tributary of Chhaunchh Khad)	520	469
Satrao Nala (Left Bank tributary of Sukhar Di Khad)	614	480
Gharoli da Nala (Left Bank tributary of Chhaunchh Khad)	648	436
Garari Ka Nala (Right Bank tributary of Chhaunchh Khad)	520	425
Rapare de Khad (Right Bank tributary of Chhaunchh Khad)	510	406
Dhado da Nala (Left Bank tributary of Chhaunchh Khad)	578	402
Barote da Nala (Left Bank tributary of Chhaunchh Khad)	540	370
Chakki Khad (Right Bank tributary of Beas River)	880	252
Sannsar Nadi (Left Bank tributary of Chakki Khad)	1188	880
Hatli Khad (Left Bank tributary of Chakki Khad)	1036	486
Jabbar Khad (Left Bank tributary of Chakki Khad)	1490	403
Harar Khad (Left Bank tributary of Jabbar Khad)	1470	580
Gareli Khad (Left Bank tributary of Jabbar Khad)	627	371
Gard Khad (Left Bank tributary of Gareli Khad)	620	520
Lamba Nala (Left Bank tributary of Gard Khad)	680	596
Sukala Khad (Right Bank tributary of Gard Khad)	605	540
Bari Khad (Left Bank tributary of Chakki Khad)	520	401
Balir Di Khad (Left Bank tributary of Chakki Khad)	510	304
Ravi River	4120	2290
Sisu Nala (Left Bank tributary of Ravi River)	5296	3640
Tantgari Nala (Left Bank tributary of Ravi River)	4101	3610
Bhadal Nala (Right Bank tributary of Ravi River)	4210	3190
Kudi Nala (Right Bank tributary of Bhadal Nala)	4610	3720
Dhundi Nala (Left Bank tributary of Bhadal Nala)	4840	3690
Biaru Nala (Left Bank tributary of Ravi River)	4340	3170
Laiuni Nala (Right Bank tributary of Ravi River)	3502	2610
Shau Nala (Right Bank tributary of Laiuni Nala)	3590	2980
Bhadral Nala (Right bank tributary of Shau Nala)	4320	3130

Gau Nala (Left Bank tributary of Laiuni Nala)	4180	2940
Johari Nala (Left Bank tributary of Laiuni Nala)	3720	2930
Nikora Nala (Right Bank tributary of Ravi River)	4360	2530
Kalihen Nala (Left bank tributary of Ravi River)	4390	2440
Garthala Nala (Right Bank tributary of Kaihen Nala)	4720	3670
Lambapar Nala (Right Bank tributary of Kaihen Nala)	4360	3410
Tapni Ghamed Nala (Right Bank tributary of Kaihen Nala)	4080	3560
Makori Nala (Left Bank tributary of Kaihen Nala)	4000	3550
Suni Nala (Right Bank tributary of Kaihen Nala)	4080	2880
Chalah Nala (Right Bank tributary of Kaihen Nala	4410	2860
Pandon Nala (left Bank tributary of Kaihen Nala)	4000	2690
Lambapar Nala (Left Bank tributary of Pandon Nala)	4410	2790
Bangi Nala (Left bank tributary of Pandon Nala)	4360	2760
Taneta Nala (Left Bank tributary of Kaihen Nala)	3960	2720
Thamsar Nala (Left Bank tributary of Kaihen Nala)	4160	2480
Paled Nal (Right Bank tributary of Ravi River)	4380	2320

13 CALCULATION OF MINERAL DEPOSITS AND ANNUAL DEPOSITION IN THE STREAM BED:

The deposition in a river bed is more pronounced during rainy season although the quantum of deposition varies from stream to stream depending upon numbers of factors such as catchment, lithology, discharge, river profile and geomorphology of the river course. The particle size may vary depending upon the stage of river i.e. youth, mature and old age. In Kangra District it is observed that annual deposition in various streams vary from 2 cms to 10 cms. However, there are certain geomorphological features developed in the river bed such as channel bars, point bars etc. where annual deposition is much more even three to four metres. It is also important to mention here that there is a provision in the Himachal Pradesh Minor Minerals (Concession) and Mineral (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015, to allow collection of material upto a depth of 2 metre where mineral concessions have been granted, but it is noticed that during flood season whole of the pit so excavated is completely filled up and as such, the excavated area is replenished with new harvest of minerals.

In order to calculate the mineral deposits in the stream beds, the mineral constituents have been categorized as clay, silt, sand, bajri and boulder and there average %age is taken into account. It is observed in different rivers/streams that % age of boulders varies from 30% to 40%, bajri from 20% to 35 %, sand from 20% 40% and silt and clay totalling from 10% 20 %. Boulder, bajri and sand are the resource mineral i.e. usable mineral and rest is taken as the waste. However during present calculation, the waste material i,e silt which vary from 10 to 20% in different streams has also been included in the total production. Further the Survey of India Topo-Sheets has been used as base map to know the extent of river course. Presently the mineral reserves have been calculated only upto a depth of 1.00 metre, but there are so many portions in the river beds such as channel bars, point bars and central islands where the annual deposition is raising the level of river bed thus causing shifting of the rivers towards banks resuting in to cutting of banks and at such locations, removal of this material upto the bed level is essential to control the river flow in its central part to check the bank cutting. While, calculating the mineral potentials, the mineral deposits lying in the sub-tributaries, of that particular stream/river has not been taken into consideration. Since, these tributaries are also adding the mineral deposits annually and especially during the rainy season in to the main river, as such the mineral deposits and annual replenishment which has been calculated presently will be much more.

It is also important to mention here that, whenever, any of the area recommended for grant of mineral concession in District Survey Report is applied by the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Disisional Officer (C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations. Thereafter, as per the site specific recommendations of the committee, the concerned Mineral concession holder has to prepare the detailed “Mining Plan” for the allotted area through Registered Qualified Person and get in approved from authorized officer of Geological Wing of the State Government. The comprehensive mining plan are prepared by RQP giving details of minerals reserves, method of mining, progressive mine closure plan, extent of proposed mining and other related details. As such, the microlevel, site specific study of the area comprising the probable and proveable mineral reserve deposition at the particular site is again conducted before the grant of mining lease.

Detail of the major Rivers flowing in the Kangra District with potential of their Catchment in respect to Mineral wealth.

Beas Khad Catchment:

The Beas is the principal river which receives almost the entire drainage of the district Kangra. The river rises from Pir –Panjal range near Rohtang pass at a height of about13,050 feet (4,350metres) from the mean sea level.

It has played a significant role in the development of peculiar hill culture which pervades the life of hill people living in the towns and surrounding villages since ages.

The key characteristic of the river and its major tributaries are described below in the Table-1, and 1(a).

Table -1.

Name of the Khad	Length (in km)	Catchment area	Average Width (in mtr)
Beas River	123 Km. (63 kms. before Pong dam, 26kms. within pong dam and 34 kmts below Pong dam)	89 Sq.Kmtrs.	300 mtr.
Origin of Beas River.	From, 636 Meter above Mean Sea Level at entry at Kangra 53 A/9.		
Important tributaries that directly drains in to Beas river: Uhl River(Right bank tributary), Binno Khad(Right bank tributary), Chanan Khad (Right bank tributary), Narad Khad(Right bank tributary),Ganunu Khad (Right bank tributary),Haroti Khad(Right bank tributary),Mandh Khad(Right bank tributary), Neugal Khad(Right bank tributary, Lohar Khad(Right bank tributary, Tall Khad (Right bank tributary), Jamna Khad(Right bank tributary),Kulhera Khad(Right bank tributary), Lohara Khad(Right bank tributary), Masihn Khad(Left bank tributary), Sard khad((Left bank tributary), Saloha khad(Right bank tributary), Kaloha khad(Left bank tributary), Baliana Khad(Left bank tributary), Nakehr khad(Right bank tributary), Nalsoha Khad(Left bank tributary), Bharwara(Left bank tributary), Thor khad(Left bank tributary), Tipri khad(Left bank tributary), Bargolalan Khad(Left bank tributary), Dada khad(Left bank tributary), Gurhala khad Left bank tributary), Buner khad(Right bank tributary), Minnu khad(Right bank tributary), Basika khad(Left bank tributary),Minnu Khad(Right bank tributary), Basika Nala(Leftt bank tributary),Gaj khad(Right bank tributary), Dehar khad(Right bank tributary), Buhl khad(Right bank tributary), Barla khad(Right bank tributary), Dailiwali khad(Right bank tributary), Mornika khad(Right bank tributary), Makor Nala(Left bank tributary), Ghamir khad(Leftt bank tributary), Kalm khad(Left bank tributary), Sohan Nadi(Left bank tributary),Jakhbari khad(Right bank tributary), Nagoe khad(Right bank tributary), Bhatoe di khad (Right bank tributary), Gandihiri di khad(Right bank tributary), Sanjuwan di khad(Right bank tributary), Kheran di khad(Right bank tributary), Paniala khad(Right bank tributary), Tara khad(Right bank tributary), Chaunchh khad(Right bank tributary),and Chakki khad(Right bank tributary)			
Catchment area.	89 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Beri Nichli, Maila, Harsi, Kathla,Khaleta, Thanpal, Jaisingpur, Bag-Kuljan, Lambagran, Kunjdwar, Kat-balla, Garh, Gahli, Alampur, Balh, Kharsal, Chaunki, Laungni, Balehu, Sanotu, Sahan, Dodru, Sarhun dhani, Dabar patta, Luthan, Bohl, Kurhu, Sanot khas,Dehra gopipur, Bari, Bhatoli, Kohli, Sothal, Rey, Bari , Kathgarh, Milwan etc.		
No. of leases or Concession given =18 Area of Khad =3690-00-00 Hect. Total leased out area = 133-03-72. Hect.			

Geological Conditions:

The Beas River flows through moderately steep to low flood plains and cut its course in Kangra district all along its length through Siwalik rocks comprising predominantly massive conglomerate, boulders, cobbles, river borne bajri, sand and clay deposits of channel alluvium.The river bed of Beas khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

This stream has developed a high flood plain at its confluence with Neugal Khad near Alampur and confluence of river Beas with Pong Dam. Total length of Beas River in District Kangra is approx.123 Kmtr. out of which approx. 26Kmtr of the channel lies within Pong Dam and approx. 34 Kmtr.of khad bed lies below the Pong Dam.The area of approx. 34Kmtr. that lies below the Pong Dam is roughly known as Mand area.

Total Potential of Beas River:

The Beas River cut its course through the boulder beds of Siwalik rocks and this formation is the prominent source of annual deposition in the river beds. During flood season, the water carries heavy sediment load comprising gravels and sand which are deposited in the bed of stream. Due to the erosion by the heavy flow during the monsoon season, the bed of Beas khad is replenished to a large extent from the Siwalik formation rocks. The following quantity of mineral potential has been calculated, based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre.

Photograph- *Showing Beas River channel near Dehra Gopipur*

Photographs Showing Beas River channel upstream to Riyali.

The following minimum mineral potential have been calculated in Beas River, based on the percentage of each mineral constituent like boulder, river borne bajri, sand upto a depth of only one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the average annual deposition of about 6 Cms. which however, may varies from, site to site and is calculated during the preparation of Mining Plan o the particular site. The total potential is given below

in the Table 1(a)

Table-1(a)

Name of River	Boulder	River borne Bajri	Sand	Minimum Mineral Potential (in Metric tonnes)
Beas River	1,17,85,500	1,57,14,000	1,17,85,500	3,92,85,000
Annual Replenishment				
	7,07130	9,42,840	7,07130	23,57,100

Recommendations:

It is evident from the above table that approximately 3, 92, 85,000 metric tones of different sizes of minor minerals are available upto depth of only one meter in the river bed of Beas river in Kangra District. Similarly, the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 23, 57,100 metric tones. It is further submitted that despite of annual replenishment in the Beas River only approx. 16, 69,001MT of mineral has been extracted/lifted during the previous period of Five Years. It is, therefore recommended that mineral concession can be granted in the river bed of Beas, from Beri-Nichli (636 Meter above Mean Sea Level at entry at Kangra Toposheet No. 53 A/9) up to confluence with Pong dam (Maharana Partap Sagar Reservoir) near Dehra Gopipur and thereafter from approx. 3 kilometers downstream from Pong reservoir i, e 3 Kmtr downstream from 52 Gate up to Kathgarh (confluence with Chaunch Khad) by keeping the safe distance from both the banks of Shah Nahar barrage. Rest of the area upstream to Beri-Nichli (636 Meter above Mean Sea Level at entry at Kangra Toposheet No. 53 A/9) and up to 3 Kmtrs downstream from 52 Gate may be declared as No mining Zone for the safety of the public utility structure and agriculture land adjoining the barrage.Though the mining leases already granted in this area, have not much impact on the mineral potential and may be renewed from time to time by keeping in view the site specific conditions, however, it has been observed that Beas river particulery downstream to 52 Gate, do not have a well defiend channel and flow as a braided stream, having multiple channels which take off and joins multiple times creating many low alluvial islands.Over a period of time the channels also become deeper and some older part of flood plains gets abundant creating older flood plains and terraces. As such, the deposition of the mineral is not confined only to active channel of the river but also along the terrace land in form of point bars. Therefore, the best way, in future, to lift such mineral from this area could be, by identification of large rectangular areas of atleast more then 15 Hect, preferably in the central part of the river and along the channel bars/point bars so developed. It is also mentioned that while making the final recommendations of this area in DSR, the observations of the committee of experts of State Expert Appraisal Committee (SEAC) constituted by the Director cum Member Secretary SEIAA, as per the directions of the Hon'ble High Court in CWP No. 2077/2017 titled as Amreek Singh Vs State of HP and others shall also be taken in to consideration that replenishment assessment report of Mand Area shall be prepared prior to allotment of more mining lease. That the authorities were directed to consider to restrict mining downstream of Shah Nagar Barrage (52 Gate) upto at least 3 Kms aerial distance declaring it as no mining zone for safety of the infrastructure and agricultural land adjoining the barrage on both sides of State of HP and Punjab. That mining activities were restricted in 2.5 Kms distance of upstream of four lanes, bridge and railway bridge has not been defined. That the border between the Himachal and Punjab shall be demarcated. These recommendations are further subject to the inspection of such identified large rectangular mining sites of more then 15 Hect by the committee constituted under the chairmanship of concerned Sub Disisional Officer (C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. and the decision to grant the mineral concession in the aforesaid recommended area shall only be taken by the respective Department after getting approved the detailed "Mining Plan" of the site specific area from

authorized officer of Geological Wing of the State Government.

Uhl Khad Catchment:

It is right bank tributary of the Beas river which rises from the North of the Dhauladhar range (4520 mtr.52D/16) in Himachal Pradesh. It flows for a considerable distance along the base of the Dhauladhar range and turns towards the South-East to merge with the Beas river near the town of Mandi (Ruleng). The key characteristic of the river and its major tributaries are described below in the Table-2, and 2(a)

Table-2.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Uhl-River:	26 Km.	389Sq.Kmtrs. (total)	50 mtr.
Origin of Uhl-River:	From, 4520 Meter above Mean Sea Level North of the Dhauladhar range (4520 mtr.52D/16).		
Important tributaries of the catchment.	Bakkarkyara Nala(Right bank tributary, Bhargu Nala (Left bank tributary) and Lambadug Nala (Left bank tributary)		
Catchment area.	389 Sq.Kmtrs (total)		
Important Villages near the bank.	From Origin to confluence: Kukargundha, Gundha, Baragaran, Sapotha, Kohar Khas, and Ruleng etc.		
No. of leases or Concession given =Nil. Total Area of Khad =130-00-00 Hect. Total leased out area =N.A.			

Geological Conditions:

The Uhl river flows from moderately steep to low hills through all its course. The rocks on both banks are represented by structural ridges and valleys with the rocks of Chamba formation comprising predominantly dark grey, carbonaceous thiny bedded Phyllites and slates with pebbly horizens at some places.

The river bed is also occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age at some places. During monsoon season the stream carries adequate sediment load and deposit it annually on the river bed.

Total Potential of Uhl Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table-2(a)

Table-2(a)

Name of River	Boulder	River borne Bajri	Sand	Total
Uhl Khad.	6,86,400	5,14,800	5,14,800	17,16,000
Annual Replenishment				
	13,7,28	10,296	10,296	34,320

Recommendations:

It is evident from the above table that about 17,16000metric tones of different sizes of minor minerals are available upto depths of one meter in the river bed of Uhl Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 34,320 metric tones. Since the annual deposition is very insignificant and stream width is narrow in major portion as such this stream is not fit for grant of mineral concession. It is therefore, recommended that no mineral concession may be accorded in this stream from origin up to Ruleng from where the boudry of District Mandi starts.

Binno (Binwa) Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Binwa is a perennial tributary of the Beas river originating from the Dhauladhar hills. The key characteristic of the river and its major tributaries are described below in the Table-3, and 3(a)

Table-3

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Binnu Khad	52Km.	376 Sq Kmtrs.	50 mtr.
Origin of Binnu Khad.	From Dhauladhar, 4298 Meter above Mean Sea Level, 52 D/12		
Important tributaries of the catchment.	Kakrela Khad(Right Bank Tributary), Parai khad(Right Bank Tributary), Nain Khad(Right Bank Tributary), Kharsa Khad(Right Bank Tributary),Luni Khad(Left Bank Tributary), Drug Khad(Right Bank Tributary), Sansal Khad(Left Bank Tributary), Bir Khad(Left Bank Tributary of Sansal Khad), Pun Khad(Right Bank Tributary),Awa Khad(Right Bank Tributary), Garanda Nala(Right Bank Tributary of Awa Khad), Salar Nala(Left Bank Tributary), Paprud Nala(Left Bank Tributary of Awa khad), Dholera Nala(Left Bank Tributary),Patech Nala(Left Bank Tributary of Awa khad), Mathan Nala (Right Bank Tributary) and Doewala Nala (Left Bank Tributary of Binu Khad).		
Catchment area.	376 Sq Kmtrs.total (including 60 Sq Kmtrs of Awa khad, 55 Sq Kmtrs of Luni Khad, 16 Sq Kmtrs of Bir and Sansal khad respectively, 30 Sq Kmtrs of Pun and Parai Khad respectively,14 Sq Kmtrs of Kakrela khad ,5 Sq Kmtrs of Doewala and Kharas Nala respectively ,8 Sq Kmtrs of Matan Nala, 7 Sq Kmtrs of Nain khad , 5 Sq Kmtrs of Drug Khad and 3 Sq Kmtrs of Paprud Nala , Dholera Nala,and Garanda Nala respectivally and 110 Sq Kmtrs of Binnu Khad.		
Important Villages near the bank.	From Origin to confluence: Dug Duhki, Ropa, Tars, Rakh, Harehe, Nagun Jhikli, Bhal, Nagan, Malghota, Kothi, Paprola, Baijnath, Khas Sagur, Chhahbain, Dohki, Barunh, kothi, Rakh, Kilhi, Kathak, Bahl, NagehrUparli, Rajol, Dhandol, Tain,Maila, Babal, Halon, Kolani, Gorat, Lahnga, Gaihr, Saperu, Richhiara,Gwal, Kand Bari, Holta, Kamlehr, Sornu, Nain, Jalrehr, Dharman, Odar, Sungal, Mat, Kot, Garh, Jandpur, Bhautni, Nagat, Bhuana, etc.		

No. of leases or Concession given =Nil
Area of Khad = 260-00-00 Hect.
Total leased out area =Nil

Geological Conditions:

The Binwa Khad flows through moderately low hills of the Himalayan foothills and mostly cut its course through the rocks of Dharamshala as well as Siwalik formation comprising predominantly of massive conglomerate, boulders, cobbles, river borne bajri, sand and clay deposits of channel alluvium and earthy buff and brown clay stone of Subathu formation.The river bed is also occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone at some places. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Binnu Khad.

On the basis of drainage analysis, No. of tributaries, average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 5 Cms.The total potential of the Binnu Khad is given below in the table

Table 3(a)

Name of River	Boulder	River borne Bajri	Sand	Total
Binnu Khad	15,44,400(45%)	12,01200(35%)	6,86,400	34,32,000
Annual Replenishment				
	77,220	600,60	34,3,20	1,71,600

Recommendations:

It is evident from the above table that about 34,32,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Binwa Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,71,600 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Binnu Khad from downstream of Nagun Jhikli up to Gadiara Buhla and from Nagehr Uparli up to Beri Nichli (Confluence with Beas Khad). However, no concession may be given from origin up to Nagun Jhikli and downstream Gadiara Buhla up to Nagehr Uparli .

Awa Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Awa Khad is a perennial right bank tributary of the Binnu khad originating from the Kand Bari PF, 4200 Meter above Mean Sea Level (53 D/12).

The key characteristic of the river and its major tributaries are described below in the Table-4, and 4(a)

Table-4

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Awa Khad	26Km.	60 Sq Kmtrs.	80 mtr
Origin of Awa Khad.	From the Kand Bari PF, 4200 Meter above Mean Sea Level (53 D/12)		
Important tributaries of the catchment.	Garanda Nala (Right bank tributary), Salar Nala (Left bank tributary), Paprud Nala (Right bank tributary), Patech Nala (Left bank tributary),Dholera Nala (Right bank tributary), Chanden Nala(Left bank tributary), and Kohar Nala(Right bank tributary).		
Catchment area.	60 Sq Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Kolani, Gorat, Lahnga, Gaihr, Saperu, Richhiara,Gwal, Kand Bari, Holta, Kamlehr, Sornu, Nain, Jalrehr, Dharman, Odar, Sungal, Mat, Kot, Garh, Jandpur, Bhautni, Nagat, Bhuana, Biara, Labo, Khudli, Rakkar, Rajot, Karaur, Non, Gagoti, Machhol, Tikri, and rakh.and Kilhi.		
No. of leases or Concession given = Nil Total Area of Khad = 208-00-00Hect Total leased out area = N.A.			

Geological Conditions:

The Awa Khad cut its course all along its length through Siwalik rocks comprising predominantly of massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Awa Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.
The total potential of the Awa Khad is given below in the Table -4(a)

Table -4(a)

Name of River	Boulder	River borne Bajri	Sand	Total
Awa Khad	11,23,200	8,42,400	8,42,400	28,08,000
Annual Replenishment.				
	33,696	25,272	25,272	84,240

Recommendations:

It is evident from the above table that about 28,08,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Awa Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 84,240 metric tones. It is therefore recommended that mineral can safely be allowed to lift from the river bed of Awa Khad from downstream of Mahal Holta up to Rakh (Confluence with Binu Khad, however no concession may be given from origin up to Mahal Holta for proper replenishment of the Awa Khad.

Haroti Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Haroti Khad is a perenial tributary of the Beas river originating from the Dhauladhar hills near Naun Forest. The key characteristic of the river and its major tributaries are described below in the Table-5, and 5(a)

Table-5.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Haroti Khad.	10Km.	53 Sq.Kmtrs.	85 mtr
Origin of Haroti Khad.	From Naun Forest,1090 Meter above Mean Sea Level, 53 A/9.		
Important tributaries of the catchment.	Dundi Khad(Left Bank Tributary of Haroti)		
Catchment area.	53 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Ropri, Dehru, Dugruhi, Umber, Baloh, Harot, Golehr, Bhati, Karahghat, Kamand, Tikri, Dabla, Jata pat, Durorha, Kotahan etc.		
No. of leases or Concession given =Nil Total Area of Khad =85-00-00 Hect. Total leased out area = 4-65-85 Hect.			

Geological Conditions:

The Haroti Khad flows through moderately steep to low hills and all along its length through foothills of Siwalik Himalayas comprising predominantly of massive conglomerates with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed where it enters from sand stone formation to flood plains, there is sudden increase in the width of the river bed.The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age.With the increase of width of bed, the competency and carrying capacity reduces considerably. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Haroti Khad:

On the basis of drainage analysis, No. of tributaries, average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 7 Cms.The total potential of the Haroti Khad is given below in the

Table -5 (a)

Name of River	Boulder	River borne Bajri	Sand	Total

Haroti Khad.	4,59,000	3,44,250	3,44,250	11,47,500
Annual Replenishment				
	32,1,30	24,097	24,097	80,325

Recommendations:

It is evident from the above table that about 11,47,500metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Haroti Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 80,325metric tones. As per the report of Mining Officer Kangra, only approx. 30,360 MT of mineral has been lifted from the khad bed during the period of previous 5 years as such, it is therefore recommended that the mineral concession can be granted in the river bed of Haroti Khad from downstream of Dugruhi up to confluence with the Beas river, however no concession may be given from origin to upstream of Dugruhi.

Mandh Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Mandh Khad is a perennial tributary of the Beas River originating from the Dhauladhar hills near Naun Forest. The key characteristic of the river and its major tributaries are described below in the Table-6, and 6(a).

Table- 6:-

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Mandh Khad.	30 Km.	133 Sq.Kmtrs.	95 mtr.
Origin of Mandh Khad.	From,1297 Meter above Mean Sea Level near Mahal Holta, 52 D/12.		
Important tributaries of the catchment.	Sukhad Khad(Left bank tributary), Sun Khad (Left bank tributary), Jangled Khad (Left bank tributary of Sukhad Khad)		
Catchment area.	133 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Mahal Holta, Pandtehr, Badehr, Chandropa, Rathan, Manjara, Kothi, Dattal, Topa, Andor, Badera,Sihoti, Balah, Chauthi band, Gadiyara, Balah, Salre, Doli, Bahedapat, Loharkar, Chhainchri, Lahat, Shivnager, Tharela, Chohla, Kotlu, Lahri, Siyara, Har, Jamula, Kut balla etc.		
No. of leases or Concession given =0 Total Area of Khad = 285-00-00 Hect. Total leased out area = N.A.			

Geological Conditions:

The Mandh Khad cut its course all along its length through Siwalik rocks comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries sediment load and deposit it annually on the river bed.

