



Office of The Managing Director

Uttarakhand Forest Development Corporation

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Letter No. 31990 /EIA

Dated 27 June, 2016

To

Member Secretary
Expert Appraisal Committee (Non-Coal Mining)
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhavan
Jor Bagh Road, New Delhi-110003

Subject: Updated EIA report and point-wise reply as per the observation raised by EAC for the grant of EC for proposed "**Extraction of Sand, Bajri and Boulder (Minor Mineral)**" [area- 60 Ha] by **M/s Uttarakhand Forest Development Corporation** at Choharpur Forest range, Village- Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand.

Ref:- MOM issued for the 6th meeting of the EAC held on 23rd- 24th May, 2016

Sir,

With reference to the subject mentioned above our case was appraised by EAC in the 6th meeting held on 23rd -24th May, 2016 for EC. The following observations were raised by committee members as well as an ADS was generated by Member Secretary. We are hereby submitting the Updated EIA report with point wise reply for the same.

Sl. No.	Observation	Reply
1.	The Project Proponent has not submitted the compliance of TOR 15 adequately and mentioned that there is no National Park and Sanctuary within 10 km radius of study area. However, the Committee observed that there is Binog Wildlife Sanctuary lies within 10 km radius of the Mine lease area. PP needs to submit clarification and distance certificate of Binog Wildlife Sanctuary from the State Government with respect to protected areas.	Binog Wildlife Sanctuary is situated at 9.89 km distance from the project site in the North East Direction. The authentication letter and map showing the distance of Binog Wildlife Sanctuary from the project site issued by Chief Conservator of Forest, Dehradun is attached as Annexure -XI and Annexure -XII of EIA report respectively.

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2. The PP mentioned that the baseline data were monitored during March to May, 2015. However, in the EIA/EMP report (Annexure VI), the ground water quality, Ambient Air Quality, Soil analyses data reported for the period of March to May 2014 which is before the issuance of TOR. The Committee is of the view that the project proponent need to submit the correct data and revise the report accordingly.	The corrected baseline data, monitored during March to May, 2015 is given in the Chapter-3 of the EIA Report as well as attached as its Annexure VI .
3. The Project Proponent has not submitted the compliance of TOR 21 w.r.t. submission of analyses/testing report done by MoEFCC/NABL accredited laboratory.	Compliance of TOR 21 i.e. analyses/testing report done by MoEF&CC/NABL accredited laboratory is attached as Annexure VI of EIA report.
4. The Committee observed that the Project Proponent has not categorized the reserve adequately as per the UNFC classification in the Mine Plan (page no. 8); The Committee is of the view that the project proponent need to revise the Mine Plan and submit accordingly.	The mining plan with adequate categorization of reserves as per UNFC classification is attached as Annexure VII of EIA report.
5. Since the Lease is in forest land the Project Proponent need to submit the Stage I FC.	The forest clearance for the project has been applied vide proposal No. FP/UK/ MIN/ 6/2015 on date 19/01/2015. The clearance is thus under process.
6. The Project Proponent has also not submitted the Questionnaires.	The questionnaire for the project is attached as Annexure XIV of EIA report.

You are requested to kindly consider our proposal in the next meeting of EAC and accord the environment clearance.

Thanking You!

Yours Faithfully,



(S.T.S. Lepcha)

Managing Director

Uttarakhand Forest Development Corporation



**FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR
"PROPOSED SAND BAJRI & BOULDER (MINOR MINERAL)
MINING ON THE BED OF KOT MOT RIVER"
(AREA- 60 HA.)**

**AT VILL-RUDRAPUR TEHSIL- VIKASNAGAR,
DISTRICT- DEHRADUN, UTTARAKHAND**

PROJECT PROPONENT

M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION



M.2016

JUNE 2016



Prepared By

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**Final EIA Report Of Sand, Bajri, Boulder Mining From The River Bed of Kot Mot (60 Ha) at
Village Rudrapur Tehsil- Vikasnagar, District- Dehradun, Uttarakhand**

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Annexure-III	Joint Inspection Report
Annexure-IV	Replenishment and drainage study from the reputed institute
Annexure-V	UKFDC Environment Policy
Annexure-VI	Lab Report
Annexure-VII	Approved Mine Plan
Annexure- VIII	Geological Section Plate
Annexure- IX	Public Hearing Minutes
Annexure- X	Conservation Plan
Annexure-XI	Authentication statement of distance of nearest wildlife sanctuary by Chief conservator of forest
Annexure-XII	Authentication map of distance of nearest wildlife sanctuary by Chief conservator of forest
Annexure-XIII	NABL Certificate
Annexure-XIV	Questionnaire

CHAPTER-1 INTRODUCTION

1.1 PREAMBLE

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage of project planning & design, find ways & means to reduce adverse impacts. By using EIA, both environmental & economic benefits can be achieved. By environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project.

Rivers are the most important life sustaining system of nature and play a vital role in transport of sediment (material) from one place to other. Total quantity of material transported by rivers, a substantial part is detained within its channels and adjoining environments as fluvial deposits. River sand (Bajri) will not create any problem to river in the ecosystem as the quantity of mining well within the replenishment limits. To cope with the ecosystem systematic and scientific mining is necessary with a certain depth from surface of river channel. Quarrying of river sand is an important economic activity in India as well as in the state of Uttarakhand. Uttarakhand has varying topographic features and a major part of the state is dominated by ephemeral rivers. River sand (Bajri) plays a crucial role to the construction industries and infrastructure projects used as a basic raw material in mortars and concrete.

The Ministry of Environment and Forests, Govt. of India, through its EIA notification number SO1533 (E) of Sept. 14th, 2006 and its subsequent amendments later under the Environment Protection Act, 1986, classified the projects under two categories – A (≥ 50 ha) and B (≥ 5 ha but < 50 ha). Category-A projects (including expansion and modernization of existing projects) require Environmental Clearance from Central Government (Ministry of Environment and Forests, Govt. of India, New Delhi) while Category – B projects are considered by State Level Environmental Impact Assessment Authority (SEIAA), constituted by MoEF&CC, New Delhi. In case, any category “B” project attracts the “General Condition” given in the EIA notification, it shall be treated as category “A” and will be considered at MoEF&CC, New Delhi.

The proposed project is categorized under category “A” 1 (a) (mining lease area ≥ 50 hectare) - {Mining of Minerals} as the lease area is 60 ha and will be considered at MoEF&CC, New Delhi.

In order to assess the likely impacts arising out of the project, the Environmental Impact Assessment (EIA) study is undertaken, which will be followed by preparation of a detailed Environmental Management Plan (EMP) to minimize those adverse impacts.

1.2 GENERAL INFORMATION ON MINING OF MINERALS

Uttarakhand, Located at the foothills of the Himalayan Mountain ranges, it is largely a hilly State. It is rich in natural resources especially water and forests with many glaciers, rivers, dense forests and snow-clad mountain peaks. Heavy rains are common in Uttarakhand districts. The river along its course brings huge quantity of material consisting of sand, boulder & bajri during every monsoon. This material has to be removed every year in order to channelize the river course and to prevent it from widening.

1.3 ENVIRONMENTAL CLEARANCE

As per EIA notification, 2006 and its subsequent amendments later, the project activity has been categorized as Category- A project, as the mining lease area is 60 hectare.

The Environmental Clearance process for the project will comprise of three stages. These stages in sequential order are given below:-

- Scoping,
- Public consultation &
- Appraisal

Scoping of the EIA study (in the form of Terms of Reference) has already been carried out by MoEF&CC, New Delhi after the presentation for obtaining Terms of Reference (TOR) before the Reconstituted Expert Appraisal Committee (Mining) on date September 25th – 26th, 2014. The same was communicated vide MoEF&CC letter no. J-11015/239/2014-IA.II (M) dated. 27.10.2014. This report has been prepared as the scoping done by the MoEF&CC and Terms of Reference issued for the proposed project. This draft EIA report was submitted to SPCB, Uttarakhand for the public consultation. The comments/suggestions from the public have been incorporated and the final report has been submitted to MoEF&CC, Delhi for appraisal of the proposed project. The report has been prepared using the following references:

- Guidance Manual of Environmental Impact Assessment For Mining of Minerals, Ministry of Environment and Forests, 2010
- Form-1 as per EIA Notification, 14th September, 2006
- Sedimentation study of the river
- Pre-feasibility Report
- In addition, other relevant standards for individual activities such as sampling and testing of environmental attributes have been followed.
- ToR prescribed by MoEF&CC

1.4 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The main objectives of this EMP are listed below:

Final EIA Report Of Sand, Bajri, Boulder Mining From The River Bed of Kot Mot (60 Ha) at Village Rudrapur Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

- To establish the present environmental scenario.
- To anticipate the impacts of mining operations on the environment.
- To prepare a detailed action plan for implementation of mitigation measures.
- To suggest preventive and mitigation measures to minimize adverse impact and to maximize beneficial impacts.
- To suggest a monitoring programmed to evaluate the effectiveness of mitigation measures.
- To suggest the formation of a core group responsible for implementation of environmental control and protective measures and monitoring of such implementation.
- To prepare a capital cost estimate and annual recurring cost for Environmental Management Plan.

1.5 METHODOLOGY FOR EIA

M/s. Mantec Consultants Pvt. Ltd. was assigned the job, to conduct EIA study for the project 'Extraction of Sand, Bajri & Boulders mine at Village-Rudrapur, Vikasnagar, District- Dehradun, Uttarakhand'.

The study was conducted within 10 Km radius from the proposed mine as centre. The base line data collection involves the data's of air quality, water status, land use; socio-economic structure of the study area, existing flora, fauna, prevailing noise levels, along with the physiographical status and meteorological conditions of the area. The current report is based on the mining technique, air emissions, waste water generation and discharge, and solid waste management. It also highlights the safety measures adopted. Effective plans to mitigate the adverse impacts and suggestive pollution control measures along with environmental management plan have been summarized.

The field survey for the collection of the baseline data commenced from March, 2015 to May, 2015 for collecting data related to air, water, noise, geology, flora, fauna, forest types and ecological parameters including soil types. Door to door socio-economic survey of the project area was also conducted. Field surveys in the study area were also conducted. For this purpose various attributes such as land features, rivers, and forest and vegetation types were recorded on the ground.

1.6 SCOPE OF STUDY

Application (Appendix-I/Form-I/ToR and Pre-Feasibility Report) for obtaining Environmental Clearance from Ministry of Environment & Forests, New Delhi for this project were submitted on 29.08.2014. The ToR presentation was held on 23rd Meeting of Reconstituted Expert Appraisal Committee (EAC) of MoEF&CC on September 25th - 26th, 2014. The committee

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prescribed the TOR for EIA study of the proposed project vide letter no. J-11015/239/2014-IA.II (M) dated 27.10.2014.

1.6.1 DATA GENERATION

The data has been generated by M/s Mantec Consultants in accordance with the requirement of statutory agencies from March to May 2015. The monitoring and testing has been done as per the guidelines of MoEF&CC and the IS standards. Monitoring has been conducted for the following parameters:

1.6.2 DATA COLLECTION

The EIA study is being done for the Mine Lease (core zone) and area within 10 km radius (buffer zone), both of which comprise the study area. The following data, through field survey and other sources, has been collected by Mantec Consultants Pvt. Ltd., for preparing the EIA/EMP for the proposed mining area with related facilities:-

- Details of wild fauna and flora within a distance of 10 km from the project site and information about forests, if any
- Eco-sensitive places, sanctuaries, biosphere reserves within 10 km radius
- Physical environment (Air, Water, Soil, & noise) baseline data
- Religious places / historical monuments and tourist places within 10 km radius.
- Land use pattern within core zone and buffer zone (10 km radius around the core zone) based on Survey of India topo-sheet map and satellite image.
- Demography and Socio-economic based on last available Census data for entire study area.
- Relevant meteorological data, for previous decades from Indian Meteorological Department (IMD) and primary data.
- Study of present environmental protection and mitigation measures.
- Identification of water bodies, hills, roads etc. within 10 km radius.