Photograh-3

Present Status of Mining:

The Govt.of Himachal Pradesh vide Notification No. Ind-II(E)2-1/2004 dated 28.06.2006 has imposed a complete ban on excavation, collection of sand, stone and bajri from the present course of Mandh khad from village Sihoti to village Siyara (Paplah Panchayat), on the basis of various complaints of the public in general as well as representation of the public local bodies. Thereafter, in compliance to the directions of Hon'ble High Court dated 30th April 2010, a Committee of Technical Officers was constituted on 29.11.2010 to visit and inspect the area of Mandh Khad and also to obtain the opinion of the public in general regarding release of ban imposed on Mandh khad. During the course of inspection and report of the technical Committee it was observed that 4 water supply schemes and 1 irrigation scheme existed along the bed of Mandh Khad between village Sihoti to Kotlu. From the then report it appeared that during public hearing concerened Gram Panchyats and Gram sabhas raised objections against mining activities in Mandh Khad and installation of stone crusher unit in the area. Reports also says that the replenishment of the sediments in between Sihoti to Siyara was very poor with regards to commercial exploitation of minor mineral and shall take few more years to make it available for future mining. However, during the recent visits of the area, adequate accumulation of minor mineral was seen observed at some strechs of the area due to recent rains and long-term ban on mining. This over accumulation of mineral especially from Sihoti to village Siyara is required to be removed after keeping the safe distance from the points of public utility structures. As such, if the joint inspection committee constituted for the purpose comprising, technical members from Irrigation and Public health department, recommend the area for grant of mining lease which has been prohibited for mining by the Govt through abovesaid Notification, in that case the mining may be allowed in the above area.

Total Potential of Mandh Khad.

On the basis of drainage analysis, No. of tributaries, average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 2 Cms.The total potential of the Mandh Khad is given below in the Table - 6(a).

Table - 6(a)

Name of River	Boulder	River borne Bajri	Sand	Total

Mandh Khad.	15,39,000	11,54,250	11,54,250	38,47,500
Annual Replenishment				
	23,085	30,780	23,085	76,950

Recommendations:

On the basis of various complaints of the public in general as well as representation of the public local bodies the Govt. of Himachal Pradesh vide Notification No. Ind-II(E)2-1/2004 dated 28.06.2006 has imposed a complete ban on excavation, collection of sand, stone and bajri from the present course of Mandh khad from village Sihoti to village Siyara (Paplah Panchayat).

However, during the recent visits of the area, huge accumulation of minor mineral was seen observed at some strechs of the Mandh Khad due to recent rains and long-term ban on mining. This over accumulation of mineral especially from Sihoti to village Siyara is required to be removed for the safety of the the points of public utility structures and to avoid disaster like situation in the downstream region. As such, if the joint inspection committee constituted for the purpose comprising, technical members from Irrigation and Public health department, recommend the area for grant of mining lease which has been prohibited for mining by the Govt through abovesaid Notification, in that case the mineral concession can be granted from Siyara to Sihoti in the Mandh Khad subject to removal of ban imposed vide Notification No. Ind-II(E)2-1/2004 dated 28.06.2006 and from downstream to Gandor up to the confluence with the Beas.

Neugal Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Neugal is a perenial tributary of the Beas river originating from the Dhauladhar hills. The key characteristic of the river is the heavy dependence on it for drinking water and irrigation. The main characteristic of the river and its major tributaries are described below in the Table-7 and 7(a) Table-7.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Neugal Khad.	53 Km	453 Sq Kmtrs.	182
Origin of Neugal Khad	From Dhauladhar, Near Riali Dhar, 4320 Meter above Mean Sea Level, 52 D/12		
Important tributaries of the catchment	Katora Nala(Right Bank Tributary), Obre Nala(Right Bank Tributary), Nair Nala (Right Bank Tributary),Khopa Nala(Right Bank Tributary), Bagh Nala(Left Bank Tributar), Sethu Nala(Right Bank Tributary), Raj Nala (Left Bank Tributary) Raj Nala(Left Bank Tributary) Lingti Khad(Right Bank Tributary), Girni Khad(Right Bank Tributary),Tahal Khad(Right Bank Tributary), Sun Khad(Left Bank Tributary),Sukhan Khad(Left Bank Tributary), Dhup Khad (Right Bank Tributary of Sukhan Khad), Janed Khad(Left Bank Tributary of Neugal Khad), and Maul Khad (Left Bank Tributary)		
Catchment area	453 Sq Kmtrs total		

Important Villages near the bank	From Origin to confluence: Darklu, Lanani, Surehr, Thala, Sukairi, Bhartarka, Kawat, Bandla, Khatena, Sughar, Dagehr, Bindraban, Chimal har, Bhagotla, Menjha uparla, Bhojal, Rai, Arath Jhikali, Ghasan, Pharehr, Machhlena, Kharot, Balla, Panapri Khas,Bhawarna Khas,Nanaun Khas,Pat ,Kuri,Rakkar, Seotu Uparla,Seotu Bhula, Bhalotah khas, Tamloh khas, ghumarnu, Jamhetar, Alampur etc.
No. of leases or Concession given =2 Total Area of Khad = 964-60-00 Total leased out area = 19-50-89 hect.	

Geological Conditions:

The Neugal Khad cut its course through Mandi Granite/Salkhala formation roughly from origin upto Thala and then all along its length through Siwalik rocks comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff/ brown clay stone aqnd schist with crystalline lime stone of Bhalai formation. The river bed is also occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Photograph showing confluence of Neugal Khad with Beas.

Photograph Showing Neugal Khad near Paror.

Total

Potential of Neugal Khad.

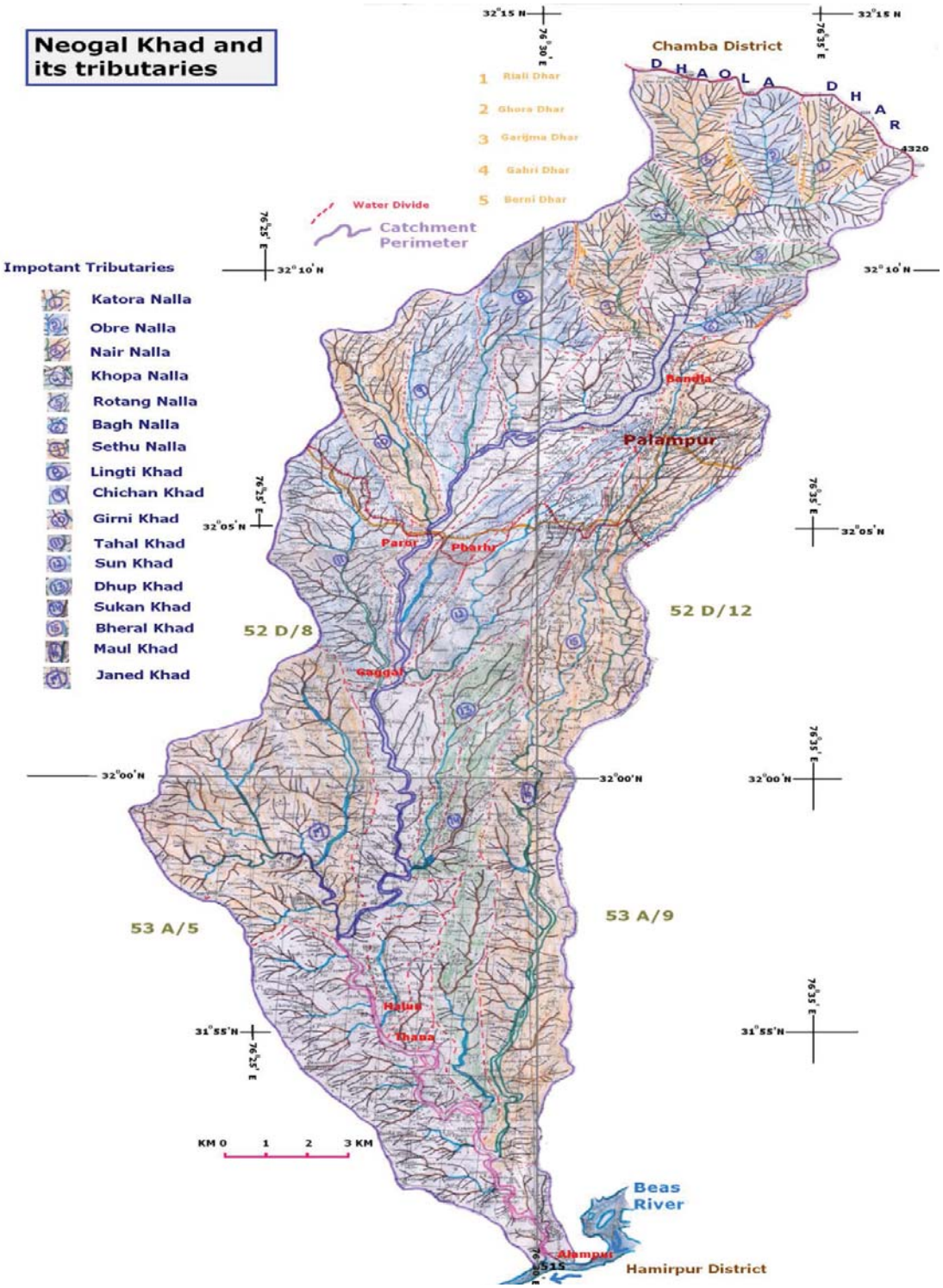
On the basis of drainage analysis, No. of tributaries, and average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 4 Cms .The total potential of the Neugal Khad is given below in the Table -7(a)
Table -7(a):

Name of River	Boulder	River borne Bajri	Sand	Total
Neugal Khad.	51,51,600	38,63,700	38,63,700	1,28,79,000
Annual Replenishment				
	2,06,064	1,54,548	1,54,548	5,15,160

Recommendations:

It is evident from the above table that about 1,28,79,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Neugal Khad in Kangra District. Similarly, the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 5, 15,160 metric tones. As per the information receieved from the Mining Officer Kangra only approx.1lakh MT of mineral has been lifted from thev Neugal Khad in previous period of 5 years, as such, mining may allowed in the river bed of Neugal Khad from Thala up to Alampur (confluence with the Beas river). This khad is the major source of building material of the area due to large catchment and favourable replenishment factor, there are great potential to allow lifting of material at number of points where river has shed its load and raised bed level resulting into diversion of flow. However, few concession could be given from origin up to Thala and from downstream of Seotu Buhla up to Bhalotah Khas.The river provides much favourable deposition conditions from Thural town down wards for granting mineral concessions and removel of the sediments periodicaly is essential in the intrest to keep natural course of river in its original position without any danger to the loss of property by keeping safe distance from water supply schemes.These mineral concessions shall also reduce demand load from other small tributaries and shall be help full to mininmise illegal extraction of minerals if legal source of raw material could be provided to meet out the demand which can not be ignored and if not provided shall result into illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology. The stream in this part of the bed has high banks and there is hardly any possibility of loss to the life and property if regular sustainable mining is allowed and periodical monitoring is done in this part of the Neugal bed.

Map-8, Showing Neugal Khad Catchment.



Tahal Khad:

Located in the Kangra Valley of Himachal Pradesh, Tahal Khad is a right bank tributary of the Neugal river originating from the Dhauladhar hills. The key characteristic of the river are described below in the Table-8 and 8(a):

Table-8.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Tahal Khad.	12 Km.	36 Sq.Kmtrs.	50 mtr.
Origin of Tahal Khad.	From, 1460 Meter above Mean Sea Level near Bandla forest. (52D/8).		
Point of Origin and Confluence with Neugal river.	From, 1460 Meter above Mean Sea Level and Confluence with Neugal river at 805 mtr.		
Catchment area.	36 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Ludharana, Mahadev, Pror khas, Thera, Tanda, Balla, Panapri khas, Kholi, Khas Gaggal.		
No. of leases or Concession given =Nil Total Area of Khad = 60-00-00 Hect. Total leased out area = Nil			

Geological Conditions:-

TheTahal Khad cut its course roughly all along its length through Siwalik rocks comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone.The area is represented by Himalayan foredeep zone and structural ridges and valleys.The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Tahal Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre .

The total potential of the Tahal Khad is given below in the Table -8(a):

Table -8(a):

Name of River	Boulder	River borne Bajri	Sand	Total
Tahal Khad.	3,24,000	2,43000	2,43000	8,10,000
Annual Replenishment.				
	16,200	12,1,50	12,1,50	40,500

Recommendations:

It is evident from the above table that about 8,10,000metric tones of different sizes of minor minerals

are available upto depth of one meter in the river bed of Tahal Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 40,500 metric tones. The stream width is narrow in major portion; At present no mineral concession has been granted in the river bed as such there is no productions of any minor mineral from this stream and in such a manner 40,500 metric tonne of mineral can safely be lifted from the river bed from downstream of Thira up to Panapari. However, mineral concession may not be accorded in this stream from its origin up to Dhira.

Sukhan Khad.

Located in the Kangra Valley of Himachal Pradesh, Sukan Khad is a left bank tributary of the Neugal river originating from the Dhauladhar hills. The key characteristic of the river are described below in the Table-9 and 9(a)

Table-9

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Sukhan Khad.	10 Km.	12 Sq.Kmtrs.	50 mtr.
Origin of Sukhan Khad.	From, 1040 Meter above Mean Sea Level (52D/8).		
Point of Origin and Confluence with Neugal river.	From, 1040 Meter above Mean Sea Level and Confluence with Neugal river at 714 mtr near Bheru.		
Catchment area.	12 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Bari, BanBhartlu, Chogan, Baskehr, Naura, Gadiara, Jalakh, Malehr, Devi and Bheru etc.		
No. of leases or Concession given =Nil Total Area of Khad = 50-00-00 Hect. Total leased out area = N.A.			

Total Potential of Sukhan Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre .The total potential of the Sukhan Khad is given below in the Table -9:

Table -9(a)

Name of River	Boulder	River borne Bajri	Sand	Total
Sukhan Khad.	2,70,000	2,02,500	2,02,500	6,75,000
Annual Replenishment.				
	10,800	8,100	8,100	27,000

Recommendations:

It is evident from the above table that about 6,75,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Sukhan Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 27,000 metric tones. The annual deposition is very insignificant i.e about 27,000MT; The stream width is narrow in major portion as such this stream is not fit for grant of fresh mineral concession. It is therefore recommended that no fresh mineral concession may be accorded in this stream from origin to confluence with Neugal river for proper replenishment of Neugal river.

21 Janed Khad:

Located in the Kangra Valley of Himachal Pradesh, Janed Khad is a left bank tributary of the Neugal river originating from 1010 Meter above Mean Sea Level (52D/8). The key characteristic of the river are described below in the Table-10 and 10(a).
Table-10.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Janed Khad.	12 Km.	24 Sq.Kmtrs.	100 mtr.
Origin of Janed Khad.	From, 1010 Meter above Mean Sea Level (52D/8).		
Point of Origin and Confluence with Neugal river.	From, 1010 Meter above Mean Sea Level and Confluence with Neugal river at 689 mtr near Purba.		
Catchment area.	24 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Kholi, Bharath, Thalehr, Dhalehra, Bhadrol, Lahar uperlla, Baloti, Dain, Dhedi, Barsola, Nawan uperla, Buhla Nawan, Kairban, Tibbi, Dhanimin, and Purba.		
No. of leases or Concession given =1 Total Area of Khad =120-00-00 Total leased out area = 08-92-02.			

Geological Conditions:-

The Upper Siwalik rocks are exposed in the catchment area of this stream comprising boulder, conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places.

Total Potential of Janed Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre.The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 6 Cms as given below in the Table -20(a)
Table -10(a)

Name of River	Boulder	River borne Bajri	Sand	Total

Janed Khad.	6,48,000	4,86,000	4,86,000	16,20,000
Annual Replenishment.				
	38,880	29,160	29,160	97,200

Recommendations:-

It is evident from the above table that about 16,20,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Janed Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 97,200metric tones. As per the information receieved from the Mining Officer Kangra only approx.95,000 MT of mineral has been lifted from thev Khad in previous period of 5 years, as such, Keeping in view the amount of minor mineral lying in the river bed, it is recommended that minor mineral such as sand stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from Dhalehra up to Purba, (Confluence with Neugal river). However no conession should be given from origin up to Dhalehra for proper replenishment of the Janed Khad.

Maul Khad:

Located in the Kangra Valley of Himachal Pradesh, Maul Khad is a left bank tributary of the Neugal river originating from 1460 Meter above Mean Sea Level near Bandla forest (52D/12).The key characteristic of the river are described below in the Table-11 and 11(a).

Table-11

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Maul Khad.	23 Km.	92 Sq.Kmtrs.	100 mtr.
Origin of Maul Khad.	From, 1460 Meter above Mean Sea Level near Bandla forest (52D/12).		
Point of Origin and Confluence with Neugal river.	From, 1460 Meter above Mean Sea Level and Confluence with Neugal river at 675 mtr near Balh Bhurian.		
Catchment area.	92 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Rajpura, Maletor, Dehan Khas, Nangnal, Daramman, Malnu, Mahlog, Uparelli, Dugni, Gadiyara, Bhauda, Sorn, Kharohal, Haula, Raura, Rahundhati, Sanba, Phagurata, Darir, Dhanun, Kotlu, Bandhukhas, Chuhla, Rirkal, Ghandera and Balhbhurian etc.		
No. of leases or Concession given =2. Total Area of Khad = 230-00-00. Total leased out area = 07-47-46.			

Geological Conditions:-

The Upper Siwalik rocks are exposed in the catchment area of this stream comprising boulder, conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places.

Total Potential of Maul Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre.
The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 5 Cms as given below in the Table -11(a):

Name of River	Boulder	River borne Bajri	Sand	Total
Maul Khad.	12,42,000	9,31,500	9,31,500	31,05,000
Annual Replenishment.				
	62,100	46,575	46,575	1,55,250

Recommendations:-

It is evident from the above table that about 31,05,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Maul Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,55,250metric tones. As per the information receieved from the Mining Officer Kangra only approx. 1.60 thousand MT of mineral has been lifted from the Khad in previous period of 5 years, as such, keeping in view the significant amount of minor mineral lying in the river bed, it is recommended that minor mineral such as sand stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from downstream of Malnu up to confluence with Neugal river. However, no conession should be given from origin upto Gadiyara.

Baliyana/NakkiKhad:

Located in the Kangra Valley of Himachal Pradesh, the Nakki Khad is a tributary of the Beas river/Pong Dam, originating from near Chunnu Hatta.The key characteristic of the river and its major tributaries are described below in the Table-12 and 12(a).

Table-12.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Baliyana/Nakki Khad.	11 Km.	24 Sq.Kmtrs.	250 mtr
Origin of Nakki Khad.	From, 820 Meter above Mean Sea Level near Chunnu Hatta, 53 A/1.		
Important tributaries of the catchment.	Sahri Khad (Right bank tributary of Nakki Khad)		
Catchment area.	24 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Lagthokran, Lagbadhron, Baliana, Dangra, Pragpur Mahon, Bat Rahala, Masot, and Chamba etc.		
No. of leases or Concession given =1 Total Area of Khad = 275-00-00 Hect Total leased out area = 13-37-86.			

Photograph -6. Showing Baliyana Khad.

Geological conditions-

The Nakki Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the potential source of river borne deposites in the stream bed. The stream bed is occupied with huge deposits of gravel and sand. Near the confluence with Beas river this stream has developed a vast flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited at this place forming vast flood plain.

Total Potential of Nakki/Baliyana Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-12(a)

Table-12(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Baliyana Khad	10,89,000	14,52,000	10,89,000	36,30,000
Annual Replenishment.				
	43,5,60	58,0,80	58,0,80	1,45200

Recommendations:

It is evident from the above table that about 36,30,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Baliyana Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,45200 metric tones. As per the information receieved from the Mining Officer Kangra only approx.25000 MT of mineral has been lifted from the Khad in previous period of 5 years, as such, keeping in view the significant amount of minor mineral lying in the river bed, it is recommended that minor mineral such as sand stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from downstream of Lagbadhron, up to confluence with the Beas River; however no conession should be given from origin up to Lag Thokran.

Nakehr Khad:

Located in the Kangra Valley of Himachal Pradesh, the Nakehr khad is a tributary of the Beas river/Pong Dam, originating from near Baniharkar.The key characteristic of the river and its major tributaries are described below in the Table-13 and 13(a).

Table-13

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Nakehr Khad	20Km.	172 Sq.Kmtrs.	200mtr
Origin of Nakehr Khad.	From, 920 Meter above Mean Sea Level near Baniharkar, (53 A/5)		
Important tributaries of the catchment.	Kher Nala (Right bank tributary of Nakehr Khad)		
Catchment area.	172 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Baniharkar, Saur Kalan, Dangehr, Soar, Saler, Thakurdwara, Jalandhar lahr, Khabli, Bhati, Narwari, Lahr, Dhawala, Thakurdwara, Kariara, Kurhu etc.		
No. of leases or Concession given =Nil Total Area of Khad =400-00-00 Hect. Total leased out area = N.A.			

Geological conditions-

The Nakehr Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the potential source of river borne deposites in the stream bed. The stream bed is occupied with huge deposits of gravel and sand. Near the confluence with Beas river this stream has developed a vast flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited at this place forming vast flood plain.

Total Potential of Nakehr Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre . The total potential is given below in the Table-13(a).

Table-13(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Nakehr Khad.	26,40,000	35,20,000	26,40,000	88,00000
Annual Replenishment.				
	79,200	10,56,00	79,200	2,64,000

Recommendations:

It is evident from the above table that about 88,00000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Nakher Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 2,64,000metric tones. Keeping in view the significant amount of minor mineral lying in the river bed, it is recommended that minor mineral such as sand stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from downstream of Thakurdwara up to Dhawala and from downstream to Dhawala up to confluence with Beas river near Kurhu, however no conession should be given from origin up to Thakurdwara.

Nalsoha Khad:

Located in the Kangra Valley of Himachal Pradesh, the Nalsoha Khad is a left bank tributary of the Beas river/Pong Dam, originating from 879 Meter above Mean Sea Level near Padiarli (53 A/1). The key characteristic of the river and its major tributaries are described below in the Table 14.
Table-14

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Nalsoha Khad.	10Km.	20 Sq.Kmtrs.	250 mtr
Origin of Nalsoha Khad.	From, 879 Meter above Mean Sea Level near Padiarli, 53 A/1.		
Important tributaries of the catchment.	Karoa Khad (Left bank tributary of Nalsoha Khad)		
Important Villages near the bank.	From Origin to confluence: Padiarli, Chanoti, Chamblet, Gandar, Mandwara, Prohara, Dhaliyara, Kariara.and Bhara etc.		
No. of leases or Concession given =2 Total Area of Khad – 250-00-00 Hect. Total leased out area = 09-67-23			

Geological conditions-

The Nalsoha Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the potential source of river borne deposites in the stream bed. The stream bed is occupied with huge deposits of gravel and sand. Near the confluence with Beas river this stream has developed a vast flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited at this place forming vast flood plain.

Photograph- 7, Showing Nalsoha Khad near Dhaliyara.

Total Potential of Nalsoha Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table-14.

Table-14(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Nalsoha Khad.	10,12,500.	13,50,000.	10,12,500.	33,75,000.
Annual Replenishment.				
	30,375.	40,500.	30,375.	1,01,250.

Recommendations:

It is evident from the above table that about 33,75,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Nalsoha Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,01,250 metric tones. As per the information receieved from the Mining Officer Kangra only approx.60, 000MT of mineral has been lifted from the Khad in previous period of 5 years, as such, keeping in view the significant amount of minor mineral lying in the river bed, it is recommended that minor mineral such as sand stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from downstream of Chamblet up to confluence with the Beas River.

Thor Khad:

Located in the Kangra Valley of Himachal Pradesh, theThor Khad is a tributary of the Beas river/Pong Dam, originating from near Nari.The key characteristic of the river and its major tributaries are described below in the Table- 15 and 15(a).

Table-15.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Thor Khad.	11Km.	28 Sq.Kmtrs.	250mtr
Origin of Thor Khad.	From, 965 Meter above Mean Sea Level near Nari, 53 A/1.		
Important tributaries of the catchment.	Suana di Khad (Left bank tributary of Thor Khad)		
Catchment area.	28 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Nari, Samnoli, Dhaonta Khurd, Karu, Tiamal, Thor, Kanrol, Badhai, Paniamal, Bari-Hatti, Jammal, Jammal Hatti etc.		
No. of leases or Concession given =Nil Total Area of Khad =275-00-00 Hect. Total leased out area = N.A.			

Geological Conditions:

The Thor stream bed is covered with boulders, cobbles, pebbles, river borne bajri, sand and clay deposits of channel alluvium.The catchment of Thor khad cut its course all along its length through Siwalik rocks comprising predominantly massive conglomerate with quartzite boulder, Sand, River borne bajri, minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Photograph -8, showing Thor khad.

Total Potential of Thor Khad.

On the basis of drainage analysis, No. of tributaries, average erosion in the river bed, the annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 4-5 Cms .The total potential of the Thor Khad is given below in the Table 25(a)

Table 15(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Thor Khad	10,89,000	14,52,000	10,89,000	36,30,000
Annual Replenishment				
	54,4,50	72,6,00	54,4,50	1,81,500

Recommendations:

It is evident from the above table that about 36,30,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Thor Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,81,500 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Thor Khad from downstream of Samnoli up to Confluence with Beas river. However no concession may be given from origin up to Sumnoli.

Chanaur/ Tipri Khad:

Located in the Kangra Valley of Himachal Pradesh, the Tipri khad is a tributary of the Beas river/Pong Dam, originating from near Bathu di Tippri.The key characteristic of the river and its major tributaries are described below in the Table-16 and 16(a).

Table-16

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)

Chanaur/ Tipri Khad	12Km.	26 Sq.Kmtrs.	250mtr
Origin of Chanaur/ Tipri Khad	From, 1020 Meter above Mean Sea Level near Bathu di Tippri., 53 A/1.		
Catchment area.	26 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Tipri, Amran, Khudiana, Thakurdwara, Chaplah, Balohal, Khanor ber, Jammal etc.		
No. of leases or Concession given =NIL Total Area of Khad = 300-00-00 Total leased out area = NIL			

Photograph- showing mineral in Tipri Khad.

Geological Conditions:

The Chanaur/ Tipri Khad cut its course all along its length through Siwalik rocks comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Chanaur/ Tipri Khad Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 16(a).