1.6.3 PREPARATION OF EMP

The EMP will include the following details:

- Present Environmental Setting
- Identification, prediction and evaluation of anticipated environmental impact due to the proposed mining operation and related facilities
- The environmental impacts would be anticipated in core and buffer zone
- Topography and drainage
- Climate

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- Water quality (Surface/Ground)
- Hydro-geological Regime
- Air quality
- Noise Levels
- Soil Quality
- Flora and Fauna
- Traffic density
- Land-Use
- Socio-Economic Conditions
- Health, culture, human environment including public health, occupational health and safety
- Measures to control the surface and ground water pollution due to various effluents to be discharged, if any
- Measures to control air pollution due to proposed activities/operation
- Green belt development plan and reclamation plan of mine.
- Measures to contain noise pollution & mitigate adverse impact on workers and habitat in core and buffer zone
- Pronounce the improvement in socio-economic conditions & benefits the people will get on implementation of the project
- Measures to control health hazard of workers and surrounding population
- Total and specific cost of control measures
- Environmental monitoring, implementation organization and feedback mechanism to effect mid-course corrections
- Identification of flora species which can be planted in and around the project

1.7 TERMS OF REFERENCE

The application for TOR for the proposed “Sand, Bajri and Boulder (Minor Minerals) mining in Kot Mot River bed” by M/s Uttarakhand Forest Development Corporation located near village- Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand was submitted on dated 29.08.2014 and the same was considered in the 23rd Meeting of Reconstituted Expert Appraisal Committee (EAC) of MoEF&CC held on September 25th–26th, 2014. The committee prescribed the TOR for EIA study of the proposed project vide letter no. No. J-11015/239/2014-IA.II (M) dated 27.10.2014 (Copy enclosed as Annexure- I). The point-wise compliance of the TOR is given in Table 1.1 as under:-

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Table 1-1:Point-Wise Compliance of Prescribed ToR

S. N.	ToR POINT	COMPLIANCE OF ToR
1.	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification, 1994 came into force w.r.t. the highest production achieved prior to 1994.	Proposed project is a new mine allotted to M/s Uttarakhand Forest Development Corporation (UKFDC) on 23.01.2013. (Copy of Letter of Intent (LOI) attached as Annexure-II). No production from the mine lease area has been carried out by the project proponent. Mining will start only after getting requisite Environmental & other statutory clearances.
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	Mine has been allotted in the name of M/s UKFDC vide Letter of Intent (LOI) no. 584/BHU/KANI/E/2012-13 dated 23.01.2013 by Director of Mines & Geology Department, Uttarakhand (Copy of same attached as Annexure-II).
3.	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.	All the documents are compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology. Approved Mine Plan is attached as Annexure-VII . Lessee Name: UKFDC Mine Lease Area: 60 Ha Proposed Capacity: 3,60,000 TPA Waste Generation & Management: No solid waste other than negligible quantity of silt/silty clay, which will be further used for plantation purpose. Mining Technology: Manual open-cast method
4.	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet should be provided.	Details of corner coordinates of the project site have been incorporated in Chapter no. 3 of

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	Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	Final EIA/ EMP Report. Land use & High resolution Imagery are also incorporate in Figure no-3.3 of Chapter no. 3. Map indicating core zone and buffer zone of study area within 10 km radius from the mine lease is shown in Chapter 3 of Final EIA reports
5.	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large may also be detailed in the EIA report.	Details of Environment policy and hierarchical system / administrative order of the Company to deal with the environmental issues are given in Sub Section 9.11 Chapter 9 of Final EIA reports. Copy of Environmental Policy is attached as Annexure-V.
6.	Issues relating to Mine Safety, including subsidence study, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	The method of mining is opencast manual mining. Therefore no blasting activity is involved in the open cast mining. Details of safeguard measures are given in Section 7.4 of Chapter 7 of Final EIA reports.
7.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the	The study area comprises of 10.0 km zone around the mine lease periphery as shown in the study area Map is given in Figure 3.1 of

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	EIA such as waste generation etc should be for the life of the mine / lease period.	<p>Chapter 3 of Final EIA reports.</p> <p>No solid waste other than negligible quantity of silt/silty clay, which gets deposited as crust material on the bed profile, shall be scrapped and deposited into the mine pits or in the upper terraces or used for plantation purpose.</p> <p>Only domestic sewage shall be generated, which shall be treated with the help of Bio-Digestor Toilets and the recycled water shall be used for horticulture and dust suppression.</p>
8.	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	<p>A map delineating all the features such as Forests, Agricultural Land, Grazing Land and National Parks etc. has been prepared and given in Figure 3.3 of Chapter 3 of Final EIA reports.</p> <p>Land use classification of 10 Km radius study area around the mine site, is given in Section 3.1 of Chapter 3 of Final EIA reports.</p> <p>Impact of change of land use is given in Section 4.1 of Chapter 4, along with the mitigation measures.</p>
9.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	There is no proposal for storage of over burden outside the mining lease area. Over burden material shall be used for backfilling into the mine pits/in the upper terraces or for plantation purpose.
10.	A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests,	Forest clearance has been obtained by Project Proponent from MOEF, New Delhi. It will be submitted at the time of final EIA.

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	the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	
11.	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	The Forest clearance of the project was applied on 19 th January, 2015 vides proposal number-FP/UK/MIN/6/2015, which is still under process (copy attached). Details of Compensatory afforestation are given in Section 9.5 of Chapter -9 .
12.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	As per the Socio-economic survey and census data no scheduled tribes and other Traditional Forest Dwellers are reported residing in the study area.
13.	The vegetation in the RF / PF areas in the study area, with necessary details, should be given.	The vegetation in the RF/PF area is given in Section 3.3.10.3 of Chapter-3 of EIA report.
14.	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly detailed mitigative measures required, should be worked out	Binog Wildlife Sanctuary is at 9.89 km distance from the project site in the North East Direction. (Authenticated letter and map showing the same is attached). Details of fauna existing within the study area are given in Section 3.3.10.5 in Chapter-3 of EIA report.

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	with cost implications and submitted.	Anticipated impact of mining on the same along with suggested mitigation measures is incorporated in Section 4.6 of chapter 4 of EIA report.
15.	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves/Critically Polluted Areas/Aravalli (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the State Wildlife Department/Chief Wildlife Warden under the Wildlife (Protection) Act, 1972 and copy furnished.	Binog Wildlife Sanctuary is situated at a distance of 9.89 Kms from the project site in the North East direction. (Authenticated Location map attached as Annexure- XI)
16.	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease) shall be carried out. Details of flora and fauna, duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished.	Details biological study (flora & fauna) within 10 km radius of the project site have been incorporated in Section 3.3.10 of Chapter no.3 of Final EIA Report. Flora listed in Scheduled-I have been found in study area so necessary plan for their conservation has been prepared and attached as Annexure-X .

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	Necessary allocation of funds for implementing the same should be made as part of the project cost.	
17.	Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	The proposed project does not come within 10 Km radius of any 'Critically polluted' area neither it comes under 'Aravalli range'. Hence not applicable.
18.	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village located in the mine lease area will be shifted or not. The issues relating to shifting of Village including their R&R and socio-economic aspects should be discussed in the report.	As per the Socio-Economic Survey, no R&R Plan is envisaged; as there is no displacement of people from their respective areas. There are no SCs/STs and any other weaker sections in the study area.
19.	One season (non-monsoon) primary	Primary baseline data has been generated for a

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	<p>baseline data on ambient air quality (PM₁₀, SO₂ and NO_x), water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction.</p> <p>The mineralogical composition of PM₁₀, particularly for free silica, should be given.</p>	<p>period of three months for March, 2015 to May, 2015. The results of the same have been incorporated in Chapter no. 3.</p> <p>Results and details of Monitoring location details are incorporated in Chapter no.3</p>
20.	<p>Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</p>	<p>In order to predict the particulate emissions, Aermom view software model ISCT3 was used to predict changes in air quality i.e., maximum ground level concentration (GLCs) of PM₁₀, SO₂ NO₂, due to the mining activity. The inputs required for the model are:-</p> <ul style="list-style-type: none"> ✓ Hourly meteorological data ✓ Source data ✓ Receptor data ✓ Programme control parameters <p>Details of Air quality modeling is given in Section 4.4 of Chapter 4</p>

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21.	The project proponent shall enclose all the analysis /testing reports of water, air, soil, noise etc.using the MOEF/NABL accredited laboratories. All the original analysis/testing reports should be available during the appraisal of the project.	All monitoring & testing has been done by the NABL accredited lab. All the original analysis reports will be available during the appraisal of the project.
22.	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Freshwater requirement for the Project should be indicated.	The water requirement for the project is 15 KLD. Details are Incorporated in Section 2.11 of Chapter- 2 of EIA report.
23.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	No ground water will be extracted for this project. Water requirement shall be fulfilled by tanker water supply. Therefore clearance from competent authority is not required.
24.	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.	Water conservation measures shall not be adopted, as the proposed project is for river bed mining.
25.	Impact of the project on the water quality, both surface and groundwater should be assessed and necessary safeguard measures, if any required, should be provided.	Impact of the proposed project on the water quality, both surface and groundwater are given in Section 4.3 of Chapter-4.
26.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect	Details for working depth and groundwater level are given in Section 9.3 of Chapter-9. Working will not intersect groundwater table, hence any detailed Hydro Geological Study is not

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	groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	required. Water requirement will be met by tanker supply therefore permission from Central Ground Water Authority for pumping of groundwater is not required.
27.	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	Proposed mining of sand/bajri/boulder is to be carried out itself in Kot Mot river bed to channelize the river flow. No other stream crosses the mine site.
28.	Information on site elevation, working depth, groundwater table etc. should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	Information on site elevation, working depth, groundwater table has been given in Section 9.3 of Chapter 9.
29.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project.	A time bound Progressive Greenbelt Development Plan has been given in Section 9.5 of Chapter-9.
30.	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if	Impact of projected increase in truck traffic on local transport infrastructure due to the Project has been given in Section 4.10 of Chapter-4.

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	contemplated (including action to be taken by other agencies such as State Government) should be covered.	
31.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.	Details of Infrastructure facilities for the mine workers are given in Section 2.12 of Chapter 2.
32.	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Details of post mining land-use are given in Section 2.13 of Chapter 2.
33.	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given.	Time bound Progressive Greenbelt Development Plan and compensatory plantation details are given in Section 9.5 of Chapter-9.
34.	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP.	Details of Occupational health impacts & medical examination schedules are given in Section 9.7 of Chapter 9.
35.	Public health implications of the Project	Public health implications of the Project and

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	and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	proposed remedial measures along with the budget are given in Section 9.10 of Chapter 9.
36.	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Details of socio economic significance and influence to the local community are given in Section 4.7 of Chapter 4.
37.	Detailed environmental management plan to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	Environmental Management Plan has been given in Chapter-9.
38.	Public hearing points raised and commitment of the project proponent on the same along with time bound action plan to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	Public Hearing was conducted on date Jan 19, 2016. Public hearing points were raised and commitment of the project proponent on the same along with the time bound action plan to implement the same is tabulated in Table 7.1. Public hearing minutes attached as Annexure-IX.
39.	Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the project should be given.	No litigation is pending against the proposed project.
40.	The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be	The cost of project is given in Section 2.1 of Chapter 2 and EMP cost has been given in Section 9.10 of Chapter-9.

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	spelt out.	
41.	Provide a brief background of the project, financial position, group companies and legal issue etc; past and current important litigations.	A brief background of the project and its details are given in section 1.7 of the report. No litigation is pending in any court against this project.
42.	Details of Replenishment studies	Replenishment study has been conducted and Detailed Study is incorporated as Annexure-IV .
43.	Details of Transportation of mined out materials as per the Indian Road Congress for both the ways (loaded as well as unloaded trucks) load and its impact on Environment.	Details of Transportation of mined out materials is given in Section 4.10 of Chapter 4 .
44.	Proper species specific conservation plan for Schedule-I and II species.	Authenticated species specific conservation plan for Schedule I and II species are given in Chapter 3 .
45.	Impact of mining on plankton	Impact of mining on plankton is given in Section 4.6 of Chapter 4 .
46.	Details of excavation schedule & sequential mining plan to be indicated.	A detail of excavation schedule is given in Section 2.14 of Chapter 2 .
47.	Appropriate Disaster Management safeguards in view of the high seismicity of the area.	Disaster management plan is given in Section-7.4.1 of the Chapter-7 .
48.	Authenticated map with regard to distance of Sanctuary/National Park from the mine lease area.	Distance of sanctuary/National Park from the mine lease area is given in Chapter-2 . The authenticated map showing distance of the nearest wildlife sanctuary and the authorized letter with this regard by Office of Forest Conservator is attached as Annexure-XI.

1.5 POST ENVIRONMENT CLEARANCE MONITORING

The project management will submit a half yearly compliance report in respect of stipulated prior Environmental Clearance terms and conditions on 1st June and 1st December of each

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calendar year. The latest such compliance report will be displayed on the website of the concerned regulatory authority.

1.6 GENERIC STRUCTURE OF ENVIRONMENT IMPACT ASSESSMENT REPORT

In terms of EIA Notification of the MoEF, New Delhi dated 14th September 2006, and its subsequent amendments later, the generic structure of the EIA report is as under in **Table 1.2**

Table 1-2: Generic Structure of EIA Report

Chapter No.	Title
1.	Introduction
2.	Project Description
3.	Description of Environment
4.	Anticipated Environment Impact & Mitigation Measures
5.	Analysis of Alternatives
6.	Environment Monitoring Programme
7.	Additional Studies
8.	Project Benefits
9.	Environment Management Plan
10.	Summary & Conclusion
11.	Disclosure of Consultants

1.7 IDENTIFICATION OF PROJECT PROPONENT

Uttarakhand Forest Development Corporation (UKFDC) is a statutory body constituted by the State Government of Uttarakhand. The Corporation was formed for the better preservation, supervision and development of forest also for better exploitation of forest produce within the State and for matters connected there with.

The Corporation has been progressing forward not only in its financial aspect but also has taken a big leap in the direction of diversification of its activities.

The Corporation has added collection and disposal of sand, bajri & boulder from the rivers situated inside reserved forest areas, collection and marketing of medicinal plants and Eco tourism in its works apart from the removal of dead, dying and uprooted trees as allotted by the Forest department.

Collection and marketing of sand, boulder and Bajri from the river beds of reserved forest areas has been undertaken in order to protect the forest lands, agricultural crops, inhabitations from

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the havoc of floods. The implementation of advanced computerized technique of minor mineral weighing system is a step towards advancement and use of new technology.

1.8 BRIEF DESCRIPTION OF THE PROJECT

1.8.1 PROJECT NATURE, SIZE & LOCATION

The project has been proposed for an annual production of 3,60,000 tonnes of Sand/Bajri/Boulder by open cast manual extraction method in Kot Mot river bed. The mineable area of 60 ha is a mine lease allotted to UKFDC for the purpose of mining of river bed material. In order to demarcate the mineable area, within the approved area, the inspection of the lease area was carried-out by the Joint Inspection Committee comprising of officers of Logging Officer, Forest Development Corporation, Ramnagar; Deputy Regional Forest Officer, Tarai Central Forest Division, Haldwani; Surveyor, Geology and Mining Unit, Haldwani. (Joint Inspection report attached as **Annexure-III**) and an area of 60 ha being part of Kot Mot river bed was recommended suitable for mining. Geographical location of mine lease area is covered under Survey of India Toposheet No. 53 F/4. Mine site pictures are given in **Figure 1.1**.