Table 16(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total

Chanaur/ Tipri Khad	11,88,000	15,84,000	11,88,000	39,60,000
Annual Replenishment				
	47,520	63,3,60	47,520	1,58,400

Recommendations:

It is evident from the above table that about 39,60,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Chanaur/ Tipri Khad in Kangra District. Similarly, the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,58,400 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Chanaur/ Tipri Khad from downstream of. Tipri Khas up to confluence with the Beas River. However, no concession may be given from origin up to Tipri Khas.

Dada Khad:

Located in the Kangra Valley of Himachal Pradesh, the Dada Khad is a Left bank tributary of the Beas river/Pong Dam, originating from near Bathu di Tippri.The key characteristic of the river and its major tributaries are described below in the Table-17.

Table-17.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Dada Khad	10 Km.	19 Sq.Kmtrs.	200 mtr
Origin of Dada Khad.	From, 1020 Meter above Mean Sea Level near Bathu di Tippri., 53 A/1.		
Catchment area.	26 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Aojeh, Mastial, Paplothar, Jalera, Dadjan, Batra, Padan, Lag, Sonata, Gurnoar, Batwar etc.		
No. of leases or Concession given =NIL Total Area of Khad = 200-00-00 Sq. Km total. Total leased out area = NIL			

Geological Conditions:

The Dada khad cut its course all along its length through Siwalik rocks comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Dada Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 17(a)

Table 17(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Dada Khad	11,88,000	15,84,000	11,88,000	39,60,000
Annual Replenishment				
	35,6,40	47,5,20	35,6,40	1,18,800

Recommendations:

It is evident from the above table that about 39,60,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Chanaur/ Tipri Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1, 18,400 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Dada Khad from downstream of Jalera up to confluence with the Beas River. However no concession may be given from origin up to Jalera.

Baner Khad:

Baner Khad is a tributary of the Beas river and drains the central part of the Kangra valley. The Baner Khad rises as a small snow fed channel on the Southern slopes of the Dhauladhar range near Palampur. The general direction of flow of the Baner river is towards South-West. Another detail regarding Baner Khad catchment which also includes Manuni Khad Catchment has also been described below in Table-18 and 18(a) respectively.

Table-18

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Baner River.	71Km.	827 Sq. Kmtrs.total	100 mtr
Origin of Baner Khad.	From Talang glacier, Near Supdhar Forest, 4440 Meter above Mean Sea Level, 52 D/12.		
Important tributaries of the catchment.	Iku Khad (Right Bank tributary), Jogal Khad (Left Bank tributary), Darun Khad (Right Bank), Sukhad Khad(Right Bank), Bathu Khad (Left Bank tributary), and Manuni Khad(Right Bank tributary).		
Catchment area.	111 Sq.Km (Baner)		
Important Villages near the bank.	From Origin to confluence: Kharti, Dadh, Ghartholi, Khas Sihund, Uprehr, Tharui, Nurah, Thanpuri,Tanda,Dehra Arla, Samloti,Sunehr, Mundla,Samela,Nandrul,Har,Chatra,Rasu, Dallipur, Tripal, Lunsu, Guler, Haripur, Dibber Rod, Bangoli, Bhatoli Phakorian e.t.c.		
No. of leases or Concession given =Nil Total Area of Khad = 710-00-00 Total leased out area = N.A			

Geological Conditions:

The Baner Khad flows through moderately low hills of the Himalayan foothills and mostly cut its course through the rocks of Siwalik formation.The catchment area is represented by admixture of boulders, cobbles, pebbles and Sand of flood plains.The banks are controlled by stable rocks.The river bed mainly contain the rocks comprising predominantly of massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Photograph - showing mineral potential of Baner Khad near Haripur.

Total Potential of Baner Khad:

During flood season, the water of Baner river carries heavy sediment load comprising gravels and sand which are deposited in the bed of stream. Due to the erosion by the heavy flow during the Monsoon season this bed of Baner khad is replenished to a large extent from the Siwalik formation rocks. The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.

The total potential is given below in the Table 18(a)

Table 18(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Baner Khad.	28,75,500	38,34,000	28,75,500	95,85,000
Annual Replenishment				
	86,265	1,15,020	86,265	2,87,550

Recommendations:

It is evident from the above table that about 95,85,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Baner Khad in Kangra District.

Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 2,87,550 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Baner Khad from Khas Sihund(Confluence with Iku Khad) to Dehra Arla (Confluence with Jogal Khad) and from down stream of Har (Confluence with Bathu Khad) up to Haripur, the Khad has attained remarkable width with huge accumulation of minor minerals and is recommended for concession. However, no concession may be given from origin up to Khas Sihund and from Dehra Arla up to Har.

Baner Khad Catchment:-

Name of the Khad.(Main tributaries)	Length (in km)	Catchment Area (in Sq.km)	Average Width (in mtr)
1. Iku Khad (Right Bank).	18	20	25
2. Jogal Khad (Left Bank) Jogal Khad Tributaries :- Sih Nala, Badrehr Nala, and Dibar Nala.	17 (including 3.9 Km of Sih Nala 1.4 of Badrehr Nala and 4.7 of Dibar Nala)	40.5 Sq Km (including 3.9 sq Km of Sih Nala , 1.9 Sq Km of Badrehr Nala , 5.7 Sq Km Dibar Nala)	100
3. Darun Khad (Right Bank)	19	35	50
4. Sukhad Khad(Right Bank)	06	09	50
5. Bathu Khad	27	65	80
6.Manuni Khad	30	159	75

Iku Khad: Right Bank tributary of Baner Khad.
Origin 4220 mtr. above mean sea level (52D/8)
Confluence with Beas river- 890 mtr above mean sea level.
Main tributaries Phaluni Nala (Left Bank Tributary).

Total Potential of Iku Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table 19.

Table 19.

Name of River	Boulder	River borne Bajri	Sand	Total
Iku Khad.	2,37,600	1,78,200	1,78,200	5,94,000
Annual Replenishment				
	4752	3564	3564	11,880

Geological Conditions:

The Upper Siwalik rocks are exposed in the catchment area of this stream comprising boulder,

conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places.

Recommendations:

It is evident from the above table that about 5, 94,000 MT of different size of minor minerals are available up to a depth of one meter. The annual deposition is about 11880 MT. However, the stream course is very narrow as such no mineral concession may be granted in this stream bed.

Jogal Khad:

Jogal Khad, originating from ,1135 Meter above Mean Sea Level, from Lahla RF is a left bank tributary of the Baner river and drains the central part of the Kangra valley. Another detail regarding Jogal Khad catchment has also been described below in Table-20 and 20(a) respectively.
Table -20.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Jogal Khad.	17 Km.	40Sq. Kmtrs.	100mtr
Origin of Jogal Khad.	Jogal Khad - 1135 Meter above Mean Sea Level, from Lahla RF. (52D/8)		
Important tributaries of the catchment.	Sih Nala(Left bank tributary), Badrehr Nala (Left bank tributary), Dibar Khad (Left bank tributary)		
Catchment area.	40 Sq.Km		
Important Villages near the bank.	From Origin to confluence: Dadh, Khatehr, Jugleta, Dhramgir, Sakrehr, Bhamnehr, Majhethi, Malan, Pankhar,Hatwas, Ambwari, Ghuneta, Tanda, Chamba, {Mansa, Gujhera, (Sih Nala catchment)}, Och, Gurbh, (Bhadrehr, Bhadrehr nala cactchment) Tanind, Mamta Khas, Kachhrehr, Samloti,Sunehr, Mundla { Masandkhar, Samloti, Nau Gaza, Kenth Lahr, Ustehr, Lili (Dibar Nala cathment)}Nehar Khola, Dehra Arla & Manda.		
No. of leases or Concession given =1 Total Area of Khad = 170-00-00 Total leased out area = 11-62-48Hect			

Geological Conditions:

The rocks of the Siwalik formation are exposed in the catchment area of this stream comprising boulder, conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places.

Total Potential of Jogal Khad Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre .. The total potential is given below in the Table 20(a).

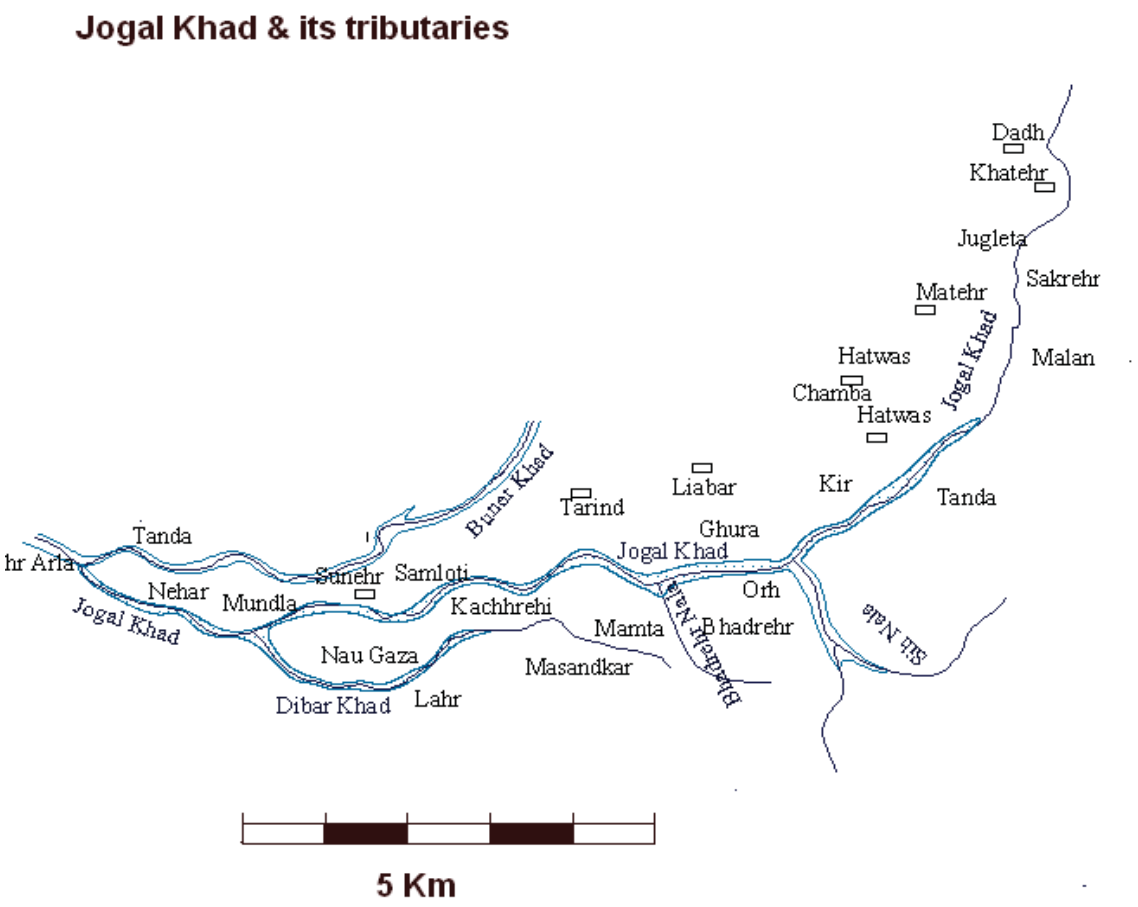
Table 20(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Jogal Khad	6,88,500	9,18,000	6,88,500	22,95,000
Annual Replenishment				
	27,540	36,720	27,540	91,800

Recommendations:

From origin up to Bhagotla Confluence of Sih Nala with Jogal Khad (856 Meter abve sea level) average width of the Khad is 25-50 mtrs and may not be recommended for any type of lease.However from downstream to Bhagtola (Confluence of Sih Nala with Jogal Khad) up to Dehar Arla the khad has attained the remarkable width with adequate accumulation of minor mineral deposits and is recommended for concession.

Map-2 Showing Jogal Khad Catchment



Darun Khad:	Right Bank tributary of Baner Khad.
Origin	2800mtr.above mean sea level.
Confluence with Baner river	708 mtr above mean sea level.
Main tributaries.	Nidal Khad (Left Bank Tributary).
Area of river bed	95-00-00
Concession given.	Nil.

Geological Conditions:

The Upper Siwalik rocks are exposed in the catchment area of this stream comprising boulder, conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places. The river bed is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone.

Total Potential of Darun Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table 21(a)

Table 21(a)

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Darun Khad.	5,01,600	3,76,200	3,76,200	12,54,000
Annual Replenishment				
	20,064	15,048	15,048	50,1,60

Recommendations:

It is evident from the above table that about 12,54,000MT of different size of minor minerals are available up to a depth of one meter. The annual deposition is about 50,1,60MT.Keeping in view the amount of minor mineral lying in the river bed, it is recommended that 50,1,60MT of minor mineral such as sand, stone and bajri can be allowed to be lifted from this river bed. It is therefore recommended that mineral concession can be accorded from downstream of Dhalun khas, up to Tanda Kholi for free sale/open sale/Collection of minor mineral; however no conession should be given from origin up to Dhalun khas for proper replenishment of river.

Bathu Khad:

Bathu Khad originating from, from Mansu PF, 1166 Meter above Mean Sea Level, drains the central part of the Kangra valley. Another detail regarding Bathu Khad catchment has also been described below in Table-22 and 22 (a) respectively.

Table 22

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Bathu Khad.	27 Km.	65 Sq. Kmtrs.	80mtr
Origin of Bathu Khad.	From Mansu PF, 1166 Meter above Mean Sea Level (52-D/8)		
Important tributaries of the catchment.	Jamula Khad(Right bank tributary), Oj Nala(Right bank tributary), Khawa Khad (Left bank tributary), Dargi Khad(Right bank tributary), Bari Khad(Right bank tributary), and Narehli Khad(Right bank tributary)		
Catchment area.	65 Sq.Km.		
Important Villages near the bank.	From Origin to confluence: Thakran, Lanjehr, Topehr, Gadiara, Barehr, Gadiara, Baggi, Chiran, Phala, Dhokar, Bhaterh, Saddun, Akrana, Gumehr, Dhasehr, Garhi,and Ranital Etc.		
No. of leases or Concession given =2 Total Area of Khad = 216-00-00. Total leased out area = 05-55-08 Hect			

Geological Conditions:

The Upper Siwalik rocks are exposed in the catchment area of this stream comprising boulder, conglomerate with thin lenses of sandstone and clays. The banks are formed of upper Siwalik rocks with deep valleys at some places. The river bed is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone.

Photograph-showing, Bathu khad near Jwalamukhi road.

Total Potential of Bathu Khad Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table 22(a)

Table 22(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Bathu Khad	8,74,800	11,66,400	8,74,800	29,16000
Annual Replenishment				
	34,992	46,656	34,992	1,16,6,40

Recommendations:

It is evident from the above table that about 29,16000MT of different size of minor minerals are available up to a depth of one meter. The annual deposition is about 1,16,640 MT. As per the information receieved from the Mining Officer Kangra approx. 50.000 MT Of minor mineral has been lifted from the khad bed in previous period of 5 years, as such, keeping in view the amount of minor mineral lying in the river bed, it is recommended that mineral concession can be accorded from downstream of Lanjehr up to Ranital (confluence with Buner Khad. However, no conession should be given from origin up to Lanjehr for proper replenishment of river.

Manuni Khad Catchment:

It rises from the Southern slopes of the Dhauladhar range and joins the river Baner and then river Beas.Huge river terraces occur on the both sides of the river bed, which are used for cultivation extensively.

Other detail of the Manuni river and its tributaries are as under in Table 23:
Table 23

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Manuni Khad(Right Bank)	30	75	75
Nod Khad (Right Bank)	8	9	25
Manjhi Khad (Right Bank)	19	55	50
Churan Khad(Right Bank)	15	25	50
Sarah Khad (Right Bank)	7	15	75
Bahl Khad (Right Bank)	8	10	80
Origin of Manuni Khad	From Dhauladhar, Near Naki, 3104 Meter above Mean Sea Level, 52 D/7.		
Length of Manuni Khad.	30 Km, Average Width-75 mtr.		
Catchment area	827 Km total of Baner Khad		
Important Villages near the bank,	From Origin to confluence: Cheka, Khas Khaniyara, Fatehpur, Bahgni, Sukar, Jhonkrehr,Taremlu, Mat, Masrehr, Mandal, Sunehr, Khopa,Khas Nodehr, ,Kangra, Nandrul,Zamanabad Khas,, Dadh, Ghartholi, Khas Sihund, Uprehr, Tharui, Nurah, Thanpuri,Tanda,Dehra Arla, Samloti,Sunehr, Mundla,Samela, Nandrul, etc.		
No. of leases or Concession given =Nil Total Area of Khad = 225-00-00 Hect. Total leased out area = Nil.			

Geological Conditions:

The Manuni Khad with all of its main tributries passes through Dharamshala formation as well as Siwalik rocks comprising predominantly massive conglomerate, Boulders, cobbles, river borne bajri, and sand and clay deposits of channel alluvium and earthy buff and brown clay stone of Subathu/Garh formation. The river bed of almost all the tributaries of Manuni khad are occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Manuni Khad:

Due to the erosion by the heavy flow during the Monsoon season this bed of Manuni khad is replenished to a large extent from the Siwalik and Dharamshala formation rocks. The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre .The total potential is given below in the Table 23(a)

Table 23(a)

Name of River	Boulder	River borne Bajri	Sand	Total
Manuni Khad	12,15,000	9,11,250	9,11,250	30,37,500
Annual Replenishment.				
	36,450	27,337	27,337	91,125

Recommendations:-

It is evident from the above table that about 30,37,500 metric tones of different sizes of minor minerals are available upto depths of one meter in the river bed of Manuni Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 91,125 metric tones. It is therefore recommended that 91,125metric tones of mineral can safely be allowed to be lifted from the river bed of Manuni Khad from downstream of Sukar up to Mehalu only for open/free sale/collection of minor mineral. However no concession may be given from origin up to Sukar for proper replenishment of the Manuni Khad.

Manjhi Khad: Right Bank tributary of Manuni Khad.
Origin 4220 mtr. above mean sea level.
Confluence with Manuni river- 629 mtr above mean sea level near Mehalu.
Main tributaries Bhawanda Nala (Right Bank Tributary), Churan Khad and Balh Khad.
Length of Manjhi Khad- 19 Kmtr.
Area of river bed. 95-00-00 Hect.
Area given for Concession 16-48-18 Hect. 1

Geological Conditions:

The Manjhi Khad passes through Dharamshala formation as well as Siwalik rocks comprising predominantly massive conglomerate, Boulders, cobbles, river borne bajri, and sand and clay deposits of channel alluvium and earthy buff and brown clay stone of Subathu formation. The river bed of Manjhi khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Manjhi Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitutuent like boulder, river borne bazri and sand upto a depth of one metre . The total potential is given below in the Table- 24

Table -24.

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Manjhi Khad.	5,13,000	3,84,750	3,84,750	12,82,500
Annual Replenishment				
	30,780	23085	23085	76,950

Recommendations

It is evident from the above table that about 12,82,500MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 76,950 MT. It is therefore recommended that mineral concession can be granted in the river bed of Manjhi Khad from Silha up to confluence with Manuni khad near Mehalu only for open/free sale/collection of minor mineral. However no concession may be given from origin up to Silha.

Churan Khad:

Churan Khad: Right Bank tributary of Manuni Khad.
Origin 1795 mtr. above mean sea level(52 D/8).
Confluence with Manjhi khad. 833 mtr above mean sea level near Banwala.
Length of Churan Khad- 15 Kmtr.
Area of river bed. 75-00-00 Hect.
Area given for concession Nil

Geological Conditions:

The Churan Khad passes through Dharamshala formation as well as Siwalik rocks comprising boulder, conglomerate with thin lenses of sandstone, clays, boulders, cobbles, river borne bajri, and brown clay stone. The river bed of Churan Khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Churan Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table -25.

Table -25

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Churan Khad.	4,05,000	3,03,750	3,03,750	10,12,500
Annual Replenishment				
	20,250	15,187	15,187	50,625

Recommendations

It is evident from the above table that about 10,12,500MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 50,625MT. It is therefore recommended that mineral concession can be granted in the river bed of Churan Khad from downstream of Jhikli Bhoral up to confluence with Manjhi Khad near Banwala only for open/free sale/collection of minor mineral.However no concession may be given from origin up to Jhikli Bharol.

22.6 Sarah Khad:

Sarah Khad: Right Bank tributary of Churan Khad.

Origin 1270 mtr. above mean sea level(52 D/8) From Sihnal PF

Confluence with Manjhi khad 805 mtr above mean sea level near Chetru.

Length of Sarah Khad- 7 Kmtr.

Area of Khad 52-50-00 Hect.

Geological Conditions:

The river bed of Sarah Khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone.The Sarah Khad passes through Dharamshala formation as well as Siwalik rocks comprising boulder, conglomerate with thin lenses of sandstone, clays, boulders, cobbles, river borne bajri, and brown clay stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Sarah Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 26

Table -26

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Sarah Khad.	2,83,500	2,12,625	2,12,625	7,08,750
Annual Replenishment				
	14,174	10,631	10,631	35,4,37

Recommendations

It is evident from the above table that about 7,087,50MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 35,437 MT.It is therefore recommended that mineral concession can be granted in the river bed of Sarah Khad from downstream of Panjlehr up to confluence with Bahl Khad near Keori only for open/free sale/collection of minor mineral wealth.However no concession may be given from origin up to Panjlehr.

Bahl Khad: Right Bank tributary of ManjhiKhad.

Origin 952 mtr. above mean sea level(52 D/8) From Sihnal PF

Confluence with Manjhi khad 764 mtr above mean sea level near Chetru.

Length of Bahl Khad- 8 Kmtr.

Area of Khad 64-00-00 Hect.

Area given for Concession. 1-85-38 Hect.

Concession given 1

Total Potential of Bahl Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constitute like boulder, river borne bazri and sand upto a depth of one metre . The total potential is given below in the Table -27

Table 27

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Bahl Khad.	3,45,600	2,59,200	2,59,200	8,64,000
Annual Replenishment				
	17,280	12,960	12,960	43,200

Recommendations

It is evident from the above table that about 8, 64,000MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 43,200MT.It is therefore recommended that mineral concession can be granted in the river bed of Bahl Khad from 3 km downstream of Sihnal Forest up to confluence with Sarah Khad near Keori only for open/free sale/collection of minor mineral wealth. However no concession may be given from origin up to Panjlehr.

Gaj Khad Catchment:

It rises as a small stream from the snows on the Southern slopes of the Dhauladhar range Near Jalehr Got, 4020 Meter above Mean Sea Level, 52 D/7. The Gaj river joins the Beas river a little upstream of the Pong dam lake (now known as Maharana Pratap Sagar).Other detail of the river and its main tributaries are as under: Table 38 and 38(a)

Table -28.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Gaj Khad	54	331Sq.Km	150 mtr.
Origin of Gaj Khad	From Dhauladhar, Near Jalehr Got , 4020 Meter above Mean Sea Level, 52 D/7		
Length of River	54 Km.		
Catchment area	76 Sq.Km (331 Km total)		
Important tributaries of the catchment.	Banol Khad (Left Bank), Chambi Khad(Right Bank), Khauli Khad(Right Bank), Lapiana Khad(Right Bank), Leond Nala (Right Bank), Bhated Khad (Left Bank). Gajue Khad (Left Bank).		
Important Villages near the bank	From Origin to confluence: Badhun, Rawa, Kreri, Balreh, Jamli, Bhataun, Kut, Bhitla, Kotla, Miniana, Diara, Har, Chari, Barini, Ansohi, Bhoj, Rajol, Parhiara, Tremla, Makroti, Balla,Tatwani, Salwana, Tatwani, Langhena, Mawa, Samelta, Bandrela, Bat Balla, Pher, Jol, Naushahra, Daman, Kaltru, Siphon, Speli, Jaslahr, Jarpal.		
No. of leases or Concession given = 5 Total Area of Khad =810-00-00 Hect. Total leased out area = 21-98-47 Hect.			

Geological Conditions:

The Gaj Khad cut its course through Siwalik formation roughly all along its length comprising predominantly massive conglomerate with red and orange clay as matrix and minor sandstone and earthy buff and brown clay stone. The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed. This stream has developed a high flood plain near the confluence of river Dehar as during flood season the velocity of this stream is checked by the water of Dehar river and most of sediment load is deposited at the confluence point.

Total Potential of Gaj River.

The Gaj Khad cut its course through the boulder beds of upper Siwalik rocks and this formation is the prominent source of annual deposition in the river beds. During flood season, the water carries heavy sediment load comprising gravels and sand which are deposited in the bed of stream.

Photograph, - Showing Gaj Khad near Nagrota Surian.

The following mineral potentials have been calculated based on the %age of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 5 Cms. As seen in photographs the banks comprise of boulder beds are steep and stable in nature.

The total potential and annual replenishment is given below in the Table-38

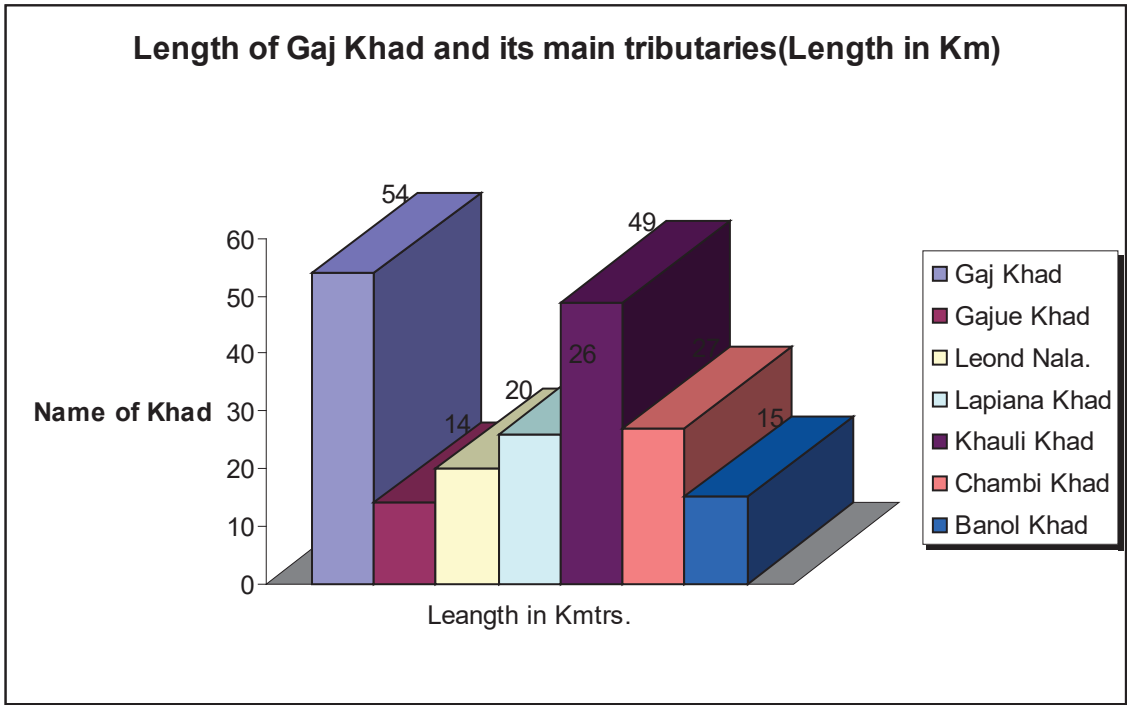
Table-28(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand	Total
Gaj River	32,07,600	42,76,800	32,07,600	1,06,92000
Annual Replenishment				
	2,13,840	1,60,380	1,60,380	5,34,600

Recommendations:

It is evident from the above table that about 1,06,92000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Gaj Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 5, 34,600metric tones. As per the information receieved from the Mining Officer Kangra approx. 2, 75,000 MT of minor mineral has been lifted from the khad bed in previous period of 5 years, as such, It is therefore recommended that mineral concession can be granted in the river bed of Gaj Khad, from Anoshi up to confluence with Beas river, However no concession may be given from origin up to upstream of Anoshi for proper replenishment of the Khad.

Map-9, Showing GaJ Khad Catchment:-



Graph Showing Length of main tributaries of Gaj Khad Catchment

It rises as a small stream from the snows on the Southern slopes of the Dhauladhar range Near Triund, 1964 Meter above Mean Sea Level, 52 D/7. TheBanol Khad joins the Gaj river a little upstream of the Kuthman.

Banol Khad Left Bank tributary of Gaj Khad.
Length 15 Kmtr.
Catchment Area (in Sq.km) 31 Sq.kmtr.
Area given for Concession: Nil
Average Width (in mtr.) 100 mtr.
Origin 1964 mtr. above mean sea level near Triund.
Confluence with Gaj Khad. 772 mtr above mean sea level near Kuthman.
Important Villages near the bank Part of Dharamsala, Kajlot, Chachrot, Dhar, Sadhed, Dungla, Garoh, Bangrehr, Odar, Sawala, Kaliara, Ghartehr, Bandi
Total Potential of Banol Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 29.

Table -29

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Banol Khad	8,10,000	6,07,500	6,07,500	20,25,000
Annual Replenishment				
	24,300	18,225	18,225	60,750

Geological Conditions:

The river bed of Banol Khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone.The Banol Khad passes through Dharamshala formation as well as through Siwalik rocks comprising boulder, conglomerate with thin lenses of sandstone, clays, boulders, cobbles, river borne bajri, and brown clay stone. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Recommendations

It is evident from the above table that about 20, 25,000MT of different size of minor minerals are available up to a depth of one meter. The annual deposition is about 60,750 MT. It is therefore recommended that mineral concession can be granted in the river bed of Banol Khad from downstream of Garoh Khas up to confluence with Gaj Khad near Kuthman only for open/free sale/collection of minor mineral. However no concession may be given from origin up to Garoh Khas.

Chambi Khad:

It rises as a small stream from the snows on the Southern slopes of the Dhauladhar range Near Chakban Chari Forest, 1600 Meter above Mean Sea Level, 52 D/7. The Chambi Khad joins the Gaj river near Makroti.

Chambi Khad Right bank tributary of Gaj Khad.
Length. 27 Kmtr.
Catchment Area (in Sq.km) 37 Sq.kmtr.
Area given for Concession Nil
Average Width (in mtr.) 125 mtr.
Origin 1600 mtr. above mean sea level from near Chakban Chari Forest
Confluence with Gaj Khad. 772 mtr above mean sea level near Makroti.
Important Villages near the bank Uni, Tharot, Gilar Bhera, Tundu, Dudhama, Dagrela, Suri, Dhanotu, Rait, Ladwara, Gagal, and Makroti etc.

Geological Conditions:

The Chambi Khad passes through Dharamshala formation as well as Siwalik rocks comprising boulder, conglomerate with thin lenses of sandstone, clays, boulders, cobbles, river borne bajri, and brown clay stone. The river bed of Chambi Khad is occupied with recent deposits comprising predominantly of quartzite boulders, Sand and river borne bajri of Sand stone. During monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Chambi Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table -30

Table 30

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Chambi Khad	18,22,500	13,66,875	13,66,875	45,56,250
Annual Replenishment				

	54,674	41,006	41,006	1,36,687

Photograph-
Showing Chambi Khad near Shahpur bridge.

Recommendations
It is evident from the above table and photograph that about 45,56,250 MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 1,36,687 MT. It is therefore recommended that mineral concession can be granted in the river bed of Chambi Khad from downstream of Dudhamb up to confluence with Gaj Khad near Makroti only for open/free sale/collection of minor mineral. However, no concession may be given from origin up to Dudhamb for proper replenishment of the khad.

Khauli Khad:

Khauli Khad is a perenial tributary of the Gaj River originating from the snows on the slopes of the Drinidhar range 3860 Meter above mean Sea Level, 52 D /7. The Khauli Khad joins the Gaj river near Balla.

Khauli Khad	Right bank tributary of Gaj Khad.
Length	49 Kmtr.
Catchment Area (in Sq.km)	82 Sq.kmtr.
Area given for concession	04-80-23 Hact.
Average Width (in mtr.)	50 mtr.
Origin	3860 mtr. above mean sea level from near Drinidhar.
Confluence with Gaj Khad.	547 mtr. above mean sea level near Ballla.
Important Villages near the bank	Duli, Boru, Tahal, Bhoara, Manjhar, Parsel, Prai, Sadaun, Kurela, Yol, Khabbal, Sahapur etc.

Geological conditions:

The Khauli Khad passes through Dharamshala formation as well as Siwalik rocks comprising boulder, conglomerate with thin lenses of sandstone, clays, boulders, cobbles, river borne bajri, and brown clay stone.

Total Potential of Khauli Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 31

Table 31

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Khauli Khad	13,23,000	99,22,50	99,22,50	33,07,500
Annual Replenishment				
	39,6,90	29,767	29,767	99,225

Recommendations:

It is evident from the above table that about 33,07,500MT of different size of minor minerals are available up to a depth of one meter.The annual deposition is about 99,225 MT.It is therefore recommended that mineral concession can be granted in the river bed of Khauli Khad from downstream of Bhohara up to Karela and from 2 kmtrs upstream of Khabbal up to confluence with Gaj Khad near Balla only for open/free sale/collection of minor mineral.However no concession may be given from origin up to Bhohara and downstream to Karela up to Khabbal for proper replenishment of the khad.

Lapiana Khad:

Lapiana Khad is a perenial right bank tributary of the Gaj River originating from 800 Meter above mean Sea Level near Chamdera, 52 D/4. The Lapiana Khad joins the Gaj river near Bhanjar.

Lapiana Khad Right bank tributary of Gaj Khad.
Length 26 Kmtr.
Catchment Area (in Sq.km) 55 Sq.kmtr.
Area given for concession Nil
Average Width (in mtr.) 50 mtr.
Origin 800 mtr. above mean sea level from near Chamdera.
Confluence with Gaj Khad. 460 mtr. above mean sea level near Bhanjar.
Important Villages near the bank Bhanjar, Chamdera, Meher, Chalian, Bansuwa, Bhalwan, Sihoga, Apiana, Thehr, Makrer, Gubhar etc.

Total Potential of Lapiana Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table-32.

Table 32.

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Lapiana Khad.	7,02000	5,26,500	5,26,500	17,55,000
Annual Replenishment.				
	14,0,40	10,530	10,530	35,100

Recommendations:

It is evident from above table that about 17,55,000 MT of minor mineral are available up to a depth of

1m.The annual deposition is very insignificant i.e about 35,100 MT, and the stream width is narrow in major portion as such this stream is not fit for grant of mineral concession. It is therefore recommended that no mineral concession may be accorded in this stream from origin to confluence with Gaj river.

Leond Nala:

Leond Nala is a perenial right bank tributary of the Gaj River originating from Dhauladhar range (Kareri Lake) Near 4020 Meter above mean Sea Level (52 D/7). The Leond Khad joins the Gaj river near Jamli.

Leond Khad Right bank tributary of Gaj Khad.

Length 20 Kmtr.
Catchment Area (in Sq.km) 17 Sq.kmtr.
Area given for concession Nil
Average Width (in mtr.) 25 mtr.
Origin 4020 mtr. above mean sea level from near
Confluence with Gaj Khad. 1220 mtr. above mean sea level near Jamli.
Important Villages near the bank :Nauh, Kareri, Nara, Dhumlar etc.
Total Potential of Leond Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the Table 33

Table -33

Name of River	Boulder (40%)	River borne Bajri (30%)	Sand (30%)	Total
Leond Khad	2,70,000	2,02,5,00	2,02,5,00	6,75,000
Annual Replenishment				
	8,100	6,075	6,075	20,250

Recommendations:

It is evident from above table that about 6,75,000MT of minor mineral are available up to a depth of 1m.The annual deposition is very insignificant i.e about 20250MT, The stream width is narrow in major portion as such this stream is not fit for grant of mineral concession. It is therefore recommended that no mineral concession may be accorded in this stream from origin to confluence with Gaj river.Similarly Gajeu khad (14L*25B) and Bhated Khad (17L*25B) which are also the left bank tributaries of Gaj Khad, with catchment area of 18 and 15 Sq.Kmtr respectivally have very narrow width and therefore may not be accorded for mineral concession.

Dehar Khad Catchment:

Located in the Kangra Valley of Himachal Pradesh, the Dehar Khad is a perenial tributary of the Beas river originating from near Pirigarh. The key characteristic of the river and its major tributaries are described below in the Table-34, and 34(a).

Table-34

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Dehar Khad.	24 Km.	239 Sq.Kmtrs.	350 mtr.

Origin of Dehar Khad.	From, 1324 Meter above Mean Sea Level near Pirigarh, 52 D/3.
Important tributaries of the catchment.	Bhed Khad(Left bank tributary),Brahi Khad (Left bank tributary), Dhramman Khad(Left bank tributary of Brahi Khad), Chho Khad(Right bank tributary), and Kibber Khad(Left bank tributary)
Catchment area.	239 Sq.Kmtrs.total
Important Villages near the bank.	From Origin to confluence: Harathi, Mankot, Sujanta, Dhumin, Khairna, Latehr, Kotla, Changleta, Bagga, Anuhi, Dhaddi, Kerta, Kalaun, Bhangoi, Dhiala, Hariyan, Lakhneu, Bagrur, Bhalwa, Ahar, Jwali, Saner, Thagor, Hawai, Harsar etc.
No. of leases or Concession given =8 Total Area of Khad = 840-00-00 Hect. Total leased out area = 61-78-22	

Geological Conditions:

The Dehar Khad cut its course all along its length through the rocks of Siwalik formation. The Siwalik Group comprises of sandstone, siltstone and clay/claystone alternations in the lower part, whereas the upper part is represented by conglomerates, pebbly bands and sandstone lenses, ranging in age from Middle Miocene to Lower Pleistocene.The river bed is occupied with recent deposits of minor minerals comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. These sediments are deposited in the shape of channel bars, piedmont bars, flood plains and alluvial fan deposits.The Alluvium consists of loose sand, silt, clay, pebble, gravel, boulder and kankar. It unconformably overlies different formations in different areas. During monsoon season the stream carries heavy sediment load and deposit it annually on the river bed. This stream has developed a high flood plain near the confluence of river Gaj as during flood season the velocity of this stream is checked by the water of Gaj river and most of the sediment load is deposited at the confluence point.

Photograph –Showing potential of Dehar Khad.

Total Potential of Dehar River.

The following mineral potentials have been calculated based on the %age of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 5 Cms. As seen in photographs the banks comprise of boulder beds are steep and stable in nature.

The total potential and annual replenishment is given below in the Table-12(a)
Table-34(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand	Total
Dehar River	34,02,000	45,36,000	34,02,000	1,13,40,000
Annual Replenishment.				
	1,70,100	22,68,00	1,70,100	5,67,000

Recommendations:

It is evident from the above table that about 1,13,40,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Dehar Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 5,67,000 metric tones. As per the information receieved from the Mining Officer Nurpur, approx. 3lakh MT of minor mineral has been lifted from the khad bed in previous period of 5 years, as such, tt is therefore recommended that mineral concession can be granted in the river bed of Dehar Khad, from downstream of Latehr up to confluence with the Gaj River. However, no concession may be given from origin up to Latehr for proper replenishment of the Khad.

Bhed Khad.

Bhed Khad is a perenial left bank tributary of the Dehar Khad originating from Near 560 Meter above mean Sea Level (52 D/3) at entry at District Kangra.The Bhed Khad joins theDehar Khad near Kotla. The key characteristic of the river and its major tributaries are described below in the Table-35.

Table-35.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Bhed Khad.	4 Km.	8.0 Sq.Kmtrs.	100 mtr.
Origin/Entry of Bhed Khad in kangra.	At 560 Meter above Mean Sea Level, 52 D/3.		
Catchment area	8.0 Sq.Kmtrs.total		
Important Villages near the bank.	From Origin to confluence: Badehr, Bhlun, Solda and Balah, Kotla etc.		
No. of leases or Concession given =Nil Total Area of Khad = 40-00-00. Total leased out area = Nil.			

Total Potential of Bhed Khad:

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre. The total potential is given below in the

Table 35(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Bhed Khad.	1,62,000	2,16,000	1,62,000	5,40,000
Annual Replenishment.				
	8100	10,800	8100	27,000

Recommendations:

It is evident from the above table that about 5,40,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Bhed Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 27,000 metric tones. Since the annual deposition is very insignificant and stream width is narrow in major portion as such this stream is not fit for grant of mineral concession. It is therefore recommended that no mineral concession may be accorded in this stream bed for proper replenishment of Dehar Khad.

Bhul Khad:

Located in the Kangra Valley of Himachal Pradesh, the Bhul Khad is a perenial right bank tributary of the Beas River originating (Entry at Kangra) from 605 Meter above Mean Sea Level near Minjgran, 43 P/16. The key characteristic of the river and its tributaries are as under:

Table-36

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Bhul Khad.	15 Km.	171 Sq.Kmtrs.	220 mtr.
Origin of Bhul Khad.	From, 605 Meter above Mean Sea Level near Minjgran, 43 P/16.		
Important tributaries of the catchment.	Damini di Khad(Left bank tributary), Chachinyan di Khad(Left bank tributary), Kau Nala(Left bank tributary), Bhugun Nala(Left bank tributary), Manjui di Khad(Right bank tributary), Parauli di khad(Right bank tributary),Hawri di khad(Right bank tributary), Bagroli di Khad(Right bank tributary), Fatehpur di khad(Right bank tributary), and Janate di khad(Right bank tributary).		
Catchment area.	171Sq.Kmtrs.		

Important Villages near the bank.	From Origin to confluence: Basa, Bilari, Banoli, Dhar-Munda, Narial, Bhul, Harnota, Sidhpur, Sibbo-da-Than, Bharmar, Baswara, Maira, Sahaura, Gurah, Jaisar, Kharar, Kuthera, Bhagglahar, Koti, Rajpura, Bhariaryan and Anur etc.
No. of leases or Concession given =1 Total Area of Khad = 330-00-00 Total leased out area =2-22-16	

Geological Conditions:

The Bhul Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed. This stream has developed a high flood plain near the confluence with river Gaj as during flood season the velocity of this stream is checked by the water of Gaj/Dehar river and most of sediment load is deposited near the confluence point.

Photograph, showing Bhul Khad.

Total Potential of Bhul Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-47(a)

Table-36(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Bhul Khad.	13,36,500	17,82,000	13,36,500	44,55,000
Annual Replenishment.				
	40,095	53,460	40,095	1,33,6,50

Recommendations:

It is evident from the above table that about 44,55,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Bhul Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,33,6,50 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Bhul Khad, from Upstream of Harnota up to confluence with the Beas Khad, as the Khad has attained remarkable width with significant accumulation of minor minerals and is recommended for concession.

Manjuhi di Khad:

Manjuhi di Khad is a right bank tributary of the Bhul Khad originating (Entry at Kangra) from 565 Meter above Mean Sea Level near Batrahn, (43 P/16). The key characteristic of the river and its tributaries are as under in table 37 and 37(a).

Table-37

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Manjuhi di Khad.	9 Km.	18 Sq.Kmtrs.	200 mtr.
Origin of Manjuhi di Khad Khad.	From, 565 Meter above Mean Sea Level near Batrahn, 43 P/16.		
Important tributaries of the catchment.	Dhial ka Nala (Left bank tributary, Rehan Nala(Right bank tributary.		
Catchment area.	18 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Batrahn, Sakoh, Suthehra, Padher, Bhagwal, Mungtihal, Paplah, and Patta etc.		
No. of leases or Concession given =Nil Total Area of Khad = 180-00-00 Hect. Total leased out area = Nil			

Geological Conditions:

The Manjuhi di Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Manjuhi di Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the table 37(a)

Table-37(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Manjuhi di Khad	7,29,000	9,72,000	7,29,000	24,30,000
Annual Replenishment.				
	29,160	38,880	29,160	97,200

Recommendations:

It is evident from the above table that about 44,55,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Manjuhi di Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 97,200metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Manjuhi di Khad, from Upstream of Bhagwal (confluence of Manjuhi di khad with Rehan Nala

and Dhial khad) up to confluence with the Bhul river, as the Khad has attained remarkable width with significant accumulation of minor minerals and is recommended for concession.However, no concession should be given from origin up to Bhagwal.

Hawri di Khad:

Located in the Kangra Valley of Himachal Pradesh, the Hawri di Khad is a right bank tributary of the Bhul Khad originating (Entry at Kangra) from 610 Meter above Mean Sea Level near Gangoli (43 P/16). The key characteristic of the river and its tributaries are as under:

Table-38.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Hawri di Khad.	9 Km.	10 Sq.Kmtrs.	100 mtr.
Origin of Hawri di Khad.	From, 610 Meter above Mean Sea Level near Gangoli (43 P/16).		
Catchment area.	10 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Gubar, Mar, Sanaurth, Barot, Bari-Talab, Moch, and Palli etc.		
No. of leases or Concession given =Nil Total Area of Khad = 90-00-00 Hect. Total leased out area = Nil			

Geological Conditions:

The Hawri di Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Photograph -15, showing mineral potential of Hawri Khad.

Total Potential of Hawri Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-38(a)

Table-38(a).

Name of River	Boulder	River borne Bajri	Sand	Total
Hawri di Khad.	3,56,400	4,75,200	3,56,400	11,88,000
Annual Replenishment.				
	17,8,20	23,7,60	17,8,20	59,400

Recommendations:

It is evident from the above table that about 11,88,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Hawri di Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 59,400metric tones. It is, therefore recommended that mineral concession can be granted in the river bed of Hawri di Khad, from downstream of Sanaurth, up to confluence with the Bhul river, as the Khad has attained remarkable width with significant accumulation of minor minerals and is recommended for concession.However no concession should be given from origin up to Gubar.

Sohan Khad:

The Sohan Khad is a left bank tributary of the Beas River originating (Entry at Kangra) from 488 Meter above Mean Sea Level near Sansarpur (44 M/13). The key characteristic of the river its tributaries are as under in table -39.

Table- 39

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Sohan Khad.	13 Km.	43 Sq.Kmtrs.	300 mtr.

Origin of Sohan di Khad.	From, 488 Meter above Mean Sea Level (Entry at Kangra) 44 M/13.
Important tributaries of the catchment.	Roli Khad (Right bank tributary of Sohan Nadi), Ghangret ki khad (Right bank tributary of Sohan Nadi), Kotla khad (Right bank tributary of Sohan Nadi).
Catchment area.	43 Sq.Kmtrs.
Important Villages near the bank.	From Origin to confluence: Sansarpur, Bhambhotar, Reri, Kuthera, Duhlal, Mahala, Gummi, Pragpur, Maira, Chak Alera, Amroh, and etc.
No. of leases or Concession given =1 Total Area of Khad = 390-00-00 Hect. Total leased out area =14-24-98	

Geological Conditions:

The river bed is occupied with recent deposits of minor minerals comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. These sediments are deposited in the shape of channel bars, piedmont bars, flood plains and alluvial fan deposits.The Alluvium consists of loose sand, silt, clay, pebble, gravel, boulder and kankar. It unconformably overlies different formations in different areas. During monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.The Sohan Khad cut its course all along its length through the rocks of Siwalik formation.The Siwalik Group comprises of sandstone, siltstone and clay/claystone alternations in the lower part, whereas the upper part is represented by conglomerates, pebbly bands and sandstone lenses, ranging in age from Middle Miocene to Lower Pleistocene. During flood season the velocity of this stream is checked by the water of Beas river and most of the sediment load is deposited near the confluence point.

Total Potential of Sohan Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-50(a)
Table- 39(a).

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Sohan Khad	15,79,500	21,06,000	15,79,500	52,65,000
Annual Replenishment.				
	47,3,85	63,1,80	47,3,85	1,57,950

Recommendations:-

It is evident from the above table that about 52,65,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Sohan Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1,57,950metric tones. As per the information receieved from the Mining Officer Kangra approx. 55,000 MT of minor mineral has been lifted from the khad bed in previous period of 5 years, as such, It is therefore recommended that mineral concession can be granted in the river bed of Sohan Khad, from downstream of Sansarpur (Confluence with Beas river), up to Sikri, as the Khad has attained remarkable width with significant accumulation of minor minerals and is recommended for concession.

Jakhbari Khad:-

Jakhbari Khad is a right bank tributary of the Beas River originating (Entry at Kangra) from 480 Meter above Mean Sea Level near Duana, 44 M/13. The key characteristic of the river and its tributaries are as under on Table-40.

Table-40.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Jakhbari Khad:	10 Km.	50 Sq.Kmtrs.	100 mtr.
Origin of Jakhbari Khad.	From, 480 Meter above Mean Sea Level near Duana, 44 M/13		
Important tributaries of the catchment.	Kusnagar di khad (Right bank tributary, and Lohara khad (Left bank tributary).		
Catchment area.	50 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Duana, Suthehra, Lathial, Jagnoli, Dhanota, Ser-bodalian, Jamluhi, Jambar and Jakhbari, etc.		
No. of leases or Concession given =Nil Total Area of Khad = 100-00-00 Hect. Total leased out area = Nil			

Geological Conditions:

The Jakhbari Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Jakhbari Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-40(a)

Table-40(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Jakhbari Khad	4,05,000	5,40,000	4,05,000	13,50,000
Annual Replenishment.				
	20,250	27,000	20,250	67,500

Recommendations:

It is evident from the above table that about 13,50,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Jakhbari Khad in Kangra District.Similarly the

annual deposition of minor mineral in the river bed is calculated approximately to the tune of 67,500 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Jakhbari Khad from downstream of of Dhanota up to confluence with Beas river (Jhambar). However, no concession should be given from origin up to downstream of Dhanota.

Pol Nala:-

Pol Nala is a right bank tributary of the Beas River originating (Entry at Kangra) from 480 Meter above Mean Sea Level near Dhanuna, 44 M/13. The key characteristic of the river and its tributaries are as under on Table-41.

Name of the Khad.	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Pol Nala	4.5 Km.	22 Sq.Kmtrs.	60 mtr.
Origin of Pol Nala.	From, 508 Meter above Mean Sea Level near Siholi, Toposheet No.44 M/13.		
Important tributaries of the catchment.	Udkarian, Bansamblia, Polian (Right Bank Tributary)		
Catchment area.	22 Sq.Kmtrs		
Important Villages near the bank.	From Origin to confluence: Bansamblia, Sathana, Chhabbar, Udkarian, Polian, Baliara, Jamlui, Machhot etc.		
No. of leases or Concession given =Nil Total Area of Khad = 27-00-00 Hect. Total leased out area = Nil			

Geological Conditions:

The Pol Nala river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of newer alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Pol Nala.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-41(a)

Table-41(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Pol Nala.	1,20,000	1,60,000	1,20,000	4,00,000
Annual Replenishment.				
	12,000	16,000	12,000	40,000

Recommendations:

It is evident from the above table that about 4,00,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Pol Nala in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 40,000 metric tones. It is therefore recommended that mineral concession can be granted in the Pol Nala from downstream to Stahana up to confluence with Jakhbar Khad. However, no concession should be given from origin up to Sthana.

Sanjuwan di Khad:

Located in the Kangra Valley of Himachal Pradesh, the Sanjuwan di Khad is a right bank tributary of the Beas river originating from an altitude of 631 Meter above Mean Sea Level near Dinaladh (43P/16). The key characteristics of the river and its tributaries are as under:

Table-42

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Sanjuwan di Khad	10 Km.	24 Sq. Kmtrs.	100 mtr
Origin of Sanjuwan di Khad.	From an altitude of 631 Meter above Mean Sea Level near Dinaladh (43P/16).		
Catchment area.	24 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Dinaladh,Gharatu, Samleta, Kum lalbtar, Mohli, Laletar,Sanjuwan, Rajgir, Matal etc.		
No. of leases or Concession given =Nil Total Area of Khad = 100Hect. Total leased out area =NIL.			

Geological Conditions:

The Sanjuwan di Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Total Potential of Sanjuwan di Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre .The total potential is given below in the Table-42.