Figure 1-1: Pictures of Mine Site



1.8.2 PROJECT IMPORTANCE

Due to continuous heavy rainfall & flooding annually during the recent past years, a large amount of sand/ bajri/ boulder has been deposited in the bed of river Kot Mot which has widened the course of river and is also causing cutting of nearby agricultural and forest land causing heavy degradation and loss of soil and vegetation along the river course. Keeping in view the environmental consideration for the ecosystem of the river it is essential to remove this material from the river bed.

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Therefore, in order to channelize the river course, prevent floods and land cutting from nearby agricultural fields and forests, it is necessary to remove river bed material from the proposed stretch in an area of 60 ha.

1.8.3 REGULATORY COMPLIANCE

- ✓ Letter of intent no. 584/BHU/KANI/E/2012-13 dated 23.01.2013 has been issued in favor of “M/S Uttarakhand Forest Development Corporation” for a period of 5 years. (Refer **Annexure-II**)
- ✓ Mining plan approved by the Mines & Geology Department Dehradun, vide letter no. 46/Mining Plan/Minor mineral/Dehradun/2013-14 dated 13 May 2015.
- ✓ Joint Inspection Report (JIR) vides letter no. PCCF 2586 has been approved. (Refer **Annexure-III**)

1.8.4 ENVIRONMENTAL SENSITIVITY OF THE PROJECT

Environmental sensitivity of the project which includes important ecological features and social infrastructures within 15 km radius from the mine lease periphery is given below in **Table 1.3** and also given in **Figure no-1.2**.

Table 1-3: Environmental Sensitivity (within 15 km study area)

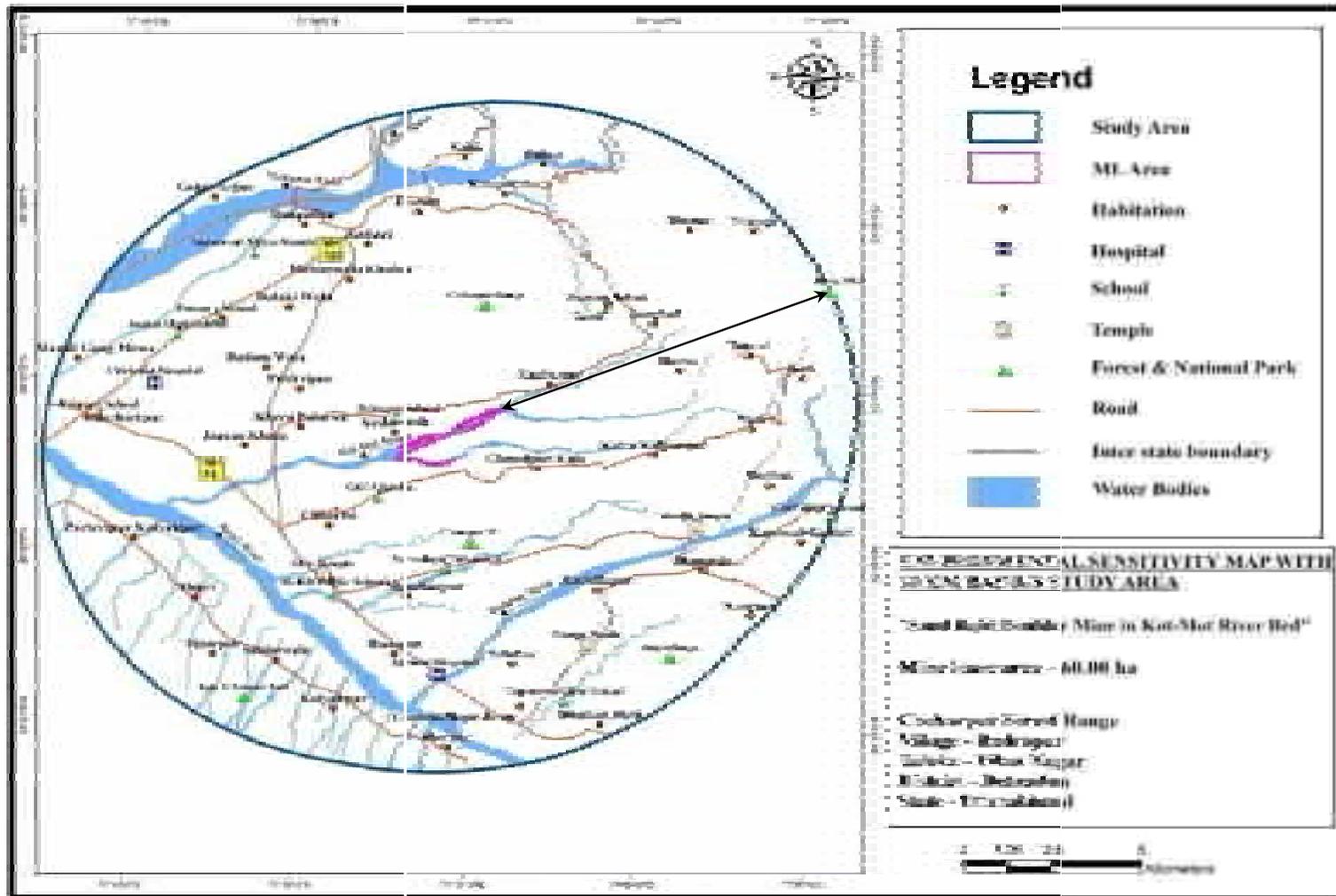
S.N.	Sensitive Ecological Features	Name	Aerial Distance (in 15 km.) from Mine Lease boundary
1.	National Park/Wildlife Sanctuary	Binog Wild life Sanctuary	9.89 Km in NE direction.
2.	Tiger Reserve/Elephant Reserve / Turtle Nesting Ground	None	-
3.	Forest	Fall under Choharpur Forest Range	
4.	Lake/ Reservoir/ Dams	None	-
5.	Core Zone of Biosphere Reserve	None	-
6.	Habitat for migratory birds	Asan Barrage	10.07 Km in West Direction
7.	Stream/Rivers	Mine is located in the bed of Kot mot river	-
8.	Estuary/Sea	None	-
9.	Mangroves	None	-
10.	Mountains/Hills		Mussorie Range, 11 Km in North East direction.
11.	Notified Archaeological sites	None	-
12.	Industries/Thermal Power Plants	None	-
13.	Defense Installation	None	Indian Military Academy,

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S.N.	Sensitive Ecological Features	Name	Aerial Distance (in 15 km.) from Mine Lease boundary
			18.75 Km in South East Direction.
14.	Airports	Jolly Grant Airport	41.19 Km in SE direction.
15.	Railway Lines	Dehradun Railway Station	23.44 Km in SE direction
16.	State/National Boundary	Himachal Pradesh- Uttarakhand Boundary	9.5 Km in NW direction
17.	National / State Highways	NH-72	4.0 Km in SW direction
18.	Densely populated area	Dehradun	23.44 Km in SE direction
19.	Hospital	Kalindi Hospital, Vikasnagar	6.78 Km
20.	School	Sahaspur Primary School Charba Senior secondary school	2 Km 2 Km

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Figure 1-2: Environmental Sensitivity Map of the Study Area



CHAPTER-2

PROJECT DESCRIPTION

2.1 GENERAL

UKFDC being a statutory body constituted by the State Government of Uttarakhand has proposed for the collection and disposal of sand, bajri and boulder (minor mineral) from the rivers situated inside reserved forest areas in Uttarakhand.

Due to continuous heavy rainfall annually & flooding during the recent past years, a large amount of river bed material has been deposited in different river beds of Uttarakhand. Kot Mot River Bed also faces the same problem of sand, bajri and boulder deposition which has widened the course of river and is also causing cutting of nearby agricultural and forest land causing heavy degradation & loss of soil and vegetation along the river course.

Keeping in view the environmental consideration for the ecosystem of the river it is essential to remove this material from the river bed. Therefore, in order to channelize the river course, prevention of floods and land cutting of nearby agricultural fields and forests, removal of river bed material from Kot Mot river bed has been proposed.

Project will also benefit in meeting the huge demand of construction material like coarse and fine aggregate required in building construction and infrastructure works, road material for construction and maintenance of roads / highways, elastic ballast material for rail tracks in the state of Uttarakhand and nearby cities and towns of Uttar Pradesh as the natural available materials of river at river bed quarry site has been found suitable from techno-economic consideration.

2.2 BRIEF DESCRIPTION OF THE PROJECT

The project for collection of minor minerals (sand, bajri, boulder) from the river bed of Kot Mot has been proposed for an annual production of 3, 60,000 TPA by Open Cast Manual Extraction method. The lease area measuring 60 ha is falling totally under the forest land.

There is practically no soil cover as well as no overburden on top profile of river bed section proposed for mining. However, if some soil is available it will be removed and carefully stored for use in plantation purpose.

Sub forest Development Corporation & Mines & Geology Department Dehradun has estimated the quantity of minor minerals that may be collected from the above river and prepared a technical report. As per the said technical report (copy enclosed as **Annexure-III**) 2.0 lakh cubic meter minor

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minerals may be collected from stretch of the Kot Mot river. Divisional Forest Development Manager of Uttarakhand Forest Development Corporation, Divisional Forest Officer of Kalasi Forest Department and the Sub-District Magistrate has recommended collection of minor mineral subject to fulfillment of certain conditions and has recommended that collection of minor minerals from the Kot Mot river in an area of 60 ha. Hence, the project has been proposed for an annual production of 3,60,000 tonnes of Sand/Bajri/Boulder by open cast manual extraction method in river bed. The lease area comes under the Choharpur Forest Range.

Some of the salient features of the project are given below in the **Table 2.1**.

Table 2-1: Salient Features of the Proposed Project

Project Name	Extraction/Collection of Sand, Bajri & Boulder (minor minerals) from Kot Mot River Bed
Area	60 ha
Capacity	3,60,000 TPA
New/Expansion/Modernization	New Mine
Category	A
Land Use	River bed in Forest land
Elevation	595 m AMSL (highest) & 529 m AMSL (lowest)
Seismic Zone	Zone-IV (As per 1893:2002)
Method of Mining	Open-cast Manual
Minerals to be Mined	Sand, Bajri, Boulder
Life of Mine	5 Years
Water Demand	15 KLD
Sources of Water	Tanker supply
Man Power	600
No of Working Days in a Year	270
Cost of Project	Rs. 15,00,000 /-

2.2.1 LOCATION DETAILS

The river bed mining lease, measuring 60 hectare (ha) is a forest land lying in bed of river Kot Mot that falls in Choharpur Forest range, at Village-Rudrapur, Tehsil-Vikasnagar, District- Dehradun, Uttarakhand.

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The mining site is well connected through rail & road network. Mine site is approachable by motor road connecting NH-72 at a road distance of 4.0 Km in the SW direction. Only temporary haul roads shall be maintained to facilitate proper plying of vehicles inside the mine lease area.

Figure 2.1 Shows location map of the mine lease area and **Table 2.2** shows road distance of important features from the mine site along with direction.

Table 2-2: Road Distance of Important Features from Mine Site with Direction

Features	Name	Road Distance (in km)
Airport	Jolly Grant Airport	41.19 Km in SE direction
Railway Station	Dehradun Railway Station	23.44 Km in SE direction
National /State Highway	NH-72	4.0 Km in SW direction

Geographical location of mine lease area is covered under Survey of India Toposheet No. 53F/4. Geographical location of the mine stretch is given below in **Table 2.3** and **Figure 2.2** shows corner coordinate map of the mine lease area.