Table-42(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Sanjuwan di Khad	4,05,000	5,40,000	4,05,000	13,50,000
Annual Replenishment.				
	20,250	27,000	20,250	67,500

Recommendations:

It is evident from the above table that about 13,50,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Sanjuwan di Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 67,500 metric tones.It is therefore recommended that mineral concession can be granted in the river bed of Sanjuwan di Khad from downstream of Sanjuwan up to confluence with Beas River as the Khad has attained remarkable width with huge accumulation of minor minerals and is recommended for concession. However, No concession should be given from origin up to Sanjuwan.

Kheran di Khad:

Kheran di khad is a right bank tributary of the Beas river originating from an altitude of 605 Meter above Mean Sea Level near Bholan ka Talu (43P/16). The key characteristics of the river and its tributaries are as under:

Table -43

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Kheran di Khad	13Km.	41 Sq Kmtrs.	200 mtr
Origin of Kheran di Khad.	From an altitude of 605 Meter above Mean Sea Level near Bholan ka Talu (43P/16).		
Important tributaries of the catchment.	Meda da Nala (Left Bank Tributary of Kheran di Khad), and Girgi Nala (Right Bank Tributary of Kheran di Khad).		
Catchment area.	41 Sq Kmtrs.total		
Important Villages near the bank.	From Origin to confluence: Bholan ka Talu, Saura, Manjhli, Dhiala, Malot, Nalonha, Kokrala, Malahri, Charuri, and Surwan etc.		
No. of leases or Concession given =Nil Total Area of Khad = 260-00-00 Total leased out area =NIL.			

Geological Conditions:

The Kheran di Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Potential of Kheran di Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-42(a)

Table-43(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total

Kheran di Khad	10,53,000	14,04,000	10,53,000	35,10,000
Annual Replenishment.				
	21,060	28,0,80	21,060	70,200

Recommendations:

It is evident from the above table that about 35,10,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Kheran di Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 70,200metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Kheran di Khad from downstream Malahri up to confluence with Beas River as the Khad has attained remarkable width with huge accumulation of minor minerals and is recommended for concession. However, No concession should be given from origin up to Malahri.

Sard Khad:
Sard khad is a left bank tributary of the Beas river originating from an altitude of 776 Meter above Mean Sea Level (43P/16).
The key characteristics of the river and its tributaries are as under:

Table -44

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Sard Khad	10Km.	39 Sq Kmtrs.	60 mtr.
Origin of Sard Khad.	From an altitude of 776 Meter above Mean Sea Level (43P/16).		
Important tributaries of the catchment.	Chaplah Khad (Right Bank Tributary of Sard Khad)		
Catchment area.	39 Sq Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Sard Bammi Dhom, Nala da Bagh, Khadna, Sutti etc.		
No. of leases or Concession given =1 Total Area of Khad = 60-00-00 Total leased out area =4-45-09			

Geological Conditions:

The Sard Khad river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.

Potential of Sard Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-43(a)

Table-44(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Sard Khad	2 ,43,000	3,24, 000	2 ,43,000	8,10,000
Annual Replenishment.				
	4860	6480	4,860	16,200

Recommendations:

It is evident from the above table that about 8,10,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Sard Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 16,200 metric tones. It is therefore recommended that mineral concession can be granted in the river bed of Sard Khad from downstream Sard Bammi Dhom up to Nala da Bagh as the Khad has attained remarkable width with huge accumulation of minor minerals and is recommended for concession.

Chaunchh Khad:

Located in the Kangra Valley of Himachal Pradesh, the Chaunchh Khad is a right bank tributary of the Beas River originating from an altitude of 540 Meter above Mean Sea Level (43P/16). The key characteristics of the river and its tributaries are as under in table-45 and 45(a).

Table-45.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Chaunchh Khad.	31 Km.	190 Sq Kmtrs.	200 mtr
Origin of Chaunchh Khad.	From an altitude of 540 Meter above Mean Sea Level (43P/16).		
Catchment area.	190 Sq Kmtrs total.		
Important tributaries of the catchment	Sukhar di khad(Left bank tributary of Chaunchh Khad), Gharoli da Nala(Left bank tributary of Chaunchh Khad), Garai ka Nala(Right bank tributary of Chaunchh Khad), Rapare de khad(Right bank tributary of Chaunchh Khad), Dhado da nala(Left bank tributary of Chaunchh Khad), and Barte da Nala(Left bank tributary of Chaunchh Khad)		
Important Villages near the bank.	From Origin to confluence: Talarah, Kutlahar, Nulari, Dhaneti, Sanuhn, Bhadrut, Gangath, Tahara, Basa, Godwal, Bhati, Rit jhikli, Godwal, Janera, Randoh, Chaluhi, Samun, Tajwan, Bhojpur, Malot, Bari, Kandrori, Ban Andaurian and Kathgarh and Melwan etc.		
No. of leases or Concession given =2 Total Area of Khad =620-00-00 Total leased out area =06-81-47			

Geological Conditions:

The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age as shown in photograph. During monsoon season the stream carries heavy sediment load and deposit it annually on the river bed. The Chaunchh Khad cut its course all along its length through Siwalik rocks containing sand, silt, gravel and pebbles of Newer Alluvium. The boulder beds are considered the prominent source of river borne deposits and this stream has developed a high flood plain near the confluence of river Beas as during flood season the velocity of this stream is checked by the water of Beas River and most of sediment load is deposited at the confluence point.

Photograph-Showing mineral potential in Chounch Khad.

Total Potential of Chaunchh Khad.

The following mineral potentials have been calculated based on the %age of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 3 Cms. The total potential is given below in the Table-44(a)

The total potential is given below in the Table 44(a)

Table 45(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Chaunchh Khad.	25,11,000	33,48,000	25,11,000	83,70,000
Annual Replenishment.				
	75,3,33	10,0440	75,3,33	2,51,100

Recommendations:

It is evident from the above table that about 83,70,000 metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Chaunchh Khad in Kangra District. Similarly, the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 2, 51,100 metric tones. As per the information receieved from the Mining Officer Nurpur about 2.60 lakh MT of mineral has been lifted from the khad bed in previous period of 5 Years, as such, it is therefore recommended that mineral concession can be granted in the river bed of Chaunchh Khad from downstream of Gangath up to Kathgarh (confluence with Beas River) as Khad has attained remarkable width with adequate accumulation of minor minerals and is recommended for concession of minor minerals. However, No concession should be given from origin up to Gangath for proper replenishment of the river.

Chakki Khad:

The Chakki Khad is a right bank tributary of the Beas River originating from near Janjru, on the Western side of Dhauladhar range at the altitude of 3212 Meter above Mean Sea Level (Entry at Kangra from 880 Meter above Mean Sea Level ,43 P/15) near Sanjhi Nalla bordering Chamba district.The Dhauladhar form the water divide between river Beas on the Southern side and river Ravi on the Northern side.The river Chakki flows through Bhatiyat Sub Division and then enter Kangra and then flows through the Nurpur and Indora Subdivisions of the Kangra district.The key characteristic of the river and its tributaries are as under in the Table- 46

Table-46:-

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Chakki Khad.	50 Km.	364 Sq.Kmtrs.total	400 mtr.
Origin of Chakki Khad	From, 3212 Meter above Mean Sea Level near Janjru		
Important tributaries of the catchment.	Sansar Nadi (Left bank tributary), Hatli Khad (Left bank tributary), Jabbar Khad(Left bank tributary), Bari Khad (Left bank tributary) and Balir Khad(Left bank tributary of Chakki Khad).		
Catchment area.	364 Sq.Kmtrs.		
Important Villages near the bank.	From Origin to confluence: Malkwal,Dudui, Dholu Ther,Gatla, Bakhtpur, Raug, Loharpur, Marel, Haral Jhikli, Narainpur, Maira Batra, Dumal kaila, Maira, Hara, Majha, Tanan, Damtal, Mohtali, Channi etc.		
No. of leases or Concession given = 11 (excluding the leases granted above HFL) Total Area of Khad = 2000-00-00Hect. Total leased out area =101-7-16			

Geological Conditions:

The following is the tectonic sequence from NE (Origion) to SW (Confluence with river Beas in the Chakki Catchment (Not as stratigraphic sequence).

Sr. No.	Formation	Rock Type.
1.	Dhaladhar Granite	Mylonitic Gneiss, Slate, Phyllite etc.
2.	Chail Formation	Slate, Phyllite and Schist.
3.	Dharamshala Formation	Sandstone and Shale.
4.	Siwalik Formation	Sandstone, Shale, Boulders and Clay.
5.	Newer Alluvium.	Boulder, river borne Bajri and Sand.

The river bed is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The boulder beds are considered the prominent source of river borne deposits and during monsoon season the stream carries heavy sediment load and deposit it annually on the river bed.This stream has developed a high flood plain near the confluence of river Beas as during flood season the velocity of this stream is checked by the water of Beas river and most of sediment load is deposited near the confluence point.

Total Potential and Annual replenishment in Chakki Khad.

The catchment of Chakki khad can broadly be divided in to three parts:

The Zone of active erosion:

Above the contour of 1000 mtr,where the river is in young stage and only erosional process is active and carrying capacity is such that it takes all eroded portion with it.

The Zone of active erosion during rainy season only otherwise zone of deposition:

Between the contour value of 500 and 1000 meter where, the hydraulic radius is such that its carrying capacity increases in the rainy season.

The Zone of deposition:

The area below the contour of 500 meter lies within this zone because due to the sudden increase in hydraulic radius, the carrying capacity of the river decreases as a result of which all the load carrying by the river is deposited.

The following mineral potentials have been calculated based on the %age of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 3 Cms.

Table-46(a)

Name of River	Boulder	River borne Bajri .	Sand.	Total
Chakki Khad.	81,00000	1,08,00000	81,00000	2,70,00000
Annual Replenishment.				
	3,24,000	2,43,000	3,24,000	8,10,000

Status of mining in Chakki Khad:

Mining in the Chakki river bed falling in both the states of Himachal and Panjab is being undertaken in the length of 38 kms long stretch falling from village Hara and upto the confluence of Chakki Khad with Beas river near Milwan.
On the basis of the availability of minor mineral wealth and no. of stone crusher units installed in the respective area, the Chakki River can be divided in to three parts.

(A) River bed area particularly below the Pathankot-Jullunder Railway Bridge.

The stone crushing activities started in the vicinity of Damtal area approximately four decades ago. Initially there were approximately 4 stone crushing units.The number however kept on increasing till the year 2003 and touched the figure of 132 units all along the border. However after the year 2003 some of the stone crusher owners subsequently closed their units, for one or other reasons and presently about 20 no. of units are in operation/established in the vicinity of Damtal area.
A no. of issues regarding illegal mining in the vicinity of Damtal area particularly below the Pathankot-Jullundur Railway Bridge in the river course of Chakki was raised from time to time.
Simultaneously in order to resolve such issues the stone crusher sites and mining leases with respect to workability in the present course of Chakki Khad in the downstream of Pathankot- Jullundur bridge were being inspected at different occasions by different Committees and on the basis of the report submitted by the Officers of of this Department/ different Committees, it was felt that hardly any scope is left to allow further installation of the new stone crusher units below railway bridge on Pathankot – Jalandhar Railway line as the material available is facing difficulty to meet out the requirement of already installed stone crushers both in the river bed as well as beyond river bed areas.

Moreover due to scaracity of the raw material in the Chakki Khad, the mining had also been undertaken in the paleo-channel in a most haphazard and unscientific manner. On the basis of the reports submitted by the Officers of this Department a notification to ban the mining in Ckakki river downstream of Pathankot- Jullundur bridge up to its Highest Flood level was issued on 26/07/2005. In context to this notification, presentally mining in Ckakki river downstream of Pathankot- Jullundur bridge up to its Highest Flood level is completely banned . Moreover, hardly any scope is left to allow further installation of stone crusher units, even on the basis of terrace mining.

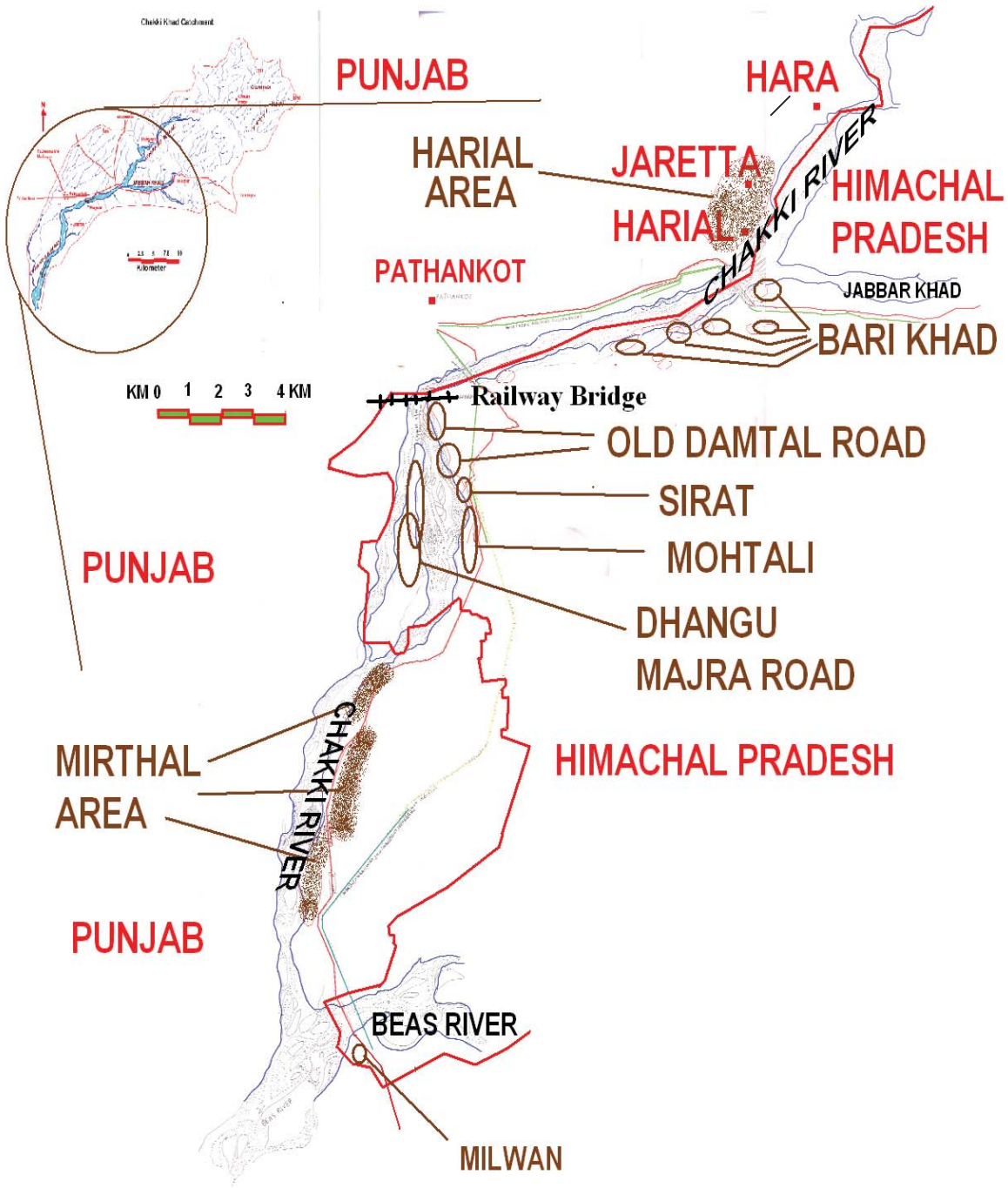
(B) River bed area upstream to Pathankot-Jullunder Railway Bridge up to Kandwal Bridge.

In this stretch of Chakki khad there are about 9 stone crushers units and the concentration of stone crusher units is alarming, however, the demand and availability of raw material can match for few more years.Moreover development of new crusher zone near Haryal (Panjab Border) has suddenly decreased the downstream replenishment factor as most of the fresh material is held up by the Haryal crusher cluster.It is also important to mention here that complete ban on use of JCB in Himachal is also not serving the purpose as mining in the other bank (in Panjab) is continued with JCB and deepning on the either bank also have collective effect towards Himachal Pradesh. In such a manner by looking for the production and minor mineral lying in the river/stream bed of Chakki River, it seems that the mineral wealth is enough only to feed the existing stone crusher units, and no mining lease should be allowed in this stretch, for fresh case of establishment of stone crusher units or for the purpose of open sale of mineral, for proper replenishment of the khad, however the mining leases may be granted/renewed for the existing already established stone crusher units which should also not exceed the area limit of 15 hect for each individual Stone crusher unit .

(C) River bed area upstream to Kandwal Bridge:

In the river course of Chakki khad most of the stone crusher units are located in the vicinity of Kandwal, Lodhwan, Tipri and Damtal area whereas upstream of Kandhwal Rail Bridge (Confluence of Jabber Khad with Chakki Khad). This stretch of Chakki Khad has not been exploited in the past, and has sufficient mineral potential. By looking for the production and minor mineral lying in this stretch of Chakki river it seems that the mineral concession may be accorded upstream to Kandwal bridge. The mineral concession may be accorded upstream to Kandwal bridge; however, no mineral concession may be allowed from upstream to Defence road Chakki bridge up to Sulayali-Dunera road Chakki - Bridge as a no. of irrigation/water supply schemes exists in between the two no. of above said bridges.

Location Map of Chakki River bed adjoining to Panjab Border.

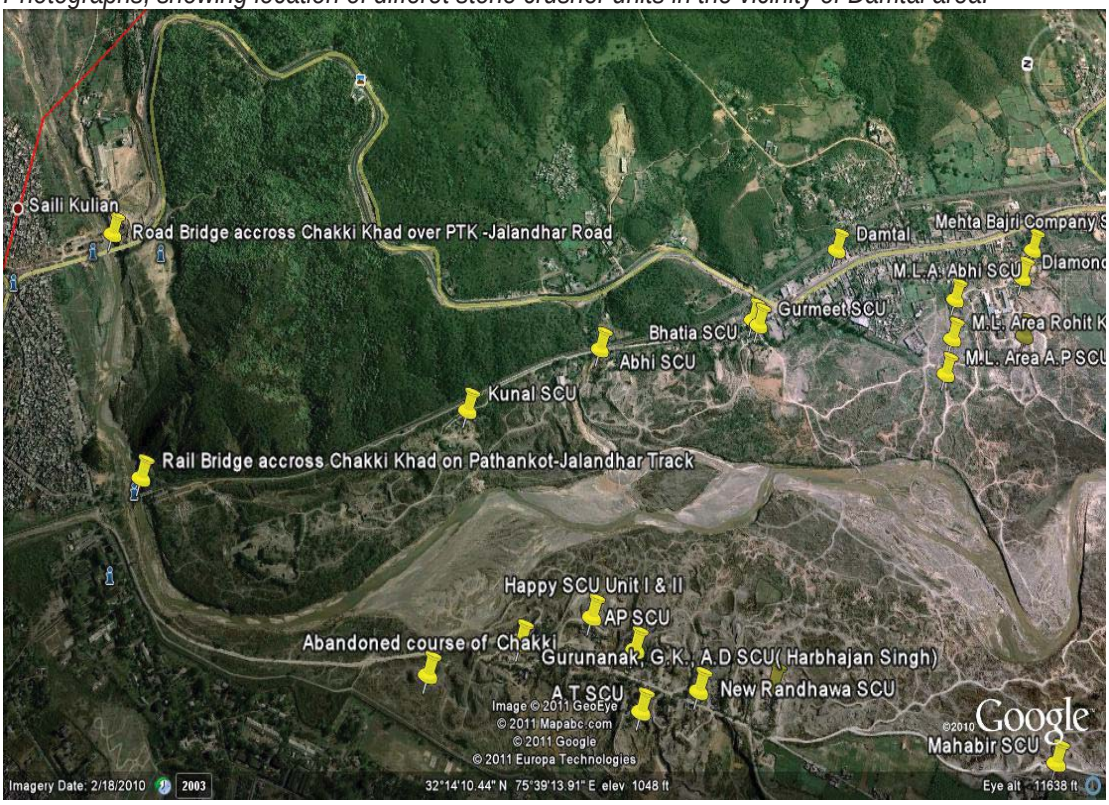


Recommendations:

It is evident from the above table that about 2,70,00000 metric tones of different sizes of minor minerals contituents are available upto depth of one meter in the river bed of Chakki Khad in Kangra District.Similarly the annual deposition of minor mineral in the river bed is calculated approximately to

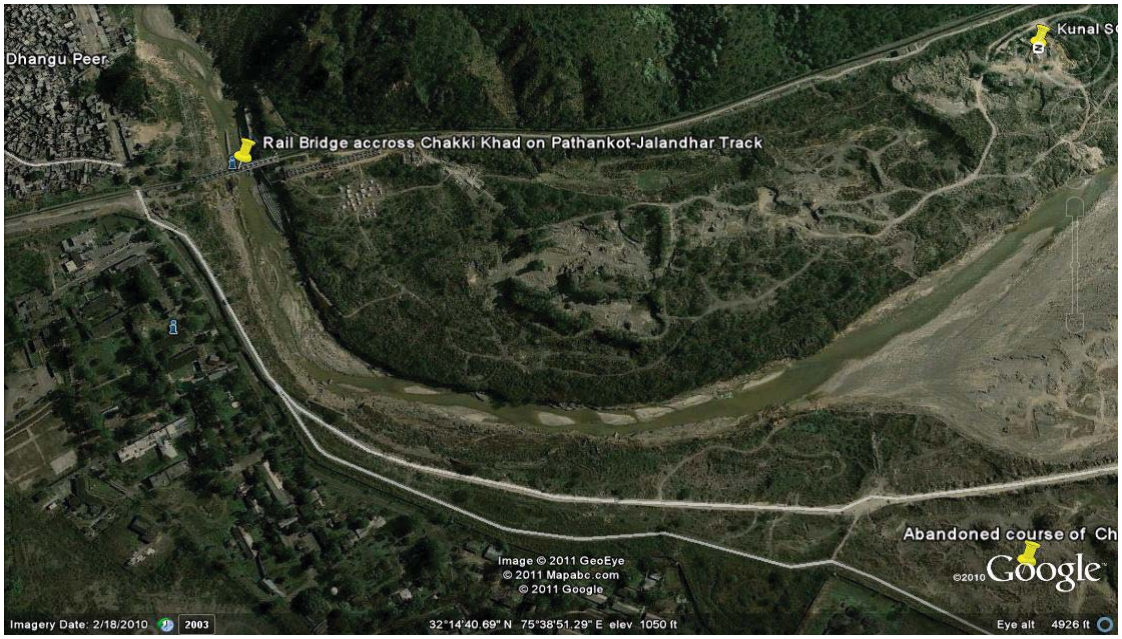
the tune of 8,10,000 metric tones. Presentally mining in Chakki river downstream of Pathankot-Jallander bridge up to its Highest Flood level is completely banned. Hardly any scope is left to allow further installation of the new stone crusher units upstream to Pathankot-Jullunder Railway Bridge up to Kandwal Bridge as the material available is facing difficulty to meet out the requirement of already installed stone crushers. However mineral concession may be accorded in the Chakki river bed area upstream of Kandwal bridge (Confluence of Jabber Khad with Chakki) up to Saura, strictly as per the approved Working cum-Environmental Management plan as this area has not been exploited in the past, and has sufficient mineral potential.

Photographs, showing location of differet stone crusher units in the vicinity of Damtal area.




Mohtali
Damtal
Mehta Bajri Company SCU
BKS SCU
Krishna SCU
Diamond SCU
M.L. Area Daljeet(Himachal SCU)
M.L.A. Abhi SCU
M.L. Area Rohit Kumar
M.L. Area A.P SCU
M.L. Area Bhatia SCU
M.L. Area Joginder Sharma(Kunal SCU)
M.L. Area Anil Trehan
M.L. Area Onkar Singh
M.L. Area Asha Pathania
M.L Area Harsaran Singh, Darshan Kumar-II
M.L Area Harsaran Singh, Darshan Kumar-I
M.L. Area Daljeet Singh(New Randhawa SCU
M.L. Area Ajay Mahajan-I
M. L. Area Gurmeet Singh
M.L. Area Ajay Mahajan-II
M.L. Area Abhi SCU
M.L Area Rutesh Kumar SCU (BK SCU)
M.L. Area A.T SCU
Proposed Site for Police Petrolling post
Image © 2011 GeoEye
© 2011 Mapabc.com
© 2011 Google
© 2011 Europa Technologies
Imagery Date: 2/18/2010
2003
32°12'29.38" N 75°39'11.36" E elev 951 ft
Eye alt 11638 ft
Google


M.L. Area A.T SCU
Proposed Site for Police Petrolling post
Majra Village
M. L. Area Harbhajan Singh
Farm House
End Point of Madhopur Canal
Old Channel of Chakki
House of Raseelo
Orchad of Dr. Kalra
Image © 2011 GeoEye
© 2011 Mapabc.com
© 2011 Google
© 2011 Europa Technologies
Imagery Date: 2/18/2010
2003
32°12'10.59" N 75°37'55.40" E elev 959 ft
Eye alt 11638 ft
Google


Dhangu Peer
Rail Bridge accross Chakki Khad on Pathankot-Jalandhar Track
Abandoned course of Ch
Image © 2011 GeoEye
© 2011 Mapabc.com
© 2011 Google
©2010 Google
Imagery Date: 2/18/2010
2003
32°14'40.69" N 75°38'51.29" E elev 1050 ft
Eye alt 4926 ft

Jabbar Khad:

The Jabbar Khad is a left bank tributary of the Chakki River originating (Entry at Kangra) from 1490 Meter above Mean Sea Level near Hathi Dhar. The key characteristic of the river its tributaries are as under:

Table-47

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Jabbar Khad.	24 Km.	40Sq.Kmtrs	200 mtr.
Origin of Jabbar Khad.	From, 1490 Meter above Mean Sea Level near Hathi Dhar		
Important tributaries of the catchment.	Harar Khad (Left bank tributary), and Gareli Khad(Left bank tributary of Jabbar Khad).		
Important Villages near the bank.	From Origin to confluence: Raund, Halai, Nathal, Dabialan da basa, Danni,L adrori, Darkali, Thana, Gulan, Madanpur, Janra, Khajan, Baldun,Nurpur, Barsal, Bod, Jachh, Jassur, Badhuhi, Pargana, and Tanau etc.		
No. of leases or Concession given =3 Total Area of Khad = 480-00-00Hect Total leased out area =25-12-08			

Geological Conditions:

The river bed of Jabbar Khad is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The Jabbar Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the potential source of river borne deposites in the stream bed.
Near the confluence with Chakki river this stream has developed a vast flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited near the confluence point forming vast flood plain.

Photograph- showing mineral potential in Jabbar Khad.

Total Potential of Jabbar Khad.

The following mineral potentials have been calculated based on the %age of each mineral constituent like boulder, river borne bajri, sand upto a depth of one metre. The annual deposition of minor mineral in the river bed has been calculated by taking into consideration the annual deposition of about 2 Cms. The total potential is given below in the Table-47(a)The total potential is given below in the Table 47(a)
Table 47(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Jabber Khad	19,44,000	25,92,000	19,44,000	64,80,000
Annual Replenishment.				
	38,880	51,8,40	38,880	1,29,600

Recommendations:

It is evident from the above table that about 64,80,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Jabber Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 1, 29,600 metric tones.

It is therefore recommended that 1,29,600 metric tonne of mineral can safely be lifted from the river bed Jabber Khad from downstream of Baral up to confluence with Chakki Khad near Tanan however no mineral concession should be accorded in this stream from origin up to Baral for proper replenishment of the khad.

24.6 Bari Khad:-

The Bari Khad is left bank tributary of the Chakki River originating from an altitude of 520 Meter above Mean Sea Level near Balkhora (43 P/15). The key characteristic of the river its tributaries are as under:

Table-48.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Bari Khad	4 Km.	9 Sq.Kmtrs.	50 mtr.
Origin of Bari Khad.	From, an altitude of 520 Meter above Mean Sea Level near Balkhora (43 P/15).		
Important Villages near the bank.	From Origin to confluence: Lakhanpur, Chandran, Balkhora and Baranda etc.		
No. of leases or Concession given =Nil Total Area of Khad = 20-00-00 Total leased out area =N.A			

Geological Conditions:

The river bed of Bari Khad is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The Bari Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the

potential source of river borne deposites in the stream bed.

Near the confluence with Beas river this stream has developed a vast flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited near the confluence point forming vast flood plain.

Total Potential of Bari Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-48(a)

Table-48(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Bari Khad	81,000	1,08,000	81,000	2,70,000
Annual Replenishment.				
	2,430	3,240	2,430	8100

Recommendations:

It is evident from the above table that about 2,70,000metric tones of different sizes of minor minerals are available upto depth of one meter in the river bed of Bari Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 8100 metric tones. Since the annual deposition is very insignificant as such this stream is not fit for grant of mineral concession.

Tara Khad:-

The Tara Khad is a right bank tributary of the Beas River originating from an altitude of 637 Meter above Mean Sea Level near Jungle of Indpur (43 P/15). The key characteristic of Tara Khad are as under:

Table-49.

Name of the Khad	Length (in km)	Catchment Area (in Sq.km)	Average Width(in mtr)
Tara Khad	16 Km.	28 Sq.Kmtrs.	70mtr.
Origin of Tara Khad.	From, an altitude of 637 Meter above Mean Sea Level near Indpur (43 P/15).		
Important Villages near the bank.	From Origin to confluence: Indpur, Indora etc.		
No. of leases or Concession given =Nil Total Area of Khad = 112-00-00 Hectare			

Geological Conditions:

The river bed of Tara Khad is occupied with recent deposits comprising sand, silt, gravel and pebbles of Newer Alluvium belonging to Quaternary age. The Tara Khad passes through rocks of upper Siwaliks containing boulder beds, and small lenses of clay and sand stone. This formation is considered the potential source of river borne deposits in the stream bed.Near the confluence with Beas river this stream has developed a wide flood plain as the velocity of water of this stream during monsoon is checked at the confluence and sediment load is deposited near the confluence point forming wide flood plain.

Total Potential of Tara Khad.

The following quantity of mineral potential has been calculated based on the percentage of each mineral constituent like boulder, river borne bazri and sand upto a depth of one metre.The total potential is given below in the Table-49(a)

Table-49(a)

Name of River	Boulder (30%)	River borne Bajri (40%)	Sand (30%)	Total
Tara Khad	443520	591360	443520	14,78,400
Annual Replenishment.				
	13305	17742	13305	44352

Recommendations:

It is evident from the above table that about 1478400 metric tones of different sizes of minor minerals is available upto depth of one meter in the river bed of Tara Khad in Kangra District. Similarly the annual deposition of minor mineral in the river bed is calculated approximately to the tune of 44352 metric tones.It is recommended that the mineral concession may be accorded in Tara Khad, from downstream of Indora bridge on Damtal-Indora road till its confluence with Beas river at village Tanda.

14 SALIENT FEATURES OF DRAINAGE SYSTEM, MINERAL POTENTIAL AND SUITABLE LOCATION FOR MINING .

Table-50

S.no	Name of Khad	Total length (in Km)	Altitude at origin/ Entry at Kangra (in meter.)	Altitude at confluence	Total area of river bed (in Hect.)	Area given for Concession (in Hect.)	Minimum Mineral potential (in metric ton)	Minimum annual replishment (in meteric tons)	Area proposed for mineral concession. (also see the main recommendations given in the respective table of the rivers)
1.	Beas Khad.	123	636	252	3690-00	133-03-72.	3,92,85,000	23,57,100	It is recommended that mineral concession can be granted in the river bed of Beas, from Beri-Nichli (636 Meter above Mean Sea Level at entry at Kangra Toposheet No. 53 A/9) up to confluence with Pong dam (Maharana Partap Sagar Reservoir) near Dehra Gopipur and thereafter from approx. 3 kilometers downstream from Pong reservoir i,e 3 Kmtr. downstream from 52 Gate up to Kathgarh (confluence with Chaunch Khad) by keeping the safe distance from both the banks of Shah Nahar barrage. Rest of the area upstream to Beri-Nichli (636 Meter above Mean Sea Level at entry at Kangra Toposheet No. 53 A/9) and up to 3 Kmtrs downstream from 52 Gate may be declared as No mining Zone for the safety of the public utility structure and agriculture land adjoining the barrage. Though the mining leases already granted in this area, have not much impact on the mineral potential and may be renewed from time to time by keeping in view the site specific conditions, however, it has been observed that Beas river particulery downstream to 52 Gate, do not have a well defiend channel and flow as a braided

									stream, having multiple channels which take off and joins multiple times creating many low alluvial islands.Over a period of time the channels also become deeper and some older part of flood plains gets abundant creating older flood plains and terraces. As such, the deposition of the mineral is not confined only to active channel of the river but also along the terrace land in form of point bars. Therefore, the best way, in future, to lift such mineral from this area could be, by identification of large rectangular areas of more then 15 Hect, preferably in the central part of the river and along the channel bars/point bars so developed. These recommendations are further subject to the inspection of such identified large rectangular mining sites of more then 15 Hect by the Joint inspection committee constituted under the chairmanship of concerned Sub Disisional Officer (C).
2.	Uhl Khad.	26	4520	1825	130-00-00	Nil	17,16,000	34,320	This stream is not fit for grant of mineral concession.
3.	Binno Khad.	52	4298	636	260-00-00	6-03-20	34,32,000	1,71,600	It is recommended that concession may be given from downstream of Nagun Jhikli up to Gadiara Buhla and from Nagehr Uparli up to Beri Nichli(Confluence with Beas Khad),however no concession may be given from origin up to Nagun Jhikli and downstream to Gadiara Buhla up to Nagehr Uparli.
4.	Awa Khad.	26	4200	790	208-00-00	Nil	28,08,000	84,240	It is recommended that concession may be given from downstream of Mahal Holta up to Rakh

									(Confluence with BinuKhad). However no concession may be given from origin up to Mahal Holta for proper replenishment of the Awa Khad.
5.	Haroti Khad.	10	1090	527	85-00-00	8-02-98	11,47,500	80,325	It is recommended that mineral concession can be granted in the river bed of Haroti Khad from downstream of Dugruhi up to confluence with the Beas river; however no concession may be given from origin up to upstream of Dugruhi.
6.	Mandh Khad.	30	1297	492	285-00-00	Nil	38,47,500	76,950	It is recommended that mineral concession may be granted from Siyara to Sihoti in the Mandh Khad subject to removal of ban imposed vide Notification No. Ind-II(E)2-1/2004 dated 28.06.2006 and from downstream to Gandor up to the confluence with the Beas,
7	Neugal Khad.	53	4320	515	964-60-00	13-35-45	1,28,79,000	5,15,160	It is recommended that mineral concession can be granted in the river bed of Neugal Khad from Thala up to Alampur (confluence with the Beas River). However, no concession may be given from origin up to Thala and from downstream of SeotuBhula up to Bhalotah Khas.
8.	Tahal Khad.	12	1460	805	60-00-00	Nil	8,10,000	40,500	It is recommended that mineral concession can be granted from downstream of Thira up to Panapari however mineral concession may not be accorded in this stream from origin up to Dhira.
9.	Sukhan Khad	10	1040	714	50-00-00	7-74-67	6,75,000	27,000	No fresh mineral concession may be accorded in this stream from origin upto confluence with Neugal river for proper replenishment of Neugal river.
10.	Janed Khad.	12	1010	689	120-00-00	37-95-06	16,20,000	97,200	It is recommended that mineral

									concession can be accorded from Dhalehra upto Purba, (Confluence with Neugal river); however, no conession should be given from origin up to Dhalehra for proper replenishment of the Janed Khad.
11.	Maul Khad.	23	1460	675	230-00-00	24-66-15	31,05,000	1,55,250	It is recommended that mineral concession can be accorded from down streamof Malnu up to confluence with Neugal river; however no conession should be given from origin up to Gadiyara.
12.	Baliyana Khad.	11	820	442	275-00-00	32-06-61	36,30,000	1,45,200	It is therefore recommended that mineral concession can be accorded from downstream of Lagbadhron, up to confluence with the Beas River; however no conession should be given from origin up to Lag Thokran.
13.	Nakher Khad.	20	920	436	400-00-00	Nil	88,00000	26,4000	It is therefore recommended that mineral concession can be accorded from downstream of Khabli, up to Dhawala; however no conession should be given from origin up to Khabli.
14.	Nalsoha Khad.	10	879	435	250-00-00	18-72-30	33,75,000	1,01,250	It is therefore recommended that mineral concession can be accorded from downstream of Chamblet up to confluence with the Beas River.
15.	Thor Khad.	11	965	435	275-00-00	8-92-57	36,30,000	1,81,500	It is recommended that mineral concession can be granted in the river bed of Thor Khad from downstream of Samnoli up to Confluence with Beas river. However no concession may be given from origin up to Sumnoli.
16.	Tipri Khad.	12	1020	480	300-00-00	Nil	39,60,000	1,58,400	It is recommended that mineral concession can be granted in the river bed of Chanaur/Tipri Khad from downstream of Tipri Khas up to

									confluence with the Beas River, however no concession may be given from origin up to Tipri Khas.
17.	Dada Khad.	10	1020	435	200-00-00	Nil	39,60,000	1,18,800	It is therefore recommended that mineral concession can be granted in the river bed of Dada Khad from downstream of Jalera up to confluence with the Beas River; however no concession may be given from origin up to Jalera.
18.	Baner Khad.	71	4440	435	710-00-00	0-38-50	95,85,000	2,87,550	It is recommended that mineral concession can be granted in the river bed of Baner Khad from Khas Sihund up to Dehra Arla (Confluence with Jogal Khad) and from down stream of Har (Confluence with Bathu Khad) up to Haripur, however no concession may be given from origin up to Khas Sihund.
19.	Iku Khad	18	4220	890	45-00-00	Nil	5,94,000	11,880	This stream is not fit for grant of mineral concession.
20.	Jogal Khad.	17	1135	695	170-00-00	11-62-48	22,95,000	91,800	It is recommended that mineral concession can be granted from downstream to Bhagtola (Confluence of Sih Nala with Jogal Khad) up to Dehar Arla.
21.	Darun Khad.	19	2800	708	95-00-00	Nil	12,54,000	50,160	It is recommended that mineral concession can be accorded from downstream of Dhalun khas, up to Tanda Kholi; however, no conession should be given from origin up to Dhalun khas for proper replenishment of river.
22.	Bathu Khad.	27	1166	488	216-00-00	9-94-94	29,16,000	1,16,640	It is recommended that mineral concession can be accorded from downstream of Lanjehr up to Ranital (confluence with Buner Khad however no conession should be given from origin up to Lanjehr for proper replenishment

									of river.
23.	Manuni Khad.	30	3104	560	225-00-00	Nil	30,37,500	91,125	Concession can be accorded from downstream of Sukar up to Mehalu; However no concession may be given from origin up to Sukar for proper replenishment of the Manuni Khad.
24.	Manjhi Khad.	19	4220	629	95-00-00	0-38-43	12,82,500	76,050	Concession can be granted in the river bed of Manjhi Khad from Silha up to confluence with Manuni khad near Mehalu, however, no concession may be given from origin up to Silha.
25.	Churan Khad.	15	1795	833	75-00-00	Nil	10,12,500	50,625	Mineral concession can be granted from downstream of Jhikli Bhoral up to confluence with Manjhi Khad near Banwala, however no concession may be given from origin up to Jhikli Bharol.
26.	Sarah Khad.	7	1270	805	52-50-00	7-02-41	7,08,750	35,437	It is recommended that mineral concession can be granted from downstream of Panjlehr up to confluence with Bahl Khad near Keori, however no concession may be given from origin up to Panjlehr.
27.	Bahl Khad.	8	952	764	64-00-00	1-85-38	8,64,000	43,200	Concession can be granted in from 3 km downstream of Sihnal Forest up to confluence with Sarah Khad near Keori. However no concession may be given from origin up to Panjlehr.
28.	Gaj Khad.	54	4020	435	810-00-00	55-86-17	1,06,92,000	5,34,600	It is recommended that mineral concession can be granted in the river bed of Gaj Khad, from Anoshi up to confluence with Beas river, However no concession may be given from origin up to upstream of Anoshi for proper replenishment of the Khad.
29	Banol Khad.	15	1964	772	150-00-00	Nil	20,25,000	60,750	It is recommended that mineral concession can be

									granted in the river bed of Banol Khad from downstream of Garoh Khas up to confluence with Gaj Khad near Kuthman, however no concession may be given from origin up to Garoh Khas.
30	Chambi Khad.	27	1600	772	337-50-00	Nil	45,56,250	13,6,687	It is recommended that mineral concession can be granted from downstream of Dudhamb up to confluence with Gaj Khad near Makroti, however no concession may be given from origin up to Dudhamb.
31	Khauli Khad.	49	3860	547	245-00-00	Nil	33,07,500	99,225	Mineral concession can be granted in the river bed of Khauli Khad from downstream of Bhohara up to Karela and from 2 kmtrs upstream of Khabbal up to confluence with Gaj Khad near Balla, however no concession may be given from origin up to Bhohara and downstream to Karela up to Khabbal for proper replenishment of the khad.
32	Lapiyana Khad.	26	800	460	130-00-00	Nil	17,55,000	35,100	This stream is not fit for grant of mineral concession.
33	Leond Khad	20	4020	1220	50-00-00	Nil	6,75,000	20,250	This stream is not fit for grant of mineral concession.
34	Dehar Khad.	24	1324	435	840-00-00	59-58-66	1,13,40,000	5,67,000	It is recommended that mineral concession can be granted in the river bed of Dehar Khad, from downstream of Latehr up to confluence with the Gaj River. However no concession may be given from origin up to Latehr for proper replenishment of the Khad.
35	Bhed Khad.	4	560	490	40-00-00	Nil	5,40,000	27,000	This stream is not fit for grant of mineral concession.
36	Bhul Khad.	15	605	435	330-00-00	Nil	44,55,000	1,33,650	It is recommended that mineral concession can be granted in the river bed of Bhul Khad, from Upstream of Harnota up to

									confluence with the Beas Khad.
37	Manjuhi Khad.	9	565	437	180-00-00	Nil	24,30,000	97,200	Mineral concession can be granted from Upstream of Bhagwal (confluence of Manjuhi di khad with Rehan Nala and Dhial khad) up to confluence with the Bhul river, and is recommended for concession. However no concession should be given from origin up to Bhagwal.
38	Hawri di Khad.	9	610	435	90-00-00	Nil	11,88,000	59,400	It is recommended that mineral concession can be granted from downstream of Sanaurth, up to confluence with the Bhul river; however no concession should be given from origin up to Gubar.
39	Sohan di Khad.	13	488	434	390-00-00	Nil	52,65,000	1,57,950	It is recommended that mineral concession can be granted in the river bed of Sohan Khad, from downstream of Sansarpur (Confluence with Beas river), up to Sikri.
40	Jakhbari Khad.	10	480	323	100-00-00	Nil	13,50,000	67,500	It is recommended that mineral concession can be granted in the river bed of Jakhbari Khad from downstream of of Dhanota up to confluence with Beas river (Jhambar), however, no concession should be given from origin up to downstream of Dhanota.
41	Sanjuwan di khad.	10	631	290	100-00-00	Nil	13,50,000	67,500	It is recommended that mineral concession can be granted from downstream of Sanjuwan up to confluence with Beas river, however no concession should be given from origin up to Sanjuwan.
42	Kheran di Khad	13	605	287	260-00-00	Nil	35,10,000	70,200	Mineral concession can be granted in the river bed of Kheran di Khad from downstream Malahri up to confluence with Beas River However, No concession should be given from

									origin up to Malahri.
43	Chaunch Khad	31	540	280	620-00-00	41-25-24	83,70,000	2,51,100	It is recommended that mineral concession can be granted in the river bed of Chaunchh Khad from downstream of Gangath up toKathgarh (confluence with Beas River). However, no concession should be given from origin up to Gangath for proper replenishment of the river
44	Chakki Khad	50	3212	252	2000-00-00	257-57-42	2,70,00000	8,10,0000	Mining in Ckakki river downstream of Pathankot- Jullundur bridge up to its highest flood level is completely banned. Similarly, no mining lease should be allowed for fresh case of establishment of stone crusher unit or for the purpose of open sale of mineral, upstream to Pathankot-Jullunder Railway Bridge up to Kandwal bridge. The mineral concession may be accorded upstream to Kandwal bridge however, no mineral concession may be allowed from upstream to defence road chakki bridge up to Sulayali-dunera road Chakki -Bridge.
45	Jabbar Khad.	24	1490	403	480-00-00	25-12-08	64,80,000	1,29,600	It is recommended that mineral concession can be granted from downstream of Baral up to confluence with Chakki Khad near Tanan, however no concession should be accorded in this stream from origin up to Baral for proper replenishment of the khad.
46	Bari Khad	4	520	401	20-00-00	Nil	2,70,000	8100	This stream is not fit for grant of mineral concession.
47	Tara Khad	16	637	274	112-00-00	Nil	14,78,400	44,352	It is recommended that the mineral concession may be accorded in Tara Khad, from downstream of Indora bridge on Damtal-Indora road till its

									confluence with Beas river at village Tanda.
48	Sard Khad	10	676	287	60-00-00	Nil	8,10,000	16,200	It is recommended that mineral concession can be granted in the river bed of Sard Khad from downstream Sard Bammi Dhom up to Nala da Bagh.
49	Pol Nala	4.5	508	-	27-00-00	Nil	4,00,000	4,00,00	It is recommended that mineral concession can be granted in the Pol Nala from downstream to Stahana up to confluence with Jakhbar Khad. However, no concession should be given from origin up to Sthana.

15 GENERAL RECOMMENDATIONS:

The part of river/stream beds recommended for grant of mineral concessions in this report are based on reconnaissaince survey conducted for whole of district Kangra, however before grant of any mineral concession in a particular river/stream bed, the guidelines contained in River/Stream bed mining policy are to be followed in addition to site specific conditions as specified bv the Joint Inspection Committee and recommendation thereof. In the ibid Policy guidelines, following general conditions are mentioned.

1. No River/Stream bed mining shall be allowed without the recommendations of the Sub-Divisional Level Committee.
2. No River/Stream bed mining shall be allowed without getting clearance under Forest Conservation Act, 1980 if the area attracts the provisions of FCA. 1980.
3. No River/Stream bed mining shall be allowed within 75 meters from the periphery of soil conservation works, nursery plantation, and check dams or within the distance as recommended by the Sub-Divisional Committee, which ever is more.
4. No River/Stream bed mining shall be allowed within 1/10th of its span or 5 meters from the bank or as specified by the Sub-Divisional Committee which ever more is.
5. No River/Stream bed mining shall be allowed within 200 meters U/S and D/S of Water Supply Scheme or the distance as specified by the Sub- Divisional Committee which ever is more.
6. No River/Stream bed mining shall be allowed within 200 meters U/S and 200 to 500 mts D/S of bridges depending upon the site-specific conditions.
7. No approach road from PWD road shall be allowed to River/Stream beds mining, unless lessee/contractor obtains written permission from XEN PWD for making road leading to all intake places from the PWD Roads.
8. No mechanical mining through mechanical excavator including any other earth moving machines like JCB, Bouldozer,Pocklain,Loders etc shall be carried out in river or stream Bed by the lease holder or permit holder or contractor as the case may be without obtaining permission as specified in Minor mineral Rules-2015 .
9. No boulder/cobbles/hand broken road ballast shall be allowed to be transported outside the State from River/Stream beds, so as to reduce pressure on the River/Stream beds.
10. Every lessee/contractor shall ensure that his labour does not involve in fish poaching.
11. No blasting shall be allowed in river/stream beds.

General recommendations:

During the preparation of the present report only few of rivers/streams has been studied in detail, as the rest of the streams/rivers either have very insignificant annual replenishment/ approachability problem or are narrow at most of the places and as such are not fit for grant of mineral concession for mineral based industries, however it is also important to mention here that because of the regular demand of sand, stone and bajri for the developmetal activities in the respective areas, such streams are prone to illegal mining, as such, if any person/party applies for open sale of mineral, the mining for open sale may be granted to meet out the local demands of minerals, or any exigency subject to the approval from the joint Inspection Committee.These mineral concessions shall also reduce demand load and shall help to mininmise illegal extraction of minerals, failure of which may result in to illegal mining at odd hours and shall be haphazard and more detrimental to the local ecology.

Irrespective of it following geoscientific considerations are also suggested to be taken into account during the river bed mining in a particular area:

1. Large rivers and streams whose periodic sediment replenishment capacities are larger, may be preferred than smaller rivers.
2. Mining at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.
3. Abandoned stream channels or terrace and inactive floodplains may be preferred.
4. Stream should not be diverted to form inactive channel.
5. Mining below subterranean water level should be avoided as a safeguard against environmental contamination and over exploitation of resources.
6. Segments of braided river system should be used preferably falling within the lateral migration area of the river regime that enhances the feasibility of sediment replenishment.
7. Mining Lease (ML) areas should be demarcated on the ground with Pucca pillars so as to avoid illegal unscientific mining.
8. The auction shall be done as per the recommendation /approval of the Sub-Divisional Level Committee.

Presently the mineral reserves have been calculated only upto a depth of 1.00 metre. Since, there are so many portions in the river beds such as channel bars, point bars and central islands, where the annual deposition is raising the level of river bed thus causing catastrophic conditions especially during the rainy seasons by shifting the rivers towards banks resuting in to cutting of banks. Therefore, removal of material at such locations upto the bed level or up to 3.00 metre depth as per the provisions of mining rules, is essential to control the river flow in its central part and to check the bank cutting. In such a manner, the mineral potential presently calculated only up to one meter depth will certainly be increased twice or thrice as per the depth allowed for mining in the area. While, calculating the mineral potentials, the mineral deposits lying in the sub-tributaries, of that particular stream/river has not been taken into consideration. Since, these tributaries are also adding the mineral deposits annually and especially during the rainy season in to the main river, as such, the mineral deposits and annual replenishment which has been calculated presently will be much more. Further the Survey of India Topo-Sheets has been used as base map to know the extent of river courses.

16 PART B: MINOR MINERALS OTHER THAN SAND MINING OR RIVER BED MINING :

Introduction:

It is important to mention here that, whenever, any of the area is applied by any of the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Disisional Officer(C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations as per the provisions of Mining Rules. Accordingly, as per the recommendations of the joint inspection committees, letter of Intents are issued to the applicants by the Competent Authorites for completion of other codal formalities required under law.

After the issuance of the Letter of Intent the mineral concession holder has to prepare the detailed “Mining Plan” for the allotted area through Registered Qualified Person which is further required to be approved from authorized officer of Geological Wing of the State Government. The comprehensive mining plan are prepared by RQP wherein, details of mineral reserves, method of mining, progressive mine closure plan, extent of proposed mining, impact of Environment due to mining and its remedial mitigation and other related details with respect to use of the mineral are required to be furnished. As such, the microlevel, site specific study of the area comprising the probable and provable mineral reserve deposition at the particular site is conducted before the grant of mining lease.

17 OVER VIEW OF MINING ACTIVITY IN DISTRICT KANGRA

As stated earlier, occurrence a number of economic rocks are found in the district but except limestone, slate, and minor minerals like Sand, Stone and Bajri none have commercial significance in the district. In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds. The demand of sand is mainly met through by river borne sand whereas the demand of bajri/grit is either met through river borne collection or through manufactured grit by stone crushers. The demand of Slate and dressed or undressed stone is met from the hill slopes. Almost all of the mineral concessions which have been granted for the extraction of sand, stone, Bajri and slate etc are type of an open cast of mining and are limited in aerial extent.