Table 2-3: Coordinates of Mine Site

Latitude	30°26'34.69"N to 30°25'40.72"N
Longitude	77°52'47.00"E to 77°49'39.22"E

Figure 2-1: Location Map of the Mine Lease Area

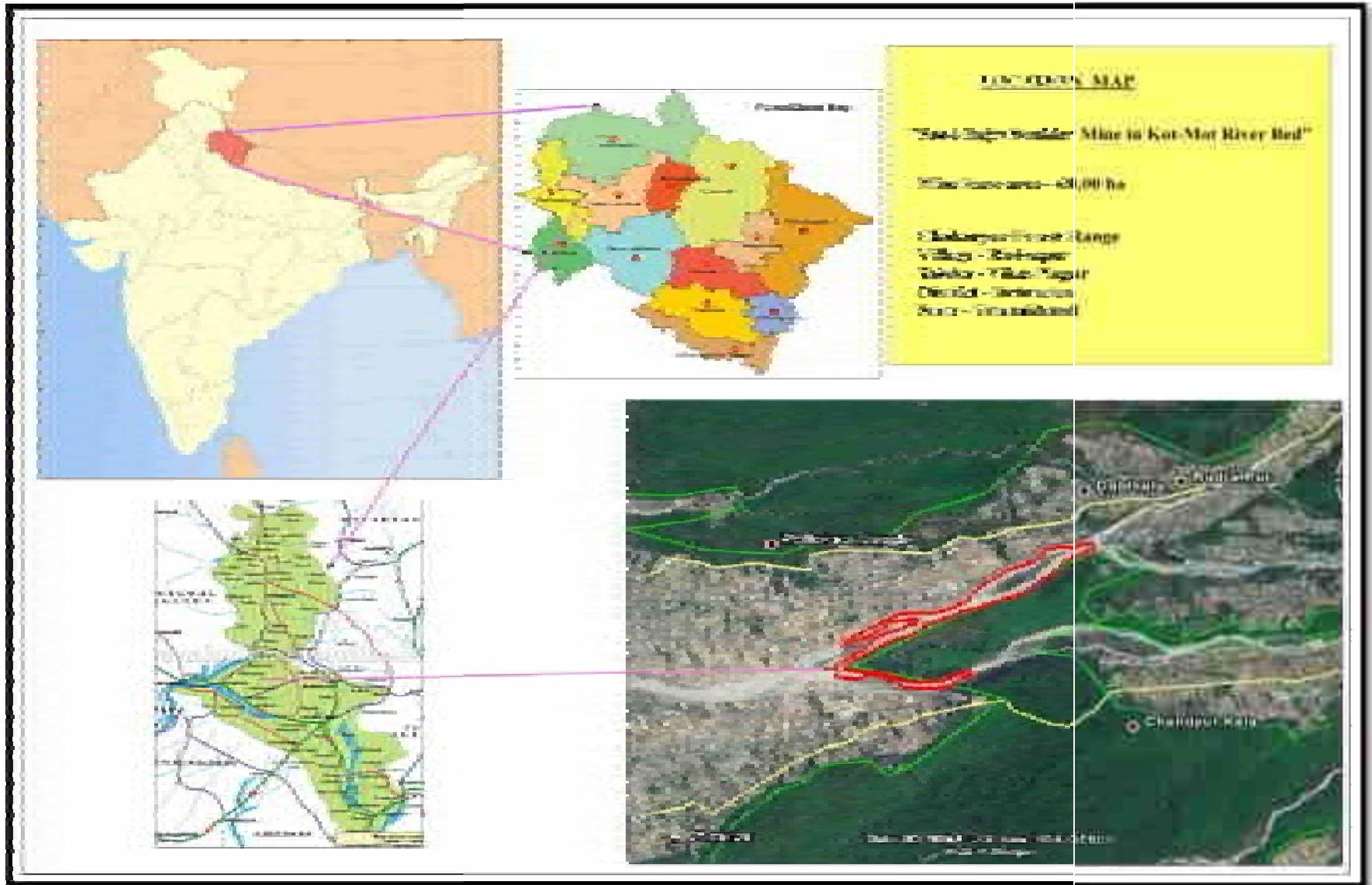
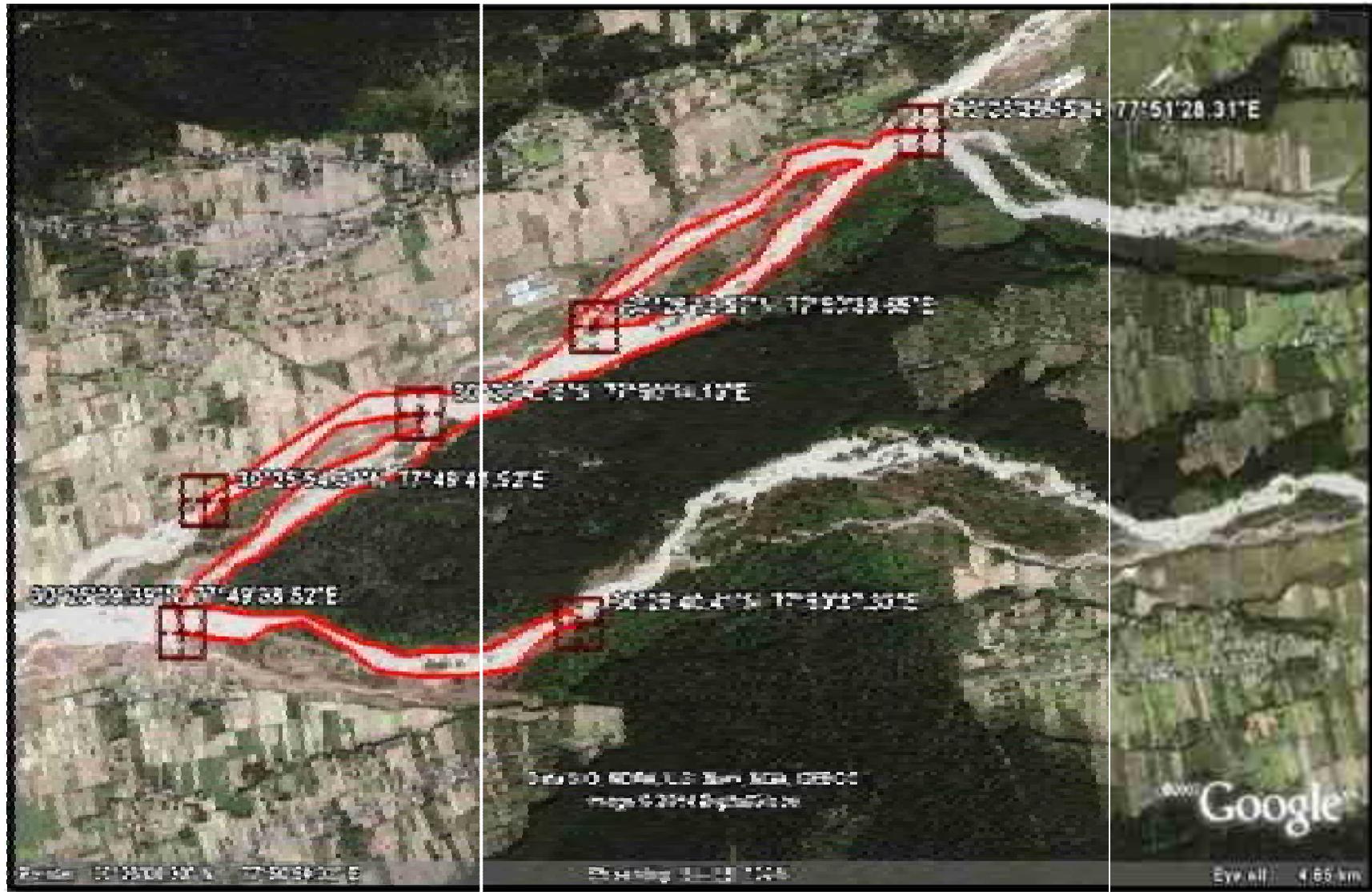


Figure 0-2: Corner Coordinate Map of the Mine Lease Area



2.2.2 LEASEHOLD AREA

The 60 ha area of mine lease is a forest land, belongs to the Choharpur Forest Range and has been allotted to UKFDC for the purpose of mining. Highest and lowest elevation in the area is 595 m AMSL and 529 m AMSL creating a level difference of 66 m.

2.3 GEOLOGY

2.3.1 REGIONAL GEOLOGY

Situated in the annals of Garhwal Himalaya, the district of Dehradun occupies the long tectonic 'Doon Valley' of the outer Himalaya. It lies within the Pre-Tertiary ranges of Lesser Himalaya to the north, and the Siwalik ranges to the south. The Siwalik rocks have been folded into an overturned syncline, flanked by two anticlines. The syncline shape of Siwaliks has controlled the geomorphological development of Doon Valley (Auden, 1937).

The terrain around Dehradun is full of minor ridges and valleys. A prominent ridge runs north-south. Western part is washed by the river Tons, Noon Nadi and Asan, tributaries of Yamuna, flowing towards southwest and the eastern segment is drained by the WNW-ESE flowing river Suswa, tributary of Ganges. Litho-stratigraphy of the Upper Siwalik and Post-Siwalik sediment in Kot Mot river is given below:

Age	Formations	Divisions	Lithology	Average Thickness
Recent	Doon Gravels	Tons/Asan Alluvium	Alluvium	
Sub-Recent	Post Siwaliks	New Terrace Sediments	Gravel & Pebble beds with brown clay bands	70m
Upper-Pleistocene & Mid Pleistocene		Old Terrace Sediments	Boulder beds Yellow, sand & maroon clay bands	44m
Unconformity				
Lower-Pleistocene	Upper Siwaliks	Boulder Conglomerates	Alternating Conglomerates, Sand & Clay bands	147m

The Upper Siwalik partly ranges into Pleistocene which is probably represented by the Boulder Conglomerate Stage here. These are overlain by Post-Siwalik sediments with a pronounced unconformity. The Siwalik rocks constitute low ranges in this area, whereas the Post-Siwalik constitutes the older and newer terraces of the river Tons/Asan. The Quaternary part of the Upper Siwalik consists mainly of conglomerates with alternating sand and clay beds. The conglomerates

contain pebble mainly of quartzite, slate, limestone, sandstone etc. embedded in a sandy matrix. The Old Terrace sediments contain boulder and gravel beds with smooth, but often cracked boulders mainly of quartzite, phyllite, schist, sandstone etc. embedded in coarse sandy matrix. There are some bands of yellow and maroon clay along with some sandy and sandy clay horizon. These sediments generally lie horizontally, but occasionally show gentle southerly dips. The New Terrace sediments contain pebble and gravel horizons with unconsolidated material composed mainly of limestone, quartzite etc. There are some brown colored clay bends, which appear to be older Alluvium. These are usually placed horizontally, overlaying the Old Terrace sediments. Sometimes, these even overlap the Old Terrace, and directly overlies the Siwalik and other Formation. These Post- Siwalik sediments exhibit variable thicknesses. Tube well data shows a gradual increase in their thickness from west to east. In the western part of the area the Old Terrace is 12m and New Terrace is 36 m thick. In Lesser Himalayan Zone steeply sloping northern flank of the valley comprising rocks of the Lesser Himalayan Formations, such as quartzite, schist, slates, phyllites, hard sandstone, limestone and dolomite of the Chandpur, Nagthat, Blaini, Krol and Tal Formations and having secondary porosity and permeability and are characterized by springs and seepages. Though sedimentary in nature the rocks have very low inter-granular porosity and are characterized by fissures, fracture and joints. The zones of lineament, faults and the Main Boundary Thrust show pockets of high secondary porosity. The groundwater/sub-surface water in this zone occurs largely as disconnected local bodies in favorably perched aquifers under both confined and unconfined conditions and also in zones of jointing, fracturing and faulting. Relatively flat areas and gently sloping grounds characterized by deep weathering, such as hill-tops, ridges, saddles, spurs and bulges of old landslide-debris, river terraces and fluvial fans from the recharge area while steeper hill slopes.

The upper portions of the catchment areas are saucer-shaped. The springs in the rocks of the secondary porosity show great variability in yield even within short distances. The limestone and dolomite of the Krol Formation is characterized by cavities and solution channels oriented along WNW-ESE and NW-SE trending joints. The sand gravel deposit of fluvial and alluvial origin in the Lesser Himalayan Zone lying the stream or near the confluence of two streams in the form of Terrace are highly porous and permeable and therefore, hold sufficient quantities of water. The soil cover of the study area was found to be mostly yellowish grey with some soil having brownish color. The texture of the soil in the study area was found in sandy clay loam in the nature.

In Synclinal central zone classified under piedmont zone' n gravels, having primary porosity and permeability, is forming the area. The groundwater is present in aquifers under unconfined and

confined conditions. The Siwalik Zone of water is present under confined conditions and the water table is relatively deep.

2.3.2 LOCAL GEOLOGY

The synclinal trough shaped Doon Valley bounded by the rocks of the Lesser Himalayan formations in north and Siwalik in south, forms a part of the sub-mountain region of the Garhwal Himalaya. Geologically the valley is divided into: The Lesser Himalaya: Mussoorie mountain range in northwest and northeastern parts. It comprises rocks of the Jaunsar (Chandpur phyllites and Nagthat quartzites) and Mussoorie Group (shales, sandstone, greywacks, calcareous slates, dolomite and limestone of Blaini- Krol Tal sequence) of Proterozoic-Cambrian age. A synclinal structural depression, filled with coarse clastic/ River Borne Material (RBM) consisting fan deposits of late Pleistocene and Holocene age known as the Doon Gravels. The Doon Gravels have been further subdivided into Oldest, Younger and Youngest Doon Gravels (Nossion, 1971; Meijerink; 1974). The Oldest Doon Gravels resting over the Upper and Middle Siwalik beds and at places directly over Chandpur phyllites consist of poorly sorted pebbles and gravels set in sandy matrix and red clays. The Oldest Doon Gravels consist partly of crushed Upper Siwalik cobbles, angular pebbles of quartzites, slates and shales from the Nagthat, Chandpur and Tal Formations and limestone pebbles from the Krol Limestone alternating with clay beds. The Younger Doon Gravels, resting unconformably over the Oldest Doon Gravels in northern part, are characterized by very large boulders present in debris flow and braided river deposits. The unit consists of poorly sorted mixture of clay, sands, gravels and large boulders. The major part of the valley is occupied by Younger Doon Gravels occurring in the form of large fans, formed by reworking of Oldest Doon Gravels, and are called as Principal Doon fans. The Youngest Doon Gravels are braided river deposits and sub-recent terrace deposit along Asan and Song River. A number of coalesced fans have also descended down from the Siwalik range forming "Piedmont zone", are also part of youngest Doon Gravels. The Siwalik range in the south comprises the middle and Upper Siwalik. The rocks of the middle Siwalik have the characteristic faces of continental deposits of large low land rivers and consist of friable medium grained grey colored sandstone rich in micaceous minerals with mudstone. The rocks of the Upper Siwalik indicate a change in the region of the large braided rivers and are characterized by ultimate polymictic conglomerate and subordinate grey micaceous sandstone (Tandon et al., 1988). The conglomerate consists of well rounded to sub-rounded clasts of white, pink, grey quartzite, granite, phyllites and rare limestone.

2.4 DRAINAGE PATTERN OF DISTRICT DEHRADUN

District Dehradun is drained by Ganga, Yamuna and their tributaries. The two basins are separated by a ridge starting from Mussoorie and passing through Dehradun. The easterly flowing rivers join River Ganga and the westerly flowing rivers join River Yamuna. Ganga River enters the district near Rishikesh where Chandrabhaga River joins it. Song and Suswa are two main tributaries of the Ganges. Suswa flows SE, draining the eastern Doon along with its ephemeral tributaries like Bindal Rao, Rispana Rao etc. and joins River Song SE of Doiwala. Song River has its origin from the adjoining Tehri district. Initially it runs parallel to the

Mussoorie Mountain chain in NW direction for few kilometers and then takes a sudden turn in SE direction and joins Suswa River south of Doiwala. Yamuna River emerges from Yamnotri, which falls in district Uttarkashi. It enters Dehradun district at the point called Khat Bhondar which is about 20km east of Deoban. Tons is the main tributary of Yamuna which has its emerging point in the north of Yamnotri and receives water from Supin and Rupin (tributaries of Tons). River Tons separates Uttarakhand from Himachal Pradesh. The western part of Doon Valley is drained by Asan and its tributaries; it joins Yamuna near Rampur Mandi. Yamuna River roughly divides the district in two halves, the hilly region in the north and Doon valley in the south.