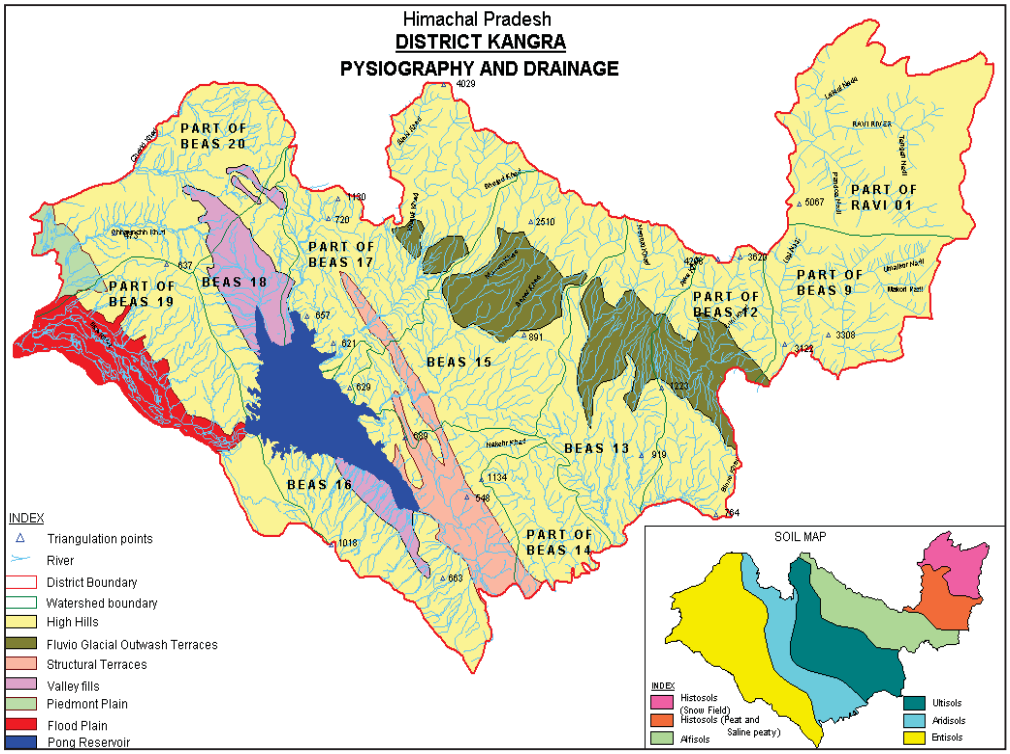
18 DRAINAGE AND IRRIGATION PATTERN

The Kangra district lies between Siwalik and the lesser Himalayas. The Kangra district has covered an area of 5739 sq. Kms in the west northwestern part of Himachal Himalaya, bordered by Punjab and Chamba, Kullu, Mandi, Hamirpur and Una in the north, east, and south respectively. The elevation of the district above mean sea level (MSL) varies from 500 meters to more than 6000 meters. In the district where the Siwalik rocks are exposed, the topography represents a series of parallel hill ranges separated by longitudinal valleys. These valleys are very fertile. The high peaks where the altitude is more than 4,000 meters above MSL remain covered with snow. Many streams that exist in the district are snow-fed and many get water from the rains.

River Beas and its tributaries constitute the main drainage system in Kangra district except for the extreme north-eastern part in Bara Bhangal area where it forms a part of the river, Ravi. The Beas River enters the district near village Harsi from the east and flows towards the west before it leaves Kangra (and Himachal Pradesh) at Mirthal in Punjab. The major southernly flowing tributaries are Neugal, Awa, Binnu, Baner, Naker, Gaj and Dehar khads.

These khads have deep valleys in the hilly area. The valleys are wide in the Kangra valley region where the slope/gradient of the rivers is gentle. The course of these rivers is structurally controlled. The gradient and flow are being utilized both for irrigation and power generations. A number of micro hydel projects are under construction on these khads. The water of these rivers is also used for irrigation by diverting its flows through kuhls. The northernly flowing tributaries ‘choes’ are ephemeral and have flash floods during the monsoons. The width of these stream channels varies from less than a kilometre to more than 2 km. The channel areas are generally devoid of vegetation. The important khads are Pragpur, Nalsuha, Chanour and Dada Siba.The major source of irrigation in district Kangra is the ageold method of directing water from various streams, rivulets and springs through small rills or channels to the cultivated fields. However, the existing system offers good scope for improvement by way of innovations in the field of cheaper lining material thereby reducing losses by seepage. Leaving aside the tribal districts of Lahaul and Spiti and Kinnaur, Kangra district has the second highest proportion of area under irrigation in the state of Himachal Pradesh after Sirmaur.

Map-8, Showing Beas /Ravi River catchment in Kangra District.



19 SURFACE WATER AND GROUND WATER SCENARIO OF THE DISTRICT.

Dal and Kareri are the two natural lakes in the district Kangra which are located in the upper reaches of Gaj khad at an altitude of about 2,083 m and 3,000m amsl, respectively. The former, which is located in Mecleodganj area of Dharamshala has been affected by the process of urbanization and has been reduced to a small pool. The other lake, Kareri, which used to be perennial lake has also been silted up and contains water during rainy season only. A few glacier lakes in Bara Bhangal area are also identified in the catchment of Beas River at altitudes of 4,650m to 4,850m amsl. Besides, a reservoir known as “Pong Reservoir” has also been constructed in the year 1974 near a village Pong in Terrace on the Beas River. The surplus water of Beas River during rainy season is released downstream of Pandoh Dam to augment the flows for impoundment in Pong Reservoir. The major sources of irrigation are small water channels or the Kuhls in the district and an area of more then 36,444 hectares has been brought under irrigation by various sources like canals, tanks, wells and other sources.

A part of the cultivated area of the district is not having any assured irrigation facilities and the agriculturists have to depend on the vagaries of weather. Based on the geological diversities and relative ground water potentialities of different geological formations, the district can broadly be divided into following two Hydrogeological units.

i) Fissured formations.

ii) Porous formations.

Fissured Formations:

Fissured formations comprise hard rocks belonging to Jutogh, Shali limestones, Chails, Chandpurs, Kangra-Darla volcanic, Subathus, Dharamsala and Siwaliks. These formations consist of schist, quartzite, slates, phyllites, limestones, granites, gneisses, sandstones, conglomerates and shales. These rocks are generally massive and consolidated, devoid of primary porosity and permeability's. Secondary porosity and permeability have developed due to the tectonic activities along the fractured joints and fault zones. Weathered zone rarely forms an aquifer because of less thickness of the weathered mantle. In this hard rock terrain ground water occurs either, along structurally week zones, viz. fracture zones, faults, joints or along the contacts of different formations. The ground water in such areas is discharged through the springs in the topographically favourable areas. The thrust zones (Main boundary Fault/Palampur Thrust) and other faults at lower topography are the important areas for ground water development. Springs located along the thrust zone in Dharamsala and Palampur areas are having a discharge of more than 40 Liters per second, indicative of their high potentialities. In Siwalik formations, the contact zones of various formations and fault zones form potential ground water horizons, especially between Nadaun in the east and Nurpur in the west. Important springs at Trilokpur (30 lps) and Nagni (25 lps) are located at the intersection of Jawalamukhi thrust and north-south trending faults. Compact conglomeratic formations are generally devoid of water, but hand pumps have been successfully installed in low topography area and of District Kangra along fractured zones. Discharge is generally higher in Jawalamukhi area along the thrust zone. Depth to water varies from free-flowing condition at Darshanpur (Trilokpur) to about 30 m in the bored wells. Depth to water in shallow zones (dugwells-NHS), generally varies from less than 1 m to 15.44 m. Water level is shallower in topographic lows as per the various reports of CGWB Kangra.

Porous Formations:

Quaternary sediments as fluvio-glacial and fluvitile deposits occur as valley fill deposits, overlying the older rocks. Morainic and fluvio-glacial deposits are distributed in Kangra Palampur valley and in the higher altitude areas, while fluvitile deposits occur either along Beas River or its tributaries in low altitude areas.

For long term monitoring of ground water level in district Kangra, first Hydrograph Network Station was established by the Geological Survey of India (GSI) in 1969. Since then, a number of hydrological studies (mostly pertaining to Nurpur and Indora area) have been conducted in the district by the Central Ground Water Board (CGWB). The water levels are being monitored by CGWB four times in a year. The dynamic ground water resource estimates have been computed only for Indora and Nurpur area. The utilizable ground water reserves are put at 60.96 MCM and the net amount draft is 13.54 MCM. This leaves a surplus of 47.42 MCM for further use. The stage of developments was 22.2 per cent and the area was put under 'white' category in 1992. By 1997 the projected stage of ground water development was set at 24 per cent. Utilisable irrigation potential for development from natural recharge has been estimated to be 12,830 hectares. The ground water resources of Palampur and Kangra valley fills are yet to be estimated. The perennial kuhls in these areas continually recharge the ground water.

20 DETAIL OF MINING LEASES:

In order to meet the requirement of raw material for construction, the extraction of sand, stone and bajri is being carried out exclusively from the river beds, however to meet out the additional demand of sand, stone bajri and Slate/dressed or undressed stone the mining leases has also been granted on the hill slopes/ terrace. Irrespective of minig leases, granted in the river beds as illustrated at Table -A, following mining leases has been granted on hill slopes/ terraces in District Kangra.

Sub–Division wise list of Mining Leases/Mineral Concession granted on hill slopes/river terraces for collection of Stone, bajri and Sand in district Kangra. (HP)

Sr. No.	Name and address of Lessee.	Name of Mineral	Mining lease grant order No.and date.	Area of Mining lease	Period of Mining lease	Remarks

1	Sh. Thakur Singh Rana S/o Late Sh. Khemdi Ram VPO Moondhi Tehsil Palampur Distt Kangra.	Sand stone and bajri.	No. Udyog-Bhu (Khani-4) Laghu-789/2019-1140 dated 6.5.2021.	1-41-44	18.8.2021 to 17.8.2026	The mining lease has been executed for non-captive purpose after issuance of EC vide letter F. No.-HPSEIAA/2021/818-5001-5008 dated 31.3.2021 for open cast of mining in between the coordinates 31^0 57' 28.8" N and 76^0 28'10.6" E and is in Working stage. Annual Production of 22000 MT has been assessed in Mining Plan.
2	Smt Mukesh Kumari, Mukhtiar Singh and Jagdish Chand W/o Sh. Kuldeep Minhas and S/o Sh. Dewan Chand Vill Ramnagar PO Tatehal and VPO Tikkar Tehsil Plampur Distt Kangra	Sand stone and bajri. (Stone crusher not installed)	No. Udyog-Bhu (Khani-4) Laghu-32/2021-7596 dated 14.10.2022.	1-60-37	12.12.2022 to 11.12.2027	The mining lease has been executed for non-captive purpose after issuance of EC vide letter F. No.-HPSEIAA/2022/950 dated 14.10.2022 for open cast of mining in between the coordinates 31^0 47' 65.8" N and 76^0 '33 2.6" E Annual Production of 60,595 MT has been assessed in Mining Plan.
3	Sh. Kul Bhushan Prop. M/s Maa Kamakhya Srone Crusher Vill Paglu PO Jawar Tehsil Amb Distt Una.	Sand stone and bajri.	No. Udyog-Bhu (Khani-4) Laghu-238/2022-12926 dated 29.03.2023	1-33-80	06.04.2023 to 5.4.2028	The mining lease has been executed for non-captive purpose after issuance of EC vide letter F. No.-HPSEIAA/2022/977 dated 14.03.2023 for open cast of mining in between the coordinates 31^0 45' 23.84" N and 76^0 12'49.98" E E and is in Working stage. Annual Production of 31,500 MT has been assessed in Mining Plan.
4	Sh. Surinder Singh VPO Dulak Teh. Palampur Distt Kangra.	Sand stone and bajri.	No. Udyog-Bhu (Khani-4) Laghu-238/2022-12926 dated 29.03.2023	1-04-70	16.04.2011 to 15.04.2026	The mining lease has been executed for non-captive purpose after issuance of EC vide letter F. No.-HPSEIAA/2022/977 dated 14.03.2023 for open cast of mining in between the coordinates 31^0 45' 23.84" N and 76^0 '12 50.60" E and is working presently. Annual Production of 11812 MT has been assessed in Mining Plan.
5	Golden Karam Jot Stone Crusher VPO Riyali	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-344/09-Vol-I-	21-07-84 Terrace		31^0 59' 36.2"N 31^0 59' 34.86"N31^0 59'21.23" N 75^0 49' 03.9" E 75^0 49' 20.87"E 75^0 49'25.91" E

						Annual Production of 80,000 MT has been assessed in Mining Plan.
6	Sh. Arvind Guleria GPA Partner M/S Diamond Enterprises, Vill. Barikhad P.O. Lodhwan.	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	8-55-55 Terrace	19.5.2023 to 18.5.2028	32º16'32.09" N 32º16'32.06"N and 75º45'2.55" E 75º45'1.51" E Annual Production of 45660 MT has been assessed in Mining Plan.
7	M/s New Randhawa SCU Sh. Daljeet Singh Dhangu Majra Road Tehsil Indora Distt Kangra	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	04-08-28 Terrace	25.10.2016 to 24.10.2031	32º 12' 57.94" N 32º 12' 1.84" N 32º12' 00.64" N 75º 38' 48.42" E 75º 38' 46.30" E75º 38'54.60" E Annual Production of 72460 MT has been assessed in Mining Plan.
8	M/s Abhi Stone Crusher Company Old GT Road, Damtal	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	1-42-01 Teerace	10.11.2020 to 9.11.2025	32º 12' 59.47" N 32º 12' 57.41" N 75º 38' 35.56" E 75º 38' 35.16"E Annual Production of 39350 MT has been assessed in Mining Plan.
9	Sh. Harsaran Singh Parnter M/s Mehta Company V.P.O Sirat(Damtal) Tehsil Indora	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	4-97-08 Terrace	29.3.2022 to 28.3.2027	32º 12' 43.9" N 32º 12' 46.2" N 75º 38' 52.1" E 75º 38' 56.3" E Annual Production of 138857 MT has been assessed in Mining Plan.
10	Sh. Darshan Kumar, partner M/s Brijesh Stone Crusher, VPO Sirat, Tehsil Indora					
11	Sh Pritpal Singh Prop M/s A.T Stone Crusher Dhangu Majra Road Damtal Tehsil Indora Distt Kangra	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	02-70-65 Terrace	11.3.2022 to 10.3.2027	32º 12' 57.61" N 32º 12' 51.84" N 32º 12' 48.58" N 75º 38' 32.26" E 75º 38' 33.57" E 75º 38' 36.42" E Annual Production of 33780 MT has been assessed in Mining Plan.
12	M/s Happy SCU-I Sh. Rahul Pathania Dhangu Majra Road Tehsil Indora Distt Kangra	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	1-43-46 Terrace	28.12.2017 to 27.12.2022	32º13'35.35" and 75º38'46.78" Annual Production of 37420 MT has been assessed in Mining Plan.

13	Sh Praveen Kumar Prop M/s India Stone Crusher Unit II,Dhangu Majra Road Damtal , ,Tehsil Indora District Kangra H.P	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	01-46-06 Terrace	1.6.2019 to 31.5.2024	32º 12' 9.84" N 75º 38' 39.65" E Annual Production of 30454 MT has been assessed in Mining Plan.
14	Sh. Surinder Singh Partner :- M/s Jai Laxmi Stone Crusher Vill Bain Attarian PO Kandrori Tehsil Indora Distt Kangra	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	2-15-86 Terrace	22.1.2018 to 21.1.2023	32º 10' 54.7" N 32º 10' 49.6" N 75º 40' 18.4" E 75º 40' 19.1" E Annual Production of 37500 MT has been assessed in Mining Plan.
15	Sh Ravinder Singh Narula M/s DS Stone Crusher ,Dhangu Majra Road, Damtal (H.P)	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	01-45-94 Terrace	20.10.2020 to 19.10.2025	32º 12' 16.69" N 75º 38' 17.09" E Annual Production of 16500 MT has been assessed in Mining Plan.
16	Sh Onkar Singh Prop M/s. Happy Stone Crusher Unit No.II Dhangu Majra Road, Damtal (H.P)	Sand stone and bajri	No. Udyog-Bhu(Khani-4)Laghu-	02-25-25 Terrace	3.7.2019 to 2.7.2024	32º 12' 24.44" N 32º 12' 17.09" N 75º 38' 40.46" E 75º 38' 43.98" E Annual Production of 37168 MT has been assessed in Mining Plan.

LIST OF LETTER OF INTENT HOLDERS IN THE DISTRICT

It is important to mention here that, whenever, any of the area is applied by any of the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Disisional Officer(C) comprising members from Public Works Departmet, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations as per the provisions of Mining Rules. Accordingly, as per the recommendations of the joint inspection committees, letter of Intents are issued to the applicants by the competent authorites for completion of other codal formalities, such as, to obtain the Forest Clearence, Environment Clearence and Mining plan etc. In such a manner, letter of intents get matured for grant of mining lease only after submission of clearences as mentioned in the conditions of LOI. Further, issuce of letter of intent, is a continuous process and all the issued LOI's can never be covered in the DSR.

Sr. No.	Name of the Letter of intent holder.	Name of River with mineral.	Area (in Hects.)	Sub division wise location of Mining lease for which co-ordinates shall be marked in Mining Plan.
1	Sh. Ajay Ohri S/o Sh. S.S. Ohri VPO Kandwal Tehsil Nurpur Distt Kangra.	Baner Khad (Padhar)	6-32-00 (Auctioned site)	Dharamshala

		(Sand stone bajri)		
2	Sh. Rajinder Singh and M/s RK Stone Crusher S/o Sh. Sant Singh VPO Kandwal Tehsil Nurpur Distt Kangra.	Chanaur Khan. (Sand stone bajri)	25-81-43 (Auctioned site)	Dehra
3	Sh. Dharam Singh & Rahul Jamwal S/o Sh. Swadesh Singh & Bhagat Ram Vill. Kandwal & Kuther PO Kandwal & Kuthehar Tehsil Nurpur Distt Kangra	Bhaddal Khan. (Sand stone bajri)	36-15-18 (auctioned site)	Dehra
4	Sh. GP Acharya S/o Sh. Moju Ram VPO Sagoor Tehsil Baijnath Distt Kangra	Binwa Khad (Chaaban). (Sand stone bajri)	2-06-30 (auctioned site)	Baijnath
5	Sh. Rajinder Singh S/o Sh. Sant Singh VPO Kandwal Tehsil Nurpur Distt Kangra	Neugal Khad Menjhja (Sand stone bajri)	5-20-18 (auctioned site)	Palampur
6	Sh. Satish Chand Katoch S/o Sh. Milap Chand VPO Bhawarna Tehsil Palampur Distt Kangra	Neugal Khad Panapar (Sand stone bajri)	2-24-60 (auctioned site)	Dheera
7	Sh. Satish Chand Katoch S/o Sh. Milap Chand VPO Bhawarna Tehsil Palampur Distt Kangra	Awa Khad (Chandpur) (Sand stone bajri)	2-49-42 (auctioned site)	Palampur
8	Sh. Gaurav Sharma S/o Sh. Kuldeep Kumar H. No. 350, Gurudwara Road, Dharamshala Tehsil Dharamshala Distt Kangra	Gaj Khad (Ketlu) (Sand stone bajri)	4-87-44 (auctioned site)	Shahpur
9	Sh. Karnik Upadhyay S/o Sh. Kamal Kishore Padha VPO and tehsil Shahpur Distt Kangra	Chambi Khad (Dadambh) (Sand stone bajri)	3-55-02 (auctioned site)	Shahpur
10	Sh. Kewal Singh S/o Sh. Munshi Ram Vill Jasur (Matholi) PO Basa Wazira Tehsil Nurpur Distt Kangra	Beas River (Kaulapur) (Sand stone bajri)	15-92-74 (auctioned site)	Dehra
11	Sh. Ajay Singh S/o Sh. Yogeshwar Singh VPO and Tehsil Indora Distt Kangra	Beas River (Kuhna) (Sand stone bajri)	19-76-85 (auctioned site)	Dehra
12	Sh. Shivam Pathania S/o Sh. Ranjeet Singh Pathania Vill. Thapkaur PO Bhadroya Tehsil Nurpur Distt Kangra	Beas River (Hardogri) (Sand stone bajri)	15-23-10 (auctioned site)	Dehra
13	Sh . Karanveer Singh S/o Sh. Surinder Singh r/o 1, Lane No.-3 Shaheed Udham Singh Nagar Pathankot Tehsil and Distt Pathankot	Kheran Khad (Kaulapur) (Sand stone bajri)	13-68-99 (auctioned site)	Dehra
14	Sh . Karanveer Singh S/o Sh. Surinder Singh r/o 1, Lane No.-3 Shaheed Udham Singh Nagar Pathankot Tehsil and Distt Pathankot	Beas River (Chalah) (Sand stone bajri)	8-13-17 (auctioned site)	Dehra
15	Sh . Jagdish Singh S/o Sh. Vijay Singh Village Dhan PO Matlahar Tehsil Jawali Distt Kangra	Manooni Khad(Part I) (Mandal) (Sand stone bajri)	1-58-51 (auctioned site)	Dharamshala
16	Smt. Tammana Thakur W/o Sh. Shivam Pathanaia Vill Thapkaur PO Bhadroya Tehsil Nurpur Dstt Kangra and Smt. Seema Devi W/o Sh. Dharambir Singh VPO Kandwal Tehsil Nurpur	Manjhi Khad (Maned) (Sand stone bajri)	2-29-72 (auctioned site)	Dharamshala
17	Sh Chandar Bhushan Nag S/o Sh. Om	Bathu Khad	6-23-55	Nagrota Bagwan

	Parkash Nag VPO Rumehar Tehsil Nagrota Bagwan Distt Kangra, Sh Abhinav Dogra S/o Sh. Chander Shekar Dogra VPO Manai Tehsil Harchakkian Distt Kangra and Sh Gaurav Sharma S/o Sh. Kuldeep Kumar H. No. 350, Gurudwara Road, Dharamshala Tehsil Dharamshala Distt Kangra	(Sadoon) (Sand stone bajri)	(auctioned site)	
18	Sh. Rahul Pathanaia S/o Sh. Ranjeet Singh Vill Thapkaur PO Bhadroya Tehsil Nurpur Dstt Kangra and Sh. Rohit Jamwal S/o SH. Om Parkash Jamwal VPO Banghiar Tehsil Palampur	Neugal Khad (Part I) (Dhaniyara) (Sand stone bajri)	21-17-56 (auctioned site)	Dheera
19	Sh. Vijay Mankotia S/o Sh. Saroop Singh Mankotia VPO Baranda Tehsil Nurpur Distt Kangra and Sh Pawan Singh S/o Sh. Mohinder Singh Vill Sutrahar PO Panjahra Tehsil Nurpur Distt	Neugal Khad (Part III) (Sand stone bajri)	3-83-86 (auctioned site)	Dheera
20	Sh . Jagdish Singh S/o Sh. Vijay Singh Village Dhan PO Matlahar Tehsil Jawali Distt Kangra	Neugal Khad (Part IV) (Sand stone bajri)	4-80-13 (auctioned site)	Dheera
21	Sh. Vijay Mankotia S/o Sh. Saroop Singh Mankotia VPO Baranda Tehsil Nurpur Distt Kangra	Manooni Khad (Part II) (Sand stone bajri)	3-70-72 (auctioned site)	Kangra
22	Sh. Bhupesh Sharma S/o Late Sh. Jeeva nand Sharma Vill Narhali PO Gohar Tehsil Chouchyoit Distt Mandi	Baner Khad (Sand stone bajri)	4-81-07 (auctioned site)	Kangra
23	Sh. Virender Bhateria and Joginder Singh, S/o Sh. Baljeet Singh and S/o Sh. Hari Singh r/o Village Gadiyara PO Geeta Peeth and Village Kutballa PO Lambagaon Tehsil Jaisinghpur Distt Kangra	Beas river (Sand stone bajri)	0-89-42	Jaisinghpur
24	Smt. Kalpana Devi Prop. M/s Kathla Mata Stone Crusher VPO Tiara Tehsil & Distt Kangra	Beas river (Sand stone bajri)	8-73-22	Jaisinghpur
25	Smt. Swapna Kumari W/o Sh. Kalyan Chand Jaggi VPO Haler Tehsil Jaisinghpur Distt Kangra	Beas river (Sand stone bajri)	4-74-51	Jaisinghpur
26	SJVN Corporate Head Quarter , Shakti Sadan ,Shimla ,Himachal Pradesh	Beas river (Sand stone bajri)	4-83-07	Jaisinghpur
27	Sh. Yudhvir Singh Rajput Vill Ropri PO Ghamiru Tehsil Ladbharol Distt Mandi	Hill Slope.	0-76-58	Dheera
28	Sh. Ajeet Kumar S/o late Sh. Sarahra Vill Thatri PO Khaniyara Tehsil Dharamshala Distt Kangra	Hill slope	0-98-55	Dharamshala
29	Sh. Kamaljeet Sharma S/o Sh. Roshan Lal Vill. Bhadwal PO Buni Tehsil Nadaun Distt Hamirpur	Beas river. (Sand stone bajri)	3-68-37	Dehra
30	M/s Shree Ram Stone crusher Partner M/s Ravi verma VPO Kandwal, Tehsil Nurpur Distt Kangra	Chakki river (Sand stone bajri)	02-11-20	Maira Batrah

31	Sh. Pawan Kumar M/s Bhandral Stone Crusher Village Gagwal, Post Office Bhadroya, Tehsil Nurpur, District Kangra	Chakki river (Sand stone bajri)	03-71-27	Lodhwan
32	Sh. Karan Singh Pathania M/s K.K Grit Udyog Village Bain Attarian, Post Office Kandrori Tehsil Nurpur, District Kangra	Chhounch river,Terrace	2-96-23	Bain Attarain
33	Sh. Karan Singh Pathania Partner M/s Jai Shree Hari Gram Udyog Village Bain Attarian, Post Office Kandrori Tehsil Nurpur, District Kangra.	Chhounch river,Terrace	2-94-00	Bain Attarain
34	Sh. Hari Parkash Abhi Prop. M/s Abhi Stone Crusher Company Old GT Road, Damtal	Chakki river, Terrace.	1-86-18	Majra
35	Sh. Rajinder Singh Prop. M/s Mankotia Stone Crusher Village Tipri Post Office Lodhwan , Tehsil Indora	Chakki river, Terrace.	1-37-38	Hagwal
36	Sh. Rameshwer Guleria Partener Mahabir Stone crusher Dhangu Majra Road, Damtal.	Chakki river, Terrace.	1-04-21	Majra
37	Sh. Rahul Pathania M/s Happy SCU-I Dhangu Majra Road Tehsil Indora Distt Kangra	Chakki river, Terrace.	2-09-82	Mohtali
38	Sh. Gurmeet Singh Bhatia Prop. M/S Bhatia Stone Crusher Old GT Road, Damtal	Chakki river, Terrace.	00-70-04	Majra
39	Sh. Gurmeet Singh Bhatia Prop. M/S Bhatia Stone Crusher Old GT Road, Damtal	Chakki river, Terrace.	00-98-53	Majra
40	Sh. Ajay Mahajan Prop. M/s Krishna Stone Crusher VPO Moohtalli Tehsil Indora	Chakki river, Terrace.	00-98-53	Mohtali

21 QUALITY /GRADE OF MINERAL AVAILABLE IN DISTRICT.

The rock types commonly seen in the district are shale, clay and sandstones of Shiwalik group, green shales and fossil rich limestones of Subathu formation, gneissic and granitic rocks of Dhauladhar group, slates, phyllites, schists and limestones of Salooni formation, quartzite, phyllite and limestone of Manjir formation and older rocks comprising slate, schist, quartzite, basic lava flows, salt, marl and dolomite belonging to Jutogh, Sundernagar and Shali formations. The Jutogh is the oldest group of rocks and is seen in a long stretch from east of Bir to Dharmkot. The Sundernagar formation is well exposed between Luni and Sansal khads and north of Tundi khad in Chakki nala. The basic lava flows, known as Mandi-Darla volcanics, occur in small patches in Bir khad, Sansal khad, Luni Khad. The cement grade limestone and salt grits of Dharamkot belong to Shale formation. The rocks of Manji formation can be seen between Bara Banghal and Kankarna Got along the foot track. Salooni formation is exposed at Dhamsar pass near Palachak bridge, Jalta and in the east of Kurkarni Got. The granitic rocks of Dhauladhar occur in a width of five kilometers across Dhauladhar ridge. The rocks of Subathu formation are observed between Manji and Manuni, near Rakh, Bhanjerl and Karti. The rocks of

Shiwalik group occur as several mile wide hill ranges with steeper scraps towards north and can be studied around Damtal, Nurpur, Kotla, Kangra, Jawalamukhi and Dehra Gopipur. Though various economically significant rock formations are found in the district, yet only the sand, stone and bajri deposits are of commercial importence. Besides, slates is also used used as roofing material in Himachal Pradesh. Roofing slates are being quarried at Khaniara, Bhagsunath, Thatri, Kareti and Narwana. Slate mining in the area dates back to the 1880s. Mining is confined to the Chandpur formation which consists of phyllites and slates. These quarries were operated by local contractors on contract from the local panchayats who held mineral rights. But recently, the Government has taken over mineral rights and efforts are being made to organise these mines on scientific and systematic mining methods.