2.5 REPLENISHMENT POTENTIAL OF MINERAL

The replenishment rate approach has the virtue of scaling extraction to the river load in a general way, but bed load transport can be variable from year to year. Thus, this approach is probably better if permitted extraction rates are based on new deposition that year rather than on long term average bed load yields. The mined reaches the "upstream" sediment source for downstream reaches, so mining at the replenishment rate could be expected to produce hungry water conditions downstream.

Dunne et al. (1981) stressed because actual bed load transport is variable from year to year, estimated average annual bed load inflow rates may not be applicable in most years.

The erosion process in the catchment area and transportation of minor mineral along with strong water current during the rainy season will augment the process of replenishment in the downstream mining lease area.

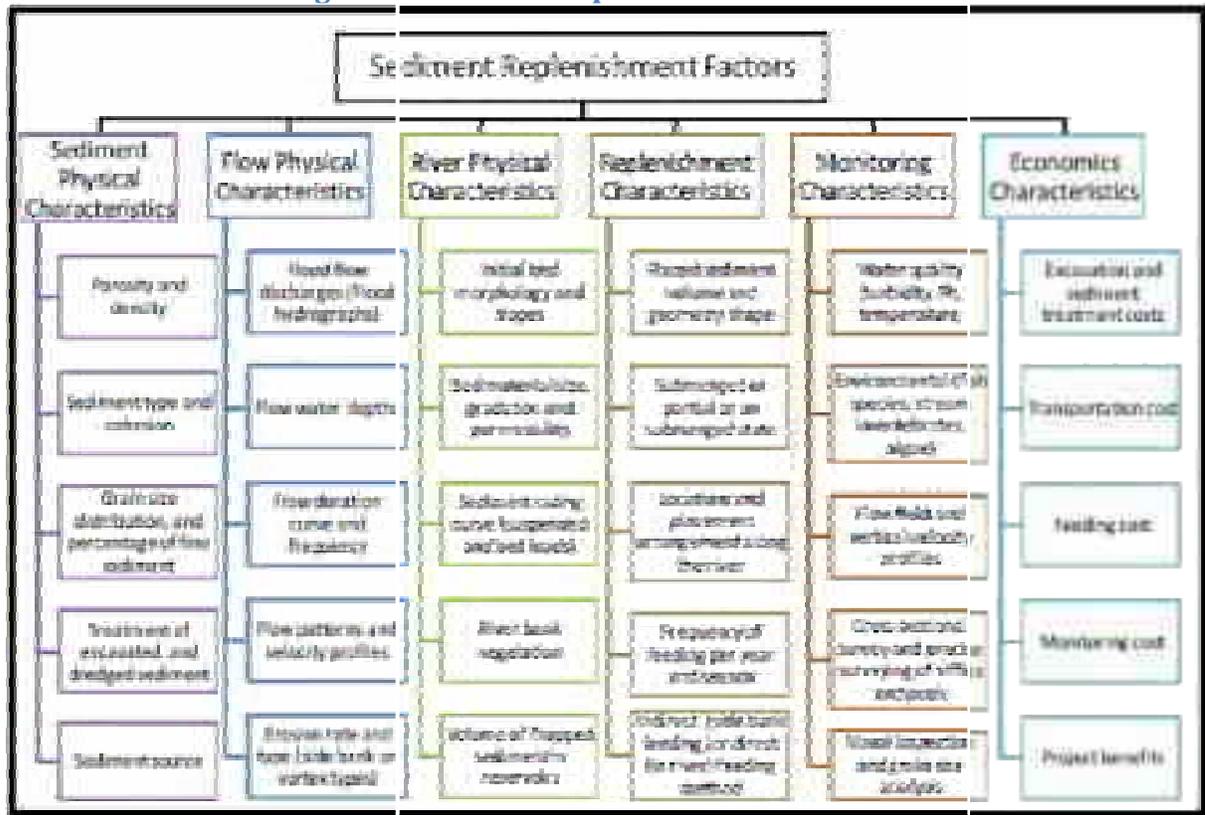
The river will flow during monsoon/Rainy Season. During the course of water flow there will be deposition of Bajri. Average 0.8 to 1 meter of Bajri will be deposited annually. Thus, at the end of mining worked out area from first year to third year will be reclaimed completely and fourth and fifth years working will be reclaimed during sixth and seventh year. Hence mined out area of the pre monsoon will be completely filled with mineral during the monsoon. Hence it is assumed that the entire pit will be filled heavy rainy floods. However, the gap of one year is left for replenishment.

Replenishment of River bed Mining is mainly depend upon the characteristic of catchment area, free drainage, soil type of catchment area & annual rainfall. The following step would be required for replenishment study of river bank.

- Identify total Catchment area/Free drainage area
- Elevation difference between Catchment area and Mine area
- Identify Soil type of catchment area/free drainage area
- Determine composite erosion intensity unit
- Density of vegetation in the area
- Annual intensity of rainfall

Details Replenishment study are enclosed as **Annexure-III**

Figure 2-3: Sediment Replenishment Factors



2.6 RESERVE ESTIMATION

As much of the lease area is covered with water catchment area only the middle area is considered for reserve estimation. The sand/gravel which is exposed in all the three dimensions (9.0 m on an average) is considered as proved. From the field trials conducted in the sector and information gathered from the project proponent, the bulk density is found to be 1.8.

The method of cross section has been adopted for computing the geological reserve. The mining lease boundary & mining limits are marked on the plans. The intersectional volume between two section lines has been determined by the following manner: $V: (S1+S2)/2 \times L$, where

V: Volume

S1 & S2: Sectional area of the mineral body

L: Strike influence

The mining lease has been applied only in river bed area. Geological reserves have been estimated through geological cross sections. The strike influence of sections is 39m to 84m. The area of each section line is calculated and sectional area is multiplied by the strike influence in between two section line to give the volume of each section line. The incidence of RBM has been taken as 90% of the total volume considering rest 10% as waste and would be used as backfilled

material for reclaiming the excavated benches. From 25% area of each side from both banks would not be used for exploitation of mineral.

While computing the geological mineral reserves the depth of mineralization is taken upto 18 m in all the applied area. There are three categories of reserve; namely measured/proved, indicated/probable, inferred/possible. The proved categories include mineral upto 9 m depth. The probable category includes 6 m after the proved depth and possible category includes 3m from the possible depth as far as this lease is concerned.

Table 2-4: Reserve Estimation

Proved reserves	6371110.76 tonnes
Probable reserves	4247407.48 tonnes
Possible reserves	2123103.28 tonnes

2.7 MINERAL RESERVES

Area does not show any outcrop of in-situ deposit. The production is generally in the form of bajri and boulder. The general recovery of the RBM is about 90% has been considered as per our past experience. Thus, total saleable quantity in tones will be around 360,000. From 1st year to 5th year about 453 m retaining wall will be constructed along the plantation & dump area and about 161m retaining wall will be constructed along the edge of bench.

I Year:

The mining face will be started from SW to NE direction from the lower level and advance towards higher levels. During this year mining is proposed RL 529m to RL 593.5m to open the mining faces and transportation of mineral. The mining face will be advance towards NE. Backfilling will be done up to RL 592m. Tonnage factor of 1.8 has been considered. Thus, total saleable quantity in Tones will be 360,000. The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high with 0.75m high sub benches. In 1st year about 58m long retaining wall will be constructed along the plantation & dump area. The net recovery of RBM has been considered 90 % of total excavation.

II Year

As mentioned that the mined out area will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. During this year mining is proposed from RL 529m to RL 593.5m to open the mining faces and transportation of mineral. The mining face will be advance towards NE. Backfilling will be done up to RL 592m. Tonnage factor of 1.8 has been

considered. Thus, total saleable quantity in Tones will be 360,000. In this year about 60m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90 % of total excavation

III Year

As mentioned that the mined out area will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. The mining face will be advance towards northeast. During this year mining is proposed RL 529m to RL 593.5m to open the mining faces and transportation of mineral. Backfilling will be done up to RL 592m. In this year about 57m long retaining wall will be constructed along the plantation & dump area. The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90% of total excavation. The net saleable production of RBM will be 360,000 Tones.

IV Year

As mentioned that the mined out area of III year will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. The mining face will be advance towards NE. During this year mining is proposed from RL 529m to RL 593.5m to open the mining faces and transportation of mineral. Backfilling will be done up to RL 592m. In IV year about 58m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90 % of total excavation. The net saleable production of RBM will be 360,000 Tones.

V Year

As mentioned that the mined out area of IV year will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. The mining face will be advance towards NE. During this year mining is proposed from RL 529m to RL 593.5m to open the mining faces and transportation of mineral. In this year about 59m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90 %

of total excavation. The net saleable production of RBM will be 360,000 Tonnes. The Year wise proposed quantity, production and closing recoverable reserves are given below:

Table 2-5: The Year wise proposed quantity, production and closing recoverable reserves

Years	Bench Level(m)	Quantity of the mineral(Tonnes)	Production (Tonnes)	Balance (Tonnes)
I Year	529-593.5	365400.83	360,000	5400.83
II Year	529-593.5	365400.83	360,000	5400.83
III Year	529-593.5	365400.83	360,000	5400.83
IV Year	529-593.5	365400.83	360,000	5400.83
V Year	529-593.5	365400.83	360,000	5400.83

2.7.1 ULTIMATE PIT LIMIT & LIFE OF THE MINE

The lease is moderate in size. A wide strip has been left all along the lease boundary as leaving a margin of 25% on both sides which will help in proper channelization of the river as a statutory condition. No RBM will be collected from the proximity of any bridge/embankment. Collection of sand is restricted up to a maximum depth of 1.5m. River/stream will not be diverted in any case. No mining is proposed during rainy season. A quantity of material about 1333m tonnes per day ROM has been proposed to collect during the course of mining. This will be replenished during the next rainy season. Area has sufficient material for the next coming 5 years.

2.8 METHOD OF MINING

The project does not involve any processes such as drilling, blasting and beneficiation. The mining process involves collection of material by simple hand tool such as shovel, pans and sieves. This is followed by sorting and manual picking, stacking and loading into trucks/tractor-trolley for transporting. The pits from where the material is picked are not deeper than 1.5m as allowed in mining area and shall follow the normal channel direction of the river. These get replenished during monsoon. The only waste is silt/clay which is recycled back to the pits. Mining will be carried out only during the day time. The factors such as topography, bed gradient, soils, rainfall etc. will be taken into consideration for the same. The material is transported through the high velocity flow and is deposited in downstream portion where the bed slope is mild.

Applied area is a part of a river bed and mining will be done manually in open cast method in quite a systematic manner by forming benches of 1.5m high. However, there may be variation in

the width which the lessee will keep on mending. About 360,000 Tones mineral will be exploited per year. From first year to fifth year total 1800,000 Tones mineral will be produced. The proposed area is within river bed and mined out area will be replenished gradually during succeeding rainy season. The sandy soil to be scrapped manually with the help of pickaxe, spade & crowbar and will be stacked separately in dump yard located near the working pit. About 10% of the total production is considered as a waste material and will be used for reclaiming the bank slope. Backfilling will be done simultaneously in each year.

Prior to any actual mining being done at the site, it is necessary to remove overburden from the top of the RBM. Overburden is sandy soil or subsoil that is mainly composed of silty sand. Sandy soil will be kept separate and used on top, once they have reached their final elevation. They have multiple purposes; they provide storage for overburden until the mine is reclaimed, they provide a visual barrier between the active mine and roads or adjoining properties, light pollution should the mine be operated after dark and they act as a noise barrier.

Once the overburden has been removed sand is excavated depending upon the lithological variation. No blasting may be used to make the sand containing material more amenable to excavation. Excavation is typically performed by the manual means. Hand operated tools like spade; tasla etc will be used to collect sand. The excavated material may be directly loaded into trucks, dumpers, tippers and tractor trolleys and sent to the destination wherever it is required for construction and other purposes.

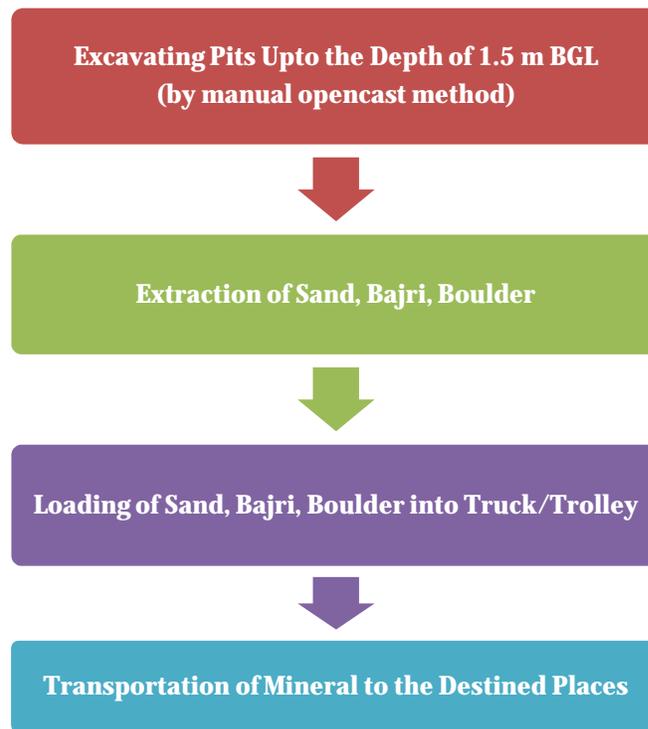
Transportation of sand from the mine is a process to deliver mined out material to the location where it is going to be collected. Mined out sand will manually be loaded into truck and transported to its destination where it will ultimately be used. Sufficient space will be left for loading of trucks. Excavation of river bed minerals will commence from the top surface of the area and commence towards down removing the minerals manually in 1.5m slices. Ultimate depth of a bench will be 1.5m. Mining will be restricted up to a maximum depth of 1.5m only. The entire area does not require excavating at once. Per year about 360,000 tones production of river RBM (sand, bajri & boulder) have been proposed to meet the market requirement.