22 USE OF MINERAL

As stated earlier, occurrence a number of economic rocks are found in the district but except minor minerals like Sand, Stone, Bajri and to some extent, slate, none have commercial significance in the district. Sand, stone and bajri are being used as constructin material whreas slates is used as roofing material. Roofing slates are being quarried at Khaniara, Bhagsunath, Thatri, Kareti and Narwana. Slate mining in the area dates back to the 1880s. Mining is confined to the Chandpur formation which consists of phyllites and slates. These quarries were operated by local contractors on contract from the local panchayats who held mineral rights. But recently, the Government has taken over mineral rights and efforts are being made to organise these mines on scientific and systematic mining methods.

23 DEMAND AND SUPPLY OF THE MINERAL IN THE LAST THREE YEARS

Mainly three types of minor mineral constituents such as sand stone and bajri are the main constituents required for the moderen construction/developmental activities apart from other material like cement and steel. With the increase in the developmental activities in the State as well as in the district the demand of minor mineral in the district started an increasing trend. The increase could be gauged from the fact that during 1993-94 the royalty receipt on minor mineral was merely 11.29 lacs which increased up to 2.51 crores in 2009-2010 and 16.34 crore in 2022-23. The royalty received since 2020-21 onwards is tabulated in the following table.

Sr No.	Year	Production of mineral (Approx.) (in Metric tonnes)	Demand of mineral
3.	2020-21	16,32,989	Most of the mining leases granted in District Kangra are situated in the Private lands and the demand of mineral depends upon the development activities which varies from time to time.
4.	2021-22	13,63,043	
5.	2022-2023	19,58,626	

24 ECO - SENSITIVE AREAS IN DISTRICT KANGRA:

The draft Notification dated 28.04.2022 regarding Eco sensitive Zone was issued by the

Ministry of Environment, Forest & Climate change, Govt of India. As per the draft notification about 51 no. of villages of Kangra District are falling in Eco sensitive Zone of Pong Dam Lake Wild Life Sanctuary.

25 IMPACT ON THE ENVIRONMENT DUE TO MINING ACTIVITY.

Mining in District Kangra is restricted only to the extraction/collection of minor minerals such as sand, stone, bajri and Slate to some extent. This type of mining is done by adopting the open cast scheme of mining in the sanctioned lease areas as per the perception of the mining plan. The mining lease areas are predominantly barren and no any type of blasting material is required for such type of mining. The major contributors of pollution in such type of open cast mining are excavation, loading, transportation, and generation of dust which leads only to momentary rise in the suspended particulate matter (SPM). Though there is no large-scale impact of opencast mining on the Environment, however, obtaining Environment Clearance for grant of any type of mining lease has been made mandatory in the Rules.

26 REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT:

As stated earlier, the mining activities in the district are predominantly carried out in barren areas and no any type of blasting material is required for such type of mining. As such there is hardly any impact on Environment other than dust emissions to a smaller extent. Such types of dust emmissions can be controlled by sprinkling water on the working face of mine so that the dust is suppressed. Moreover, to mitigate the impact of mining on the Environment, if any, the mining lease holder has to get approved the Environment clearece as well as mining plan of the area prior to mining wherein adequate procedure for prevention of Environment degradation is prescrived.

27 RECLAMATION OF MINED OUT AREA AND DISASTER MANAGEMENT PLAN.

For the development and conservation of minerals in the State, it has been provided under Rule 35(1) of Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining Transportation and Storage) Rules, 2015 that “No mining lease or contract shall be granted in the State of Himachal Pradesh, unless there is a mining plan approved from the Competent Authority. As such, prior to mining, the mining lease holder has to get approved the mining plan of the area. The said mining plan is required to be prepared in accordance with Form “M” appended with the said Rules wherein sufficient provisions for the reclamation of mined out area as well as management planning is prescribed as per the site-specific conditions.

28 DETAILS OF OCCUPATIONAL HEALTH ISSUES TUBERCULOSIS PATIENTS.

Kangra district represent diverse climatic conditions. Kangra proper is the plain area while the upper part of District Kangra, i, e Dharamshala is hilly and mountainous and extremely rainy, cold and snowy. As such, in the latter part, the respiratory ailments are in plenty in winter, while in the plain area, the diarrheic upsets are quite common in the summer. There are many factors that influence the quality of health services, morbidity and mortality of people residing in the Kangra, however due to the application of technology in mining sector as well as nature of mining in the district (open cast mining) the contribution of mining is negligible for creating health issues of workers. As per the data available with the Health Department the detail of tuberculosis patients is tabulated below.

Sr No.	Year	No.of patients

1.	2019	3288
2.	2020	2391
3.	2021	2658
4.	2022	2943
5.	2023	2798

29 PLANTATION AND GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT.

Specific conditions are being imposed by the state pollution control board during grant of consent to operate to the mines to develope adequate no. of plantation as per the recommendation made in the approved mining plan during operation period and closure of mining activity. Most of the mines of the district are situated in the riverbed areas and reclamation measures are been undertaken by the lease holders including plantation of local species in the peripheral safety zones of the quarries/clusters and along the the haul roads.

The District Survey Report of District Kangra has been updated by covering the mineral bearing areas after taking in to consideration all the relevant features pertaining to geology and mineral wealth in replenish-able and non-replenish-able (paleo- channels) areas of rivers/terraces, stream and other sources related with hill slopes as stated earlier. It is worthwhile to mention here that District Kangra is not known for large-scale minerals/ mining activities unlike other parts of the State and Country. Mostly the minor mineral such as, sand, stone, bajri and slates are well available in various parts of the district, including private and Govt Lands. However, whenever, any of the abovesaid mineral bearing area is applied by any of the project proponent for the grant of mining lease, the same is further inspected by the committee constituted under the chairmanship of concerned Sub Divisional Officer (C) comprising members from Public Works Department, Irrigation and Public Health Department, Forest Department, Pollution Control Board and Mining Officer/Geologist etc. for submission of their recommendations. Thereafter, only as per the site-specific recommendations of the committee, and approval of the detailed “Mining Plan” comprising details of mineral reserves, method of mining, progressive mine closure plan, extent of proposed mining and other related details of the allotted area, the mineral concessions are granted by the Competent authorities after completion of all the codal formalites required under law.

30 MONITORING & EVALUATION

The Ministry of Environment, Forest & Climate Change has published "Enforcement & Monitoring Guidelines for Sand Mining" in the year 2020 wherein Monitoring Mechanism has been defined very specifically and recommended that a uniform monitoring mechanism is required to assess the regulatory provision in quantitative terms, with robust institutional and legal framework. Based on past experience and suggestions available, the following requirements are suggested for defining a mechanism for monitoring of mining activities which will help in identification of mining which is operating either illegally or are violating the regulatory provisions. Some suggestion will facilitate direct or indirect information to help in such an assessment.

1. All precaution shall be taken to ensure that the water stream flows unhindered and process of Natural river meandering doesn't get affected due to mining activity.
2. River mining from outside shall not affect rivers, no mining shall be permitted in an area up to a width of 100 meters from the active edge of embankments or distance prescribed by the Irrigation department.
3. The mining from the area outside river bed shall be permitted subject to the condition that a safety margin of two meters (2 m) shall be maintained above the groundwater table while undertaking mining and no mining operation shall be permissible below this level unless specific permission is obtained from the Competent Authority. Further, the mining should not exceed nine-meter (9 m) at any point in time.
4. Survey shall be carried out for identifying the stretches having habitation of freshwater turtles or turtle nesting zones. Similarly, stretches shall be identified for other species of significant importance to the river eco-system. Such stretch with adequate buffer distance shall be declared as no-mining zone and no mining shall be permitted. The regulatory authority as defined for granting Environmental Clearance, while considering the application of issuance of ToR and/or EC for the adjacent block (to non-mining zone) of mining shall take due precaution and impose requisite conditions to safeguard the interest of such species of importance.
5. District administration shall provide detailed information on its website about the sand mines in its district for public information, with an objective to extend all information in public domain so that the citizens are aware of the mining activities and can also report to the district administration on any deviation observed. Appropriate feedback and its redressal mechanism shall also be made operational. The details shall include, but not limited to, lease area, geo-coordinates of lease area and mineable area, transport routes, permitted capacity, regulatory conditions for operation including mining, environmental and social commitments etc.
6. A website needs to be maintain to track the movement of centralised sand mining and a Centralised server system should be made to manage the data related to sand mining across India.
7. The mineral concession holders shall maintain electronic weighbridges at the appropriate location identified by the district mining officer, in order to ensure that all mined minerals from that particular mine are accounted for before the material is dispatched from the mine. The weighing bridge shall have the provision of CCTV camera and all dispatch from the mine shall be accounted for.
8. The mineral movement shall be monitored and controlled through the use of transit permit with security features like printing on IBA approved MICR papers, Unique bar/QR, fugitive ink background, invisible ink mark, void pantographs and watermarks papers or through use of RFID tagged transit permits and IT /IT-enabled services. Such monitoring system shall be created and made operationalised by State Mining department and district level mining officer shall be responsible for ensuring that all legal and operational mines are connected and providing the requisite information on the system.
9. State Government shall constitute a District Level Task Force (DLTF) under the Chairmanship of Deputy Commissioner/District Magistrate/Collector with Superintendents of Police and other related senior functionaries (District Forest Officer, District transport officer, Regional officer-

SPCBs, Senior Officer of Irrigation Department, District Mining Officer) with one/two independent member nominated by the Commissioner concerned. The independent member shall be retired government officials/teacher or ex-serviceman or ex-judiciary member. The DLTF shall keep regular watch over the mining activities and movement of minerals in the district. The DLTF shall have its regular meeting, preferably every month to reconcile the information from the mining activity, and other observations made during the month and take appropriate corrective and remedial action, which may include a recommendation for revoking mining lease or environmental clearance. The DLTF may constitute an independent committee of the expert to assess the environmental or ecological damage caused due to illegal mining and recommend recovery of environmental compensation from the miner's concern. The recommendation may also include action under the provision of E(P) Act, 1986.

10. The area not identified for mining due to restriction or otherwise are also to be monitored on a regular basis by the DLTF. Any observations of mining activity from the restricted area shall be reported and corrective measures shall be initiated on an urgent basis by the DLTF.
11. The dispatch routes shall be defined in the Environmental Clearance and shall be avoided through densely habituated area and the increase in the number of vehicle movement on the road shall be in agreement with the IRC guidelines / carrying capacity of the road. The alternate and dedicated route shall be explored and preferred for movement of mining to avoid inconvenience to the local habitat. The mining production capacity, by volume/weight, shall be governed by total permissible dispatch calculated based on the carrying capacity of dispatch link roads and accordingly, the production should be regulated.
12. The movement of minerals shall be reconciled with the data collected from the mines and various Naka/check posts. Other measures may also include a general survey of the potential mineable area in the district which has not been leased/auctioned or permitted for mining due to regulatory or other reasons.
13. The location and number of check post requirement shall be reviewed by DLTF on a regular basis so that appropriate changes in location/number could be made as per the requirement. Such review shall be carried out on a regular basis for the district on inter-state boundary or district providing multiple passages between two districts of different states.
14. The district administration shall compile the information from their district of the permitted and legal mined out minerals and other details and share such information and intelligence with the officials of the adjoining district (Inter or/and Intra State) for reconciliation. The information shall include the area of operation, permissible quantity, mined out minerals (production) the permitted route etc., and other observations, especially where the mine lease boundary is congruent with the district boundary. Such coordination meeting shall be held on a quarterly basis, alternatively in two district headquarters or any other site in two districts decided mutually by the District Magistrate.
15. The in-situ and ex-situ environmental mitigative measures stipulated as EMP, CER, CSR and other environmental and safety conditions in mines including the welfare of labours shall properly reflect in the audit report.

31 COMMENTS/ SUGGESTIONS:

HPSEIAA in its 69th meeting on dated 18th June, 2024 approved the DSR of district Kangra and decided to upload the DSR on public domain/ official websites of Department of Industries and Department of Environment, Science Technology & Climate Change for twenty-one days. The comments, if received, shall be considered and if found fit, shall be incorporated in the final Report. As per the decision of the HPSEIAA the DSR was uploaded on the portal. The suggestions received from the users through e-mail on ms.hpseiaa@gmail.com & remarks of the Industries Department are as under:

#	District	Email dated	Comments	Forwarded to industries	Remarks from Industry Deptt., if any
1.	Kangra	17-Jul-24	"District Survey Reports" District- Kangra Himachal Pradesh page no. 202 Serial no.5 "Golden Karamjot Stone Crusher VPO Riyali Tehsil Fatehpur Distt Kangra HP in this regard you have shown Annual Production (12000 MT) however the Annual Production of above lease area assessed in Mining Plan (80000 MT) is different.	18-Jul-24	The necessary corrections have been made in the DSR. Please refer Sr. No. 5.
2.	Kangra	17-Jul-24	Please add our mining lease areas details in district survey reports details given below 1 Rajinder Singh Collection/extraction of sand,stone and bajri Khasra no 1910/348 measuring 3-86-34 hectare falling in Mohal and Mauza Lodhwan Pratham of Tehsil Indora Distt. Kangra Himachal Pradesh . Upcoming Lease in the name of Shri Devender Mankotia falling in Mohal Ghandra having khasra No 2052,2124,2125,2126 14.48 hectare Tehsil Indora District Kangra Himachal Pradesh	18-Jul-24	The letter of intent is in-principle approval to obtain the required clearances for the grant of mineral concession. The applicant has to complete the codal formalities like preparation of a mining plan and has to obtain environmental clearance before the grant of mineral concession. As such, it is an ongoing process and as soon as the clearances are obtained, the letters of intent are converted into mining lease. Also, if the letter of intent holder is unable to obtain the required statutory clearances within the validity period of letter of intent, the period is either extended or

					withdrawn. Also, please refer to the email sent on 19.07.2024 to ms.hpseiaa@gmail.com
3.	Kangra	17-Jul-24	Not included in DSR - Our lease area is under process for getting environmental clearance. As per previous DSR report our lease area is not mention. Kindly add our area given below in the updated DSR. “Sand, Stone & Bajri Mining Project” Located at Khasra No. 1363. Near Mauza/Mohal Har/Jaladi,Tehsil & District- Kangra, H.P.Area: 4-81-07 Hectares Production Capacity: 72,596TPA	18-Jul-24	-do-
4.	Kangra	17-Jul-24	Not included in DSR - Extraction of sand, stone & bajri over an area situated in Khasra No. 1019/4, measuring an area 01-49-47 Hectares (Private Land/Hill Slope) falling in Mohal Baldoh & Mauza Garli, Tehsil Pragpur, District Kangra, Himachal Pradesh, proposed by Sh. Sachin Langa, Prop. M/s Krishna Stone Crushing Company, V.P.O. Nakki Pragpur, Tehsil Pragpur, District Kangra, Himachal Pradesh	18-Jul-24	-do-
5.	Kangra	17-Jul-24	Not included in DSR - Extraction of Stone, Sand and Bajri falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Proposed by Sh. Andresh Syal, S/o Sh. Pritam Chand, Alampur, Sub-Teh. Alampur, District Kangra, Himachal Pradesh, over Khasra No. 740, measuring an area 01-58-56 Hectare, (Private Land/River Bed)	18-Jul-24	-do-
6.	Kangra	17-Jul-24	Not included in DSR - Extraction of Stone, Sand and Bajri falling in Mauza Alampur, Mohal Bagh, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh by Proposed by Sh. Andresh Syal, S/o Sh.	18-Jul-24	-do-

			Pritam Chand, Alampur, Sub-Teh. Alampur, District Kangra, Himachal Pradesh, over Khasa No. 750 & 800/747 measuring an area 04-39-42 Hectare		
7.	Kangra	17-Jul-24	Not included in DSR - Extraction of Minor Mineral Sand, Stone & Bajri, at Khasra No.2885/2713/1 & 2886/2713/1, Measuring an area 01-79-62 Hectares (Private land, Terrace deposit) Falling in Mauza/Mohal Raja Khas, Tehsil Indora, District Kangra, Himachal Pradesh, Proposed by Sh. Devi Singh, Partner M/s Jai Lakshmi Stone Crursher V.P.O. Kandrori, Tehsil Indora, District Kangra, Himachal Pradesh.	18-Jul-24	-do-
8.	Kangra	17-Jul-24	Not included in DSR - Extraction of sand, stone and bajri, for the purpose of open sale of mineral, over an area measuring 00-80-46 Ha., bearing Khasra nos. 1326/2 and 1325/1 (Private Land, River Bed) falling in Mohal Kutballa, Mauza Lambagaon, Tehsil Jaisinghpur, District Kangra, Himachal Pradesh Sh. Gaurav Manhas, S/o Sh Swaroop Singh, V.P.O. Tiara, Tehsil & District Kangra, Himachal Pradesh	18-Jul-24	-do-
9.	Kangra	16-Jul-24	Not included in DSR -"District Survey Reports" District-Kangra Himachal Pradesh page no. 15 Serial no.20 "Smt. Malkeet Kaur W/o Sh. Dinesh Singh VPO Soldha Tehsil Jawali Distt Kangra" in this regard you have shown production as per Environment Clearance (13 7 660 MT) however the Annual Production of above lease area assessed in Mining Plan (139050 MT) is different. Therefore it is humbly submitted that kindly correct this in the survey document before approval of the DSR.	18-Jul-24	There is no need to make any changes in the production level as the mineral concession holder has to restrict the production as per mining plan or environment clearance, whichever is less
10.	Kangra	16-Jul-24	Our mining lease is not added in district survey report of	18-Jul-24	The details are already given the in the DSR at

			Kangra.Kindly add our mining lease as per given below details for helping us getting environment clearance Mining Lease for Sand, Stone and Bajri by Shri Raghubir Singh Prop. M/s Kajal Stone Crusher area having lease area 4-87-36 hectare falling in khasra No 582/1,585/1,725/1 situated Mohal Mouch Upperla Mauza Sunet Tehsil Fatehpur District Kangra and State Himachal Pradesh.		Sr. No. 53 .
11.	Kangra	16-Jul-24	Not included in DSR -Prop: Sh Gurmeet Singh M/s Bhatia Stone Crusher R/o Village: Old GT Road Damtal, Tehsil: Indora, District: Kangra Sand, Stone & Bajri Mining Project" Located at Khasra No. 131/2 Near: - Mohal & Mauza: Majra, Tehsil: Indora, District: Kangra (Himachal Pradesh) Lease Area: 0-70-04 Hectares (Pvt Land/Terrace deposit) Proposed Production Capacity: 16,099 TPA(ROM) (Sand Stone & Bajri: 4,830 MT, Top Soil & Clay:11,269 MT)	18-Jul-24	The letter of intent is in-principle approval to obtain the required clearances for the grant of mineral concession. The applicant has to complete the codal formalities like preparation of a mining plan and has to obtain environmental clearance before the grant of mineral concession. As such, it is an ongoing process and as soon as the clearances are obtained, the letters of intent are converted into mining lease. Also, if the letter of intent holder is unable to obtain the required statutory clearances within the validity period of letter of intent, the period is either extended or withdrawn. Also, please refer to the email sent on 19.07.2024 to ms.hpseiaa@gmail.com
12.	Kangra	16-Jul-24	Not included in DSR -Prop: Sh Gurmeet Singh M/s Bhatia Stone Crusher R/o Village: Old GT Road Damtal, Tehsil: Indora, District: Kangra "Sand, Stone & Bajri Mining Project" Located at Khasra No. 1390/3	18-Jul-24	-do-

			and 1391 Mohal & Mauza: Mohtil, Tehsil: Indora, District: Kangra (Himachal Pradesh) Lease Area: 0-90-52 Hectare (Pvt Land/Terrace Land) Proposed Production Capacity: 21,566 TPA(ROM) (Sand, Stone & Bajri- 3,235 TPA, Top Soil and Clay- 18,331 TPA)		
13.	Kangra	14-Jul-24	Objections, suggestions and comments for the district survey reports of District Kangra - by Bhag Hussain (Adhar no. 723022645750) Kanta Devi (Adhar no. 287815870245) Jugal Kishor (Adhar no. 975505702286) - that Comprehensive and detailed specific survey report of the Mand area (downstream of Shah Nahar Barrage to Tamota Village Stretch after defining State Area) may be prepared by the Geological Wing of the Industry Department through expert agency prior to allotment of mineral plots, as was done in the case of Chakki River bed instead of the District Survey Report. No such specific survey report of the Mand area was prepared; hence the DSR report is against the recommendation made by the committee formed by the Hon 'ble High court of Himachal Pradesh. It is, therefore, respectfully prayed that the specific report of the Mand Area downstream to Shah Nagar Barrage to Tamota Village Stretch after defining the boundary between HP an Punjab and putting Pukka point on the spot be prepared by the geological wing of industries by associating local people, agricultural experts and subject matter experts and after conducting the survey through the experts agency prior to allotment of mineral plots in the Mand area as done in the	15-Jul-24	The objections stands already covered and the detail has been mentioned specifically under the recommendations part of river Beas catchment of DSR.

			Chakki river bed instead of having the district survey report of whole district of Kangra.		
14.	Kangra	4th July 2024	M/s Sidhi Vinayak Stone Crusher for Extraction/Collection of sand, stone & bajri located at Khasra No. 79/1(05-72-02 Ha) and 447/1 (04-24- 62) in the river bed of Soan river having an area of 09-96- 64 hectare, Mohal Ranoh, Tehsil- Jaswan, District- Kangra, Himachal Pradesh.	4th July 2024	The letter of intent is in-principle approval to obtain the required clearances for the grant of mineral concession. The applicant has to complete the codal formalities like preparation of a mining plan and has to obtain environmental clearance before the grant of mineral concession. As such, it is an ongoing process and as soon as the clearances are obtained, the letters of intent are converted into mining lease. Also, if the letter of intent holder is unable to obtain the required statutory clearances within the validity period of letter of intent, the period is either extended or withdrawn (Refer Page 1999 of DSR). Also, please refer to the email sent on 19.07.2024 to ms.hpseiaa@gmail.com

The Deptt. of Industries vide email dated 19th July, 2024 informed that the Department grants mineral concessions by two modes, one through auction and another through mining leases. In both the cases, as per the provisions contained in the Himachal Pradesh Minor Minerals (Concession) and Minerals (Prevention of Illegal Mining, Transportation and Storage) Rules, 2015, the areas are inspected by the Joint Inspection Committee under the Chairmanship of SDO (Civil) concerned comprising members from other department like Irrigation & Public health, State Pollution Control Board, Forest Department, HP Public Works Department, Geologist or Mining Officer and as such, the letter of intents are issued only after recommendations of the Joint Inspection Committee which is continuous process.

The letter of intent is in-principle approval to obtain the required clearances for the grant of mineral concession. The applicant has to complete the codal formalities like preparation of a mining plan and has to obtain environmental clearance before the grant of mineral concession. As such, it is an ongoing process and as soon as the clearances are obtained, the letters of intent are converted into mining lease. Also, if the letter of intent holder is unable to obtain the required statutory clearances within the validity period of letter of intent, the period is either extended or withdrawn.

So, the list of letters of intents cannot be provided at this stage as these are dynamic in nature and only the information of granted mineral concessions is provided in the updated DSR.