The mineral extraction will be done for a period of 270 days in a year. During this period the areas of mining quarry will be free from submergence. During mining operation the river flow will be away to enable dry pit mining. In the lease area the river flow being reduced and sediment load get deposited. During flood season, the area gets replenished with sediments and source of erosion at this location is comparatively less. The guidelines of the Ministry of Environment & Forests and Directorate of Geology and Mining will be followed; the most important is as under:

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- Dry pit mining will be followed which means mining an all times will be above the flowing river water level. Mining activity will be immediately stopped when water comes in the mining pits.
- RBM (sand, bajri & boulder) will be collected in slices up to a depth of 1.5 m or river water levels whichever less than prescribed.
- Stream will not be diverted to form inactive channel.
- Mining at the concave side of the river channel will be avoided to prevent bank erosion.
- Mining will be restricted minimum 25% (UPL) from both banks to minimize effect of river bank erosion and to avoid consequent channel migration. Plantation will be done on such area to isolate mining operation form the rest of the area.
- Area of mining lease will be demarcated prior to mining and pillars will be erected on ground.
- No mining operations shall be carried out in proximity of any bridge and or embankment.
- Working will be during day-time only; i.e. sunrise to sunset only;
- No constructions will be done at site except for construction of initial temporary shelter house;
- No water intake from river will be done. Water will be supplied by tankers from outside sources;
- No machineries will be used;
- Mining will be completely stopped during monsoon

Figure 2-4: Schematic Flowchart of Mining Process



2.9 PRODUCTION PARAMETERS

- Leaving 25% area on both the banks of the river along with 200 feet each upstream and downstream for any road /bridge crossing the river, thereby collecting the minor mineral in almost 50% of the total area along the centre of river channel; yearly production of mine is estimated as 50% of the total reserve available per year i.e.@3,60,000 tones per year.
- The river training measures (spurs) should be adopted for protection of banks and adjoining lands from flood damages.
- The extraction shall be allowed and controlled in such a manner that a defined river course is always maintained with required gradient for unhindered flow.
- Mining will be carried out only during the day time. Extraction of sand, bajri and boulder material will be completely stopped during the monsoon season.
- The pits from where the material will be picked should not go deeper than 1.5 meter and shall follow the normal channel direction of the river. These get replenished during monsoon every year.
- The equipments for mining will be arranged by project proponent who will also be responsible for administrative control of labors as well as for carrying out mining operations in the sanctioned/demarcated lease area within the ambit of the conditions set-

forth in the order for execution of mine by the competent authority and also the instructions/guideline issued by the Khanan Vibhag, Uttarakhand.

2.10 EMPLOYMENT POTENTIAL

About 600 workers including skilled, semi-skilled & unskilled labors shall be engaged through project proponent for extraction of sand, bajri, boulder (minor mineral) and loading & handling of mineral in mining area, besides watch & ward and plantation activity with proper maintenance. Preference will be given to the local people as per their eligibility. Breakup of manpower is given in **Table 2.6**.

Table 2-6: Manpower Requirement

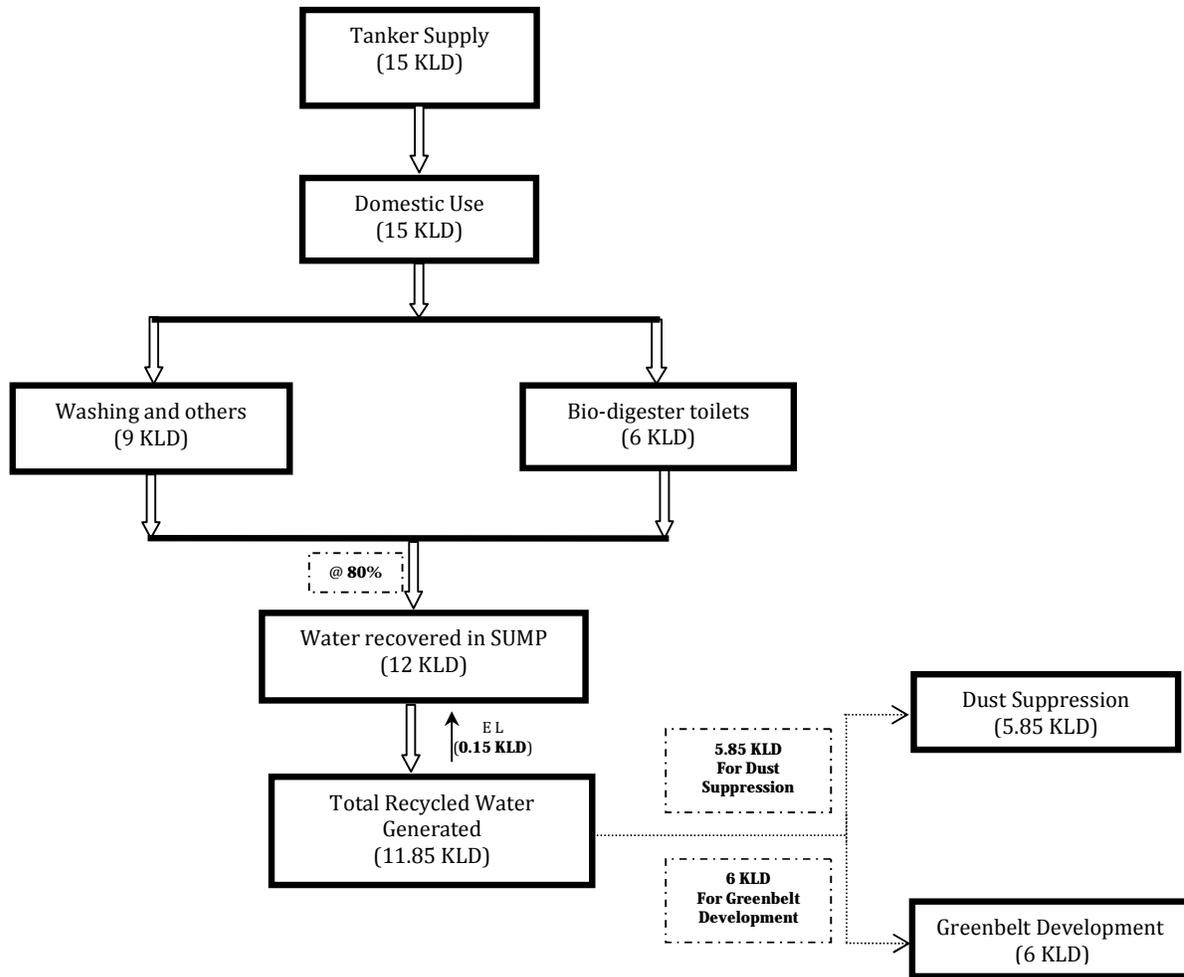
S. No.	Type of Manpower	Number
1	Manager/Foreman	11
2	Skilled	59
3	Unskilled Labors	530
	Total	600

2.11 WATER REQUIREMENT

Water requirement for the proposed project for domestic use, dust suppression and plantation, shall be met from the tanker water supply. The water is further required for sprinkling on haulage road which is done twice a day in morning and evening using water tanker. Total water requirement shall be 15 KLD. The domestic water demand has been calculated as 15 KLD in which 9 will be consumed for drinking and washing purpose and 6 for sanitation purpose. The water required for greenbelt development and dust suppression shall be met with the recycled water generated bi bio-digester toilets. **Table 2.7** shows breakup of water requirement. The water balance diagram showing water requirement, waste water generated and its usage is also given below.

Table 2-7: Total Water Requirement

S. No.	Activity	Water Required (KLD)	Source
1.	Domestic	15	Tanker Supply
2.	Dust Suppression	5.85	Recycled water obtained by bio-digester toilets.
3.	Green Belt	6.0	



2.12 GENERAL FEATURES

Facilities which will be required at the mine site during operational phase are described below:

- **Mine Office:** Proper site services such as first-aid, attendance record, complaint box and telephone facility will be provided to the workers.
- **Weighing Bridge:** A weighing bridge will be installed on mite site for weighing of unloaded and loaded heavy vehicles.
- **Workshop:** Temporary workshop for storage and maintenance of hand equipments will be made.
- **Security:** Security guards will be deployed at the mine site. A Jeep with drivers will be kept at the mine.
- **Rest Shelter:** Rest shelter along with first-aid station complying with all the provisions of Mines Rules will be constructed temporarily in the lease area itself.
- **Training centre:** A well equipped vocational training centre will be provided at the mine.

- **Communication Arrangements:** Proper communication arrangements will be made by providing telephone facilities.
- **Sanitation Facility:** Temporary sanitation facilities will be provided to workers during operational phase of mining.
- **Drinking Water Facility:** Arrangement of water will be done separately for drinking purpose of workers.

2.13 POST MINING LANDUSE

River Bed of Kot Mot River will get replenished annually by deposition of sand, bajri, boulder which will come along with the flowing water during rainy season. At the end of mining of sand, bajri, boulder in river bed, land use will remain the same as River Bed only.

2.14 EXCAVATION SCHEDULE

Extraction of 360,000 tons of Sand/Bajri/boulder from the mine site will be done on annual basis for 5 years. Working hours shift will be of 8 hours during day time only. Number of working days will be 270 in a year.

CHAPTER 3 DESCRIPTION OF ENVIRONMENT

3.1 GENERAL

The main objectives of environmental baseline study are:

- ❖ To assess present environmental quality for prediction of environmental impacts.
- ❖ To identify environmentally significant factors for taking mitigating measures.

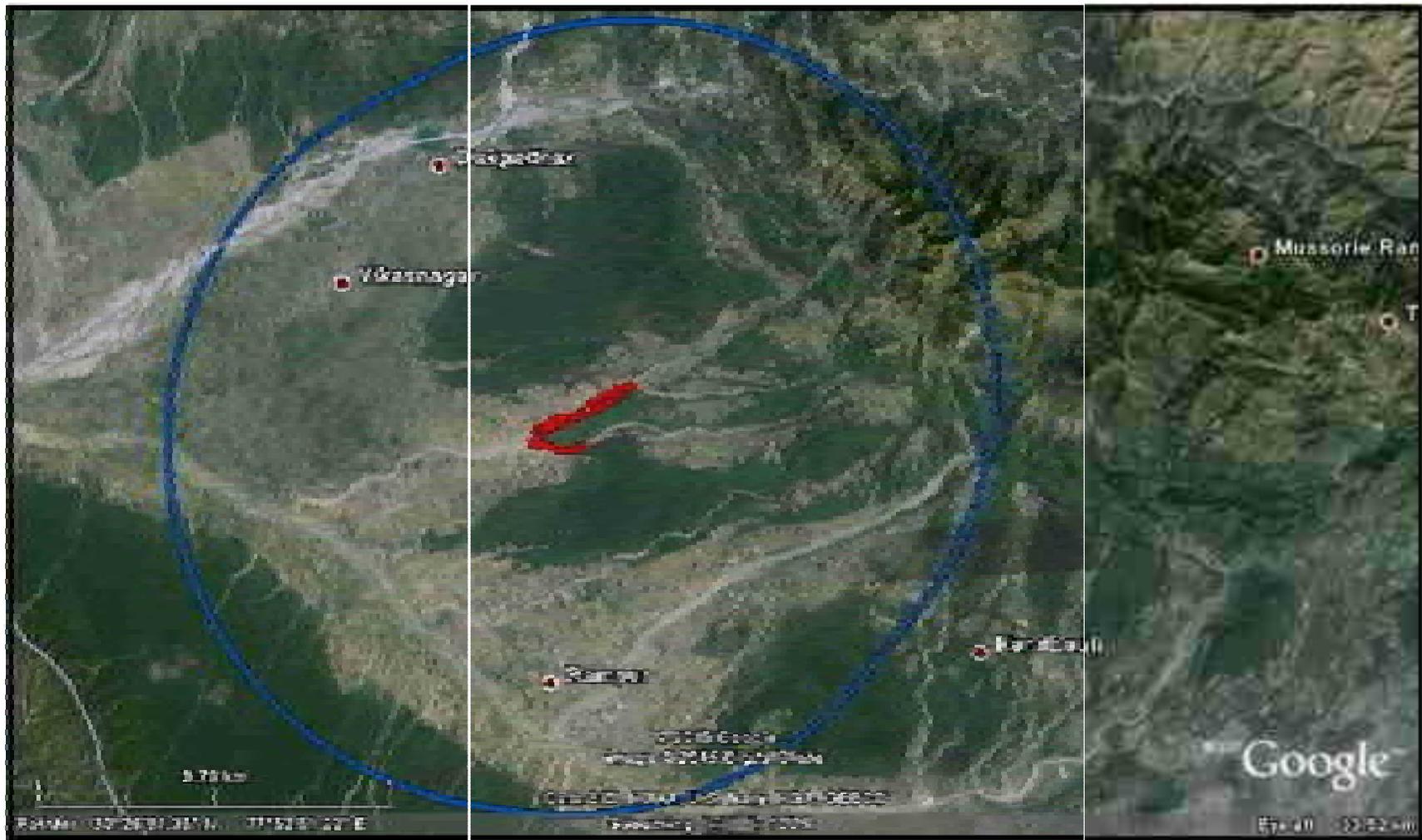
This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as Land, Water, Air, Noise, Biological and Socio-economic status of the study area. Field monitoring studies to evaluate the base line status of the project site were carried out covering three months (March to May, 2015) as per the CPCB guidelines. Environmental data has been collected to establish the baseline status of

- a) Land
- b) Soil
- c) Water
- d) Air
- e) Noise
- f) Biological
- g) Socio-economic Status

3.2 STUDY AREA

Study area of proposed mine for baseline study covers the total area covering a 10 Km radius from the mine lease periphery. Further the study area has been divided into two zones namely “Core Zone” and “Buffer Zone”. Core zone comprises of the mine lease area within the mine lease boundary while the area around the mine lease periphery covering 10 Km radius area constitutes the Buffer Zone. Map of the study area is given in **Figure 3.1**

Figure 3-1:10 Km radius map from mine site



3. 3 METHODOLOGY ADOPTED FOR GENERATING BASELINE DATA

The methodology for conducting the baseline environmental survey considered the guidelines given in the EIA Manual of the MoEF&CC. Baseline information with respect to Land, Soil, Water, Air, Noise, Biological and Socio-economic quality status in the study area were collected by conducting primary sampling / field studies during pre-monsoon season March-May 2015. The characteristics of baseline status of study area with respect to the parameters are discussed.

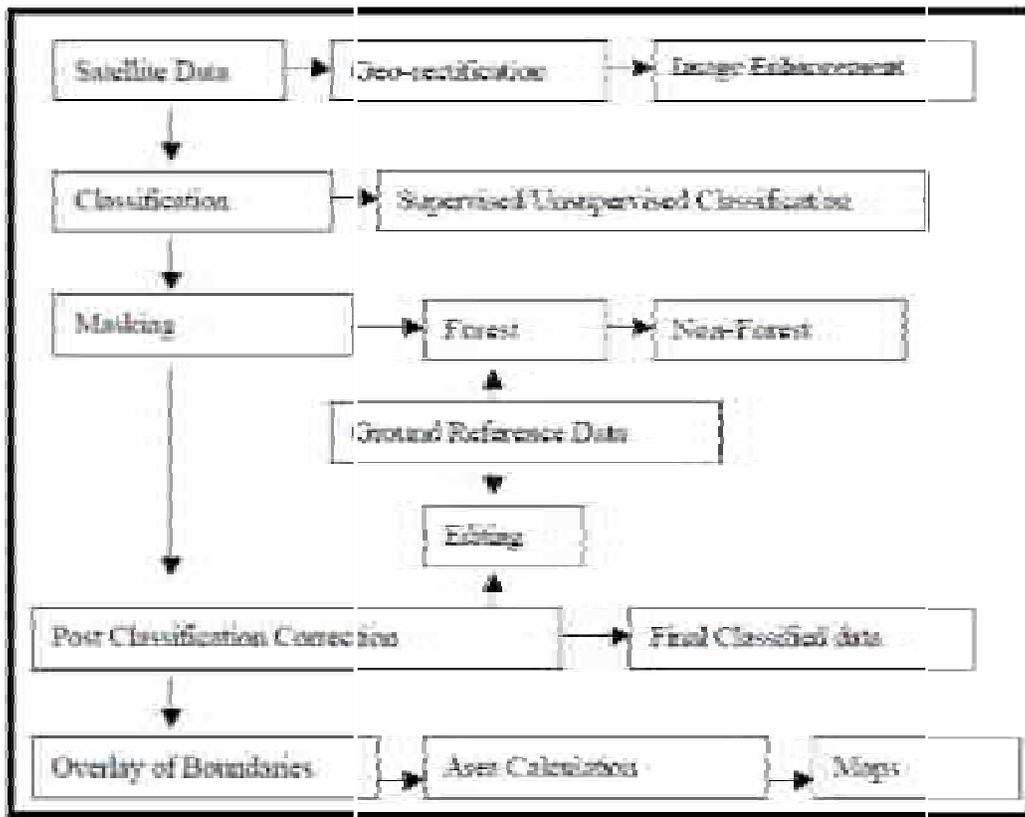
3.3.1 LAND ENVIRONMENT

Since the mining is carried out by opencast mining method, studies on land environment of ecosystem play an imperative role in identifying susceptible issues and taking appropriate action to uphold ecological equilibrium in the region. The main objective of this section is to provide a baseline status of the study area covering 10 km radius around the proposed mine site so that temporal changes due to the mining activities on the surroundings can be assessed for future.

3.3.2 METHODOLOGY FOR BASELINE DATA GENERATION

Land use / Land cover map preparation, Base map creation; Geometric and Radiometric correction of satellite image has been processed using ERDAS Imagine 9.2 and Arc GIS 9.3 Software. The methodology used for present LU/LC of study area is shown in **Figure 3.2** and is detailed below:

Figure 3-2: Methodology Use for Land-use Classification & Mapping



Methodology Adopted For Thematic Data Extraction From The Satellite Imageries:

ERDAS image processing software and ArcGIS Software were used for the project. Erdas 9.2 Image Processing Software was used for digital processing of the spatial data. Digital image processing techniques were applied for the mapping of the land use/land cover classes of the provided area from the satellite data. The methodology applied comes under following steps:

- **Image Extraction:**

Satellite imageries were obtained and a sub set for the Area of Interest was created through ERDAS image processing software.

- **Geo-Rectification:**

Geometric correction includes correction for geometric distortions due to sensor, earth geometry variations and conversion of the data to real world coordinates (e.g. Latitude and Longitude) on the Earth's surface. The satellite imagery was geometrically rectified with reference to the geo-referenced topo-sheets and vector data.

- **Image Enhancement:**

Image enhancement is one of the important image processing functions primarily done to improve the appearance of the imagery to assist in visual interpretation and analysis. Various options of image enhancement techniques were tried out to get the best image for visual interpretation. Histogram equalized stretch enhancement techniques was applied to the imagery of the study area for better interpretation of different features in the satellite imagery.

- **Classification:**

Satellites images are composed of array of grid, each grid have a numeric value that is known as digital number. Smallest unit of this grid is known as a pixel that captures reflectance of ground features represented in terms of Digital number, which represent a specific land features. Using image classification technique, the satellite data is converted into thematic information map based on the user's knowledge about the ground area.

Hybrid technique has been used i.e. visual interpretation and digital image processing for identification of different land use and vegetation cover classes based on spectral signature of geographic feature. Spectral signature represents various land use classes. Image interpretation keys are developed based on image characteristics like color, tone, size, shape, texture, pattern, shadow, association etc which enables interpretation of satellite images for ground feature. Training sites are then assigned based on their spectral signature and interpretation elements.

Land use/Land cover Map has been broadly classified into five classes namely Agriculture, Forest Land, Built-up Area, Water Bodies and Waste Land and all other land uses have been categorized in others class. Using image classification algorithm land use map is then generated.

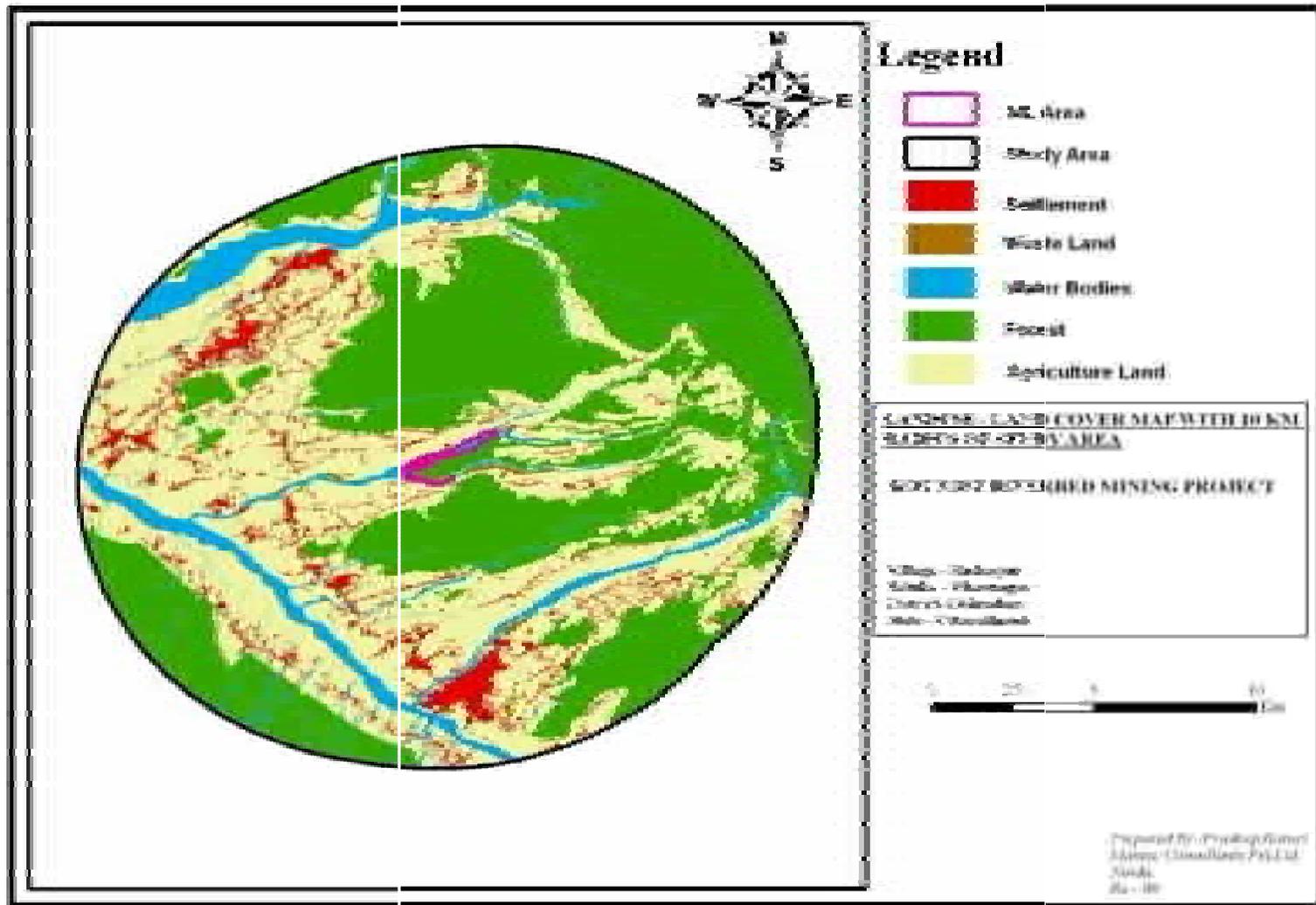
3.3.3 LAND USE/ LAND COVER PATTERN OF THE STUDY AREA

The existing land use pattern of the study area based on the latest satellite imagery is given in **Table 3.1** as follows and is shown in **Figure 3.3**

Table 3-1: Land Use Pattern of the Study Area

S.No	Classes	Area (sq.km)	Area in %
1	Agriculture	390.87	63.29
2	Settlement	21.79	3.53
3	Forest Land	175.45	28.41
4	Waste Land	1.52	0.25
6	Water Bodies	27.95	4.53
Total		617.58	100

Figure 3-3: Land-Use/Land-Cover Map of the Study Area



3.3.4 DESCRIPTION OF LAND USE

The study area is prominently covered by forest land (28.41%), Agricultural land covers (63.29%) of the study area. The water bodies cover (4.53 %) while settlements are covering (3.53%) of the study area. Waste land constitutes about (0.25 %) of the study area.

3.3.4.1 PHYSIOGRAPHY

The mine lease area lies in the river bed and is a part of foothills of Mussorie range of Uttarakhand. Highest and lowest elevation in the study area is 595 m AMSL and 529 m AMSL creating a level difference of 66 m.

3.3.4.2 SEISMICITY OF THE AREA

Many parts of the Indian subcontinent have historically high Seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates. The project site as well as study area lies in Zone-IV of Seismic Zoning Map (**Figure-3.4**), and thus can be said to be located in an area of moderate seismic hazard by national standards. Hence the risk of earthquake at the site persists though there has been no incident in the near past.

Figure 3.4: Seismic Zone Map of Uttarakhand



(Source: Disaster Mitigation and Management Center, Government of Uttarakhand)

3.3.5 SOIL ENVIRONMENT

3.3.5.1 SOIL PROFILE OF DISTRICT DEHRADUN

The nature and soil type play an important role in agriculture and have direct relation with groundwater recharge. Physiography, climate, drainage and geology of the area are the factors responsible for the nature and type of soil and soil cover. The soil type also depends upon the slope and rate of erosion. The soil types of district Dehradun are given in **Table 3.2**.

Table 3-2: Soil Type of District Dehradun

Physiography	Characteristics	Taxonomic Classification
Mountains	Moderately deep, well-drained, thermic coarse loamy soils on steep slopes, strong, stoniness, associated with shallow excessively drained, loamy skeletal soil.	Loamy skeletal, Dystric Eutrochrepts, Fine loamy lithic and typic Hapludolls- Loamy skeletal typic Udorthants
Soils on Upper piedmont plains	Deep, well-drained, coarse loamy cover, fragmental soils on heavy gentle slope with loamy surface and slight erosion. Associated with excessively drained soils with loamy surface and slight to moderate erosion. Deep, well- drained, fine to coarse loamy surface and slight to moderate erosion	Udifluventic Ustochrepts
Soil on Lower piedmont plains	Deep, well- drained, coarse loamy cover over fragmental soils on nearly level plains with loamy surface. Associated with deep, well drained, fine loamy soil with loamy surface. Deep, well drained, fine silty soil on very gentle slopes with loamy surface and slight erosion Deep, well drained, fine to coarse loamy surface and slight to moderate erosion, silty soil with loamy surface.	Udifluventic Ustochrepts Udic Ustochrepts Udic Haplustolls Udic Ustochrepts

Soil is the largest pool of terrestrial organic carbon. Soil may be defined as a thin layer of earth's crust, which serves as a natural medium for the growth of plants. It is the environmental sieve that controls the fate of contaminants, and directs water in the various pathways of the hydrologic cycle. The soil characteristics are mainly classified into three groups which include physical, chemical and electrical properties.

For studying soil quality of the region 4 samples were collected to assess the existing soil conditions in and around the area. The study area has sandy loam.

3.3.5.2 METHODOLOGY OF BASELINE DATA GENERATION

The soil survey was carried out to assess the soil characteristics of the area. For studying soil quality of the region, 4 samples were collected from 4 different locations in the study area (in and around the mine lease area) to assess the existing soil conditions. Distance and direction of soil sampling station from the mine site have been given below in **Table 3.3:**

Table 3-3: Details of Soil monitoring Locations

S. No.	Location code	Location Name
1.	S1	Mine Site
2.	S2	Khusalpur
3.	S3	Vikasnagar
4.	S4	Rampur

The samples were collected by driving an auger into the soil up to the depth of 90cm. The present study on the soil quality establishes the baseline characteristics and identifies the incremental concentrations if any, due to the proposed project. The objective of the sampling is:

- To determine the baseline soil characteristics of the study area;
- To determine the impact of proposed activity on soil characteristics and;
- To determine the impact on soil more importantly agriculture production point of view.

The soil samples were collected from three different depths viz. 30cm, 60cm and 90cm. The samples were then packed in polythene plastic bags and sealed. The samples from three different depths are homogenized and are then analyzed. Main test methodologies used for analysis of Soil are given below in **Table 3.4**

Table 3-4: Methodologies Used for Soil Analysis

Final EIA Report Of Sand, Bajri, Boulder Mining From The River Bed of Kot Mot (60 Ha) at Village Rudrapur Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

Sampling Parameters		Analytical Equipment	Methodology
Texture	Manual samples were collected by driving an auger. Soil samples collected once in a season	Hygrometer and measuring cylinder	IS: 2720 Part 4
Porosity		As per IS: 2720	IS: 2720 Part VII
Moisture		Electronic Balance	IS: 2720 Part 2
Cation Exchange Capacity		As per IS: 2720	IS: 2720 part 24
Electrical Conductivity		As per IS: 14767-2000	IS: 14767-2000
pH		pH Meter	4500 H+B
Calcium		EDTA Titration	3500 Ca B
Magnesium		EDTA Titration	3500 Mg B
Sodium (Na)		Flame Photometer	3500 Na B
Potassium		Flame Photometer	3500 K B

Map showing monitoring locations of Soil samples for physico-chemical analysis of soil is shown below in **Figure 3.4**

3.3.5.3 SOIL QUALITY RESULTS

The results of soil analysis for one season (March-May 2015) collected from four different locations are given below in **Table 3.5**.

Table 3-5: Soil Quality Analysis Results

Sl. No.	Parameter	Units of Measurements	Mine site	Khusalpur	Vikasnagar	Rampur
1	pH	-	7.32	7.45	7.59	7.18
2	Bulk Density	gm/cm ³	1.45	1.48	1.4	1.38
3	Conductivity	micro mhos/cm	468	512	480	381
4	Moisture	%	12.5	11.3	12.8	10.3
5	WHC	-	40.2	37.8	30.4	32
6	Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
7	Sand	%	72	76	70	74
8	Clay	%	12	6	12	10
9	Silt	%	16	18	18	16
10	Sodium	mg/100gm	38	32	36	34
11	Potassium	mg/100gm	3.4	2.8	2.4	2.6
12	CEC	meq/100gm	8.52	5.16	8.92	7.04
13	Nitrogen	mg/100gm	13.6	15.2	14.4	12.8
14	Organic Matter	%	0.68	0.76	0.72	0.64
15	Phosphorous	mg/100gm	0.64	0.75	0.7	0.58
16	Calcium	meq /100gm	10.4	8.1	7.8	9.2
17	SAR	-	2.62	2.47	2.65	2.41
18	Magnesium	meq /100gm	3.3	2.8	3.7	3.5

Monitoring data shows that the texture of soil at all locations is Sandy Loam. The monitoring sites have sand ranging from 76% to 80% in soil samples. Silt content varies from 10% to 12%, while Clay content varies from 10% to 13% in the soil samples.

- The data shows that value of pH ranges from 7.45 at Mine site and Khusalpur to 7.65 at Rampur indicating that all soil samples are Slightly Alkaline.
- Khusalpur location shows maximum conductivity of 512 μ mhos/cm, while Rampur shows minimum conductivity of 381 μ mhos/cm.

- Values of CEC ranges from 2.2 meq/100g as lowest at Mine Site U/S and 2.8 meq/100g as maximum at Khusalpur and Vikasnagar.
- Magnesium values ranges from 2.8 meq/100g as lowest at Khusalpur and 3.7 meq/100g as highest at Vikasnagar.
- The average concentration of Nitrogen, Phosphorus and Potassium in the soil samples varies from 11.5 to 14.6 mg/100gm, 87 to 94.2mg/100gm and 0.85to 3 mg/100gm.

3.3.6 WATER ENVIRONMENT

There are six developmental blocks in District Dehradun. Two blocks (Chakrata and Kalsi) fall in mountainous terrain where the slopes are high and water resources are not estimated for these blocks. Water Resources are estimated, using GEC 1997 methodology, for Raipur, Doiwala, Sahaspur and Vikas Nagar blocks as the topography is by and large plain, in these blocks. The block areas are divided into command and non-command. The block-wise gross groundwater Final, net annual groundwater availability, stage of groundwater development and category are summarized in Table below. The stage of groundwater development, for command area, ranges from 53.78 to 78.34% while it ranges from 19.23 to 51.23% for non-command areas. All the four blocks are categorized as Safe.

3.3.6.1 WATER CONSUMPTION & SOURCES

The projected water requirements for the mine site are likely to be in the range of 15 KLD. The major areas of water consumption are dust suppression (5.85 KLD), for domestic purposes (6 KLD) and green belt development (6 KLD). Water requirement will be met by tanker supply.

3.3.6.2 METHODOLOGY FOR BASELINE DATA GENERATION

The assessment of present status of water quality within the study area was conducted by collecting water sample from ground water sources and surface water sources during the period of March-May 2015. The sampling locations were identified on the basis of their importance within the study area. Four ground water samples and one surface water samples were collected during the monitoring period. The details of locations of sampling stations for ground water and surface water are given below in **Table 3.6** and shown in **Figure 3.4**

Table 3-6: Location of Water Monitoring Station

S.N.	Type of sample	Location code	Location Name
1.	Surface water	SW1	Mine Site
2.	Surface water	SW2	Khusalpur
3.	Ground water	GW1	Vikas Nagar
4.	Ground water	GW2	Rampur

Water samples were collected from all the sampling locations and analyzed for relevant physico-chemical and bacteriological parameters. Collection and analysis of the samples was carried out as per established standard methods and procedures, prescribed by CPCB, relevant IS Codes and Standard Methods of Examination of Water. This report presented data for the month of March-May 2015.

Analyses of the parameters like temperature, pH, dissolved oxygen and alkalinity were carried out at the sampling stations immediately after collection of samples with the help of Field Analysis Kits. For analysis of other parameters, the samples were preserved and brought to laboratory at Noida. The metallic constituents like arsenic, mercury, lead, cadmium, chromium, copper, zinc, selenium, iron and manganese were analyzed with Atomic Absorption Spectrophotometer.

3.3.6.3 WATER QUALITY

Water quality is assessed with Water Quality Standards which are the foundation of the water quality-based pollution control program. Water Quality Standards define the goals for a water-body by designating its uses, setting criteria to protect those uses, and establishing provisions such as anti-degradation policies to protect water-bodies from pollutants.

The baseline data was collected and analyzed separately for ground water and surface water samples respectively. Results of both are discussed below separately.

3.3.6.4 GROUNDWATER QUALITY

Groundwater is the water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations. Since groundwater moves through rocks and subsurface soil, it has a lot of opportunity to dissolve substances as it moves. Ground water quality comprises the physical, chemical and biological qualities of ground water. Temperature, color, turbidity, odor and taste make up the list of physical water quality parameters. Mostly, groundwater is colorless, odorless

and without specific taste so quality of groundwater is mostly concerned with chemical and biological qualities.

Result: The physico-chemical characteristics of groundwater were analyzed as per relevant parts of IS: 3025 and compared with the drinking water specifications, prescribed in IS: 10500. The groundwater analysis data for the monitoring period i.e. March-May 2015 is presented in **Table 3.7** given below:

Table 3-7: Ground Water Quality Analysis Results

S.No.	Parameters	Units	Ground water Quality	
			Vikasnagar	Rampur
1.	Colour	Hazen Units	<5	<5
2.	Odour	-	Agreeable	Agreeable
3.	Taste	-	Agreeable	Agreeable
4.	Turbidity	NTU	<5	<5
5.	pH	-	7.42	7.56
6.	Temperature	°C	26.5	26.5
7.	Conductivity	µmhos/cm	448	436
8.	Alkalinity as CaCO ₃	mg/l	182	177
9.	Total Dissolved Solids	mg/l	292	288
10.	Total Hardness as CaCO ₃	mg/l	180	179
11.	Calcium as Ca	mg/l	50	56
12.	Magnesium as Mg	mg/l	13.4	9.5
13.	Chloride as Cl	mg/l	14	15
14.	Phosphate as PO ₄	mg/l	0.25	0.17
15.	Nitrate as NO ₃	mg/l	3.8	3.6
16.	Sulphate as SO ₄	mg/l	26	30
17.	Fluoride as F	mg/l	<0.001	<0.001
18.	Phenolic Compound	mg/l	<0.01	<0.01
19.	Copper as Cu	mg/l	0.71	0.78
20.	Mercury as Hg	mg/l	<0.001	<0.001
21.	Selenium as Se	mg/l	<0.01	<0.01
22.	Total Arsenic as As	mg/l	<0.01	<0.01
23.	Lead as Pb	mg/l	<0.01	<0.01
24.	Zinc as Zn	mg/l	0.098	0.074
25.	Chromium as Cr ⁺⁶	mg/l	<0.05	<0.05
26.	Manganese as Mn	mg/l	<0.02	<0.02

27.	Boron as B	mg/l	0.21	0.23
28.	Iron as Fe	mg/l	0.11	0.08
29.	Sodium as Na	mg/l	8	10
30.	Potassium as K	mg/l	1	2
31	Dissolved oxygen	mg/l	NA	NA
32	COD	mg/l	NA	NA
33	BOD	mg/l	NA	NA
34	Total Coliform	MPN/100ml	Absent	Absent
35	Faecal Coliform	MPN/100ml	Absent	Absent

The value of Ground Water pH ranges from 7.42 to 7.56, indicating that water is neutral to slightly alkaline in the study area. Maximum Conductivity observed is 448 μ mhos/cm at Vikasnagar whereas minimum conductivity was observed at Rampur as 436 μ mhos/cm. Total hardness of ground water ranges from 3.58 to 3.6 mg/l. The observed values of Chloride vary from 14 mg/l at Vikasnagar to 15 mg/l at Rampur. The ground water quality is in good conditions at mostly all locations.

Conclusion

The test results show that ground water quality is suitable for drinking, other domestic consumption and irrigation.

3.3.6.5 SURFACE WATER QUALITY

Surface water is any source of water that is open to the atmosphere and is subject to runoff from the land. This includes lakes, streams, rivers, ponds, springs, marine bays, estuaries, and oceans.

Result

The sample of surface water have been collected from two differently located surface water bodies and analyzed for parameters prescribed as per IS-2296. The result of surface water analysis data for the monitoring period i.e. March-May 2015 is presented below in **Table 3.8**.

Table 3-8: Surface Water Quality Analysis Results

S.No.	Parameters	Units	Surface water Quality	
			Mine Site	Khusalpur
1.	Colour	Hazen Units	<5	<5
2.	Odour	-	Agreeable	Agreeable
3.	Taste	-	Not Done*	Not Done*
4.	Turbidity	NTU	<5	<5

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5.	pH	-	7.65	7.47
6.	Temperature	°C	26.5	26.5
7.	Conductivity	µmhos/cm	405	400
8.	Alkalinity as CaCO ₃	mg/l	75	66
9.	Total Dissolved Solids	mg/l	262	258
10.	Total Hardness as CaCO ₃	mg/l	160	157
11.	Calcium as Ca	mg/l	118	110
12.	Magnesium as Mg	mg/l	42	47
13.	Chloride as Cl	mg/l	28	34
14.	Phosphate as PO ₄	mg/l	0.4	0.23
15.	Nitrate as NO ₃	mg/l	3.8	4.6
16.	Sulphate as SO ₄	mg/l	42	58
17.	Fluoride as F	mg/l	0.75	0.79
18.	Phenolic Compound	mg/l	<0.001	<0.001
19.	Copper as Cu	mg/l	<0.01	<0.01
20.	Mercury as Hg	mg/l	<0.001	<0.001
21.	Selenium as Se	mg/l	<0.01	<0.01
22.	Total Arsenic as As	mg/l	<0.01	<0.01
23.	Lead as Pb	mg/l	<0.01	<0.01
24.	Zinc as Zn	mg/l	0.086	0.16
25.	Chromium as Cr ⁺⁶	mg/l	<0.05	<0.05
26.	Manganese as Mn	mg/l	<0.02	<0.02
27.	Boron as B	mg/l	0.28	0.27
28.	Iron as Fe	mg/l	0.12	0.12
29.	Sodium as Na	mg/l	13	13
30.	Potassium as K	mg/l	2	2
31.	Dissolved oxygen	mg/l	6.2	6.4
32.	COD	mg/l	10	8
33.	BOD	mg/l	<2.0	<2.0
34.	Total Coliform	MPN/100ml	42	48
35.	Faecal Coliform	MPN/100ml	8.6	9.4

3.3.6.6 RESULTS

The value of Surface Water pH ranges from 7.47-7.65, indicating that water is neutral to slightly alkaline in the study area. Conductivity of surface water ranges from 400-405 μ mhos/cm. Total hardness of surface water ranges from 3.2 mg/l -3.14 mg/l. TDS ranges from 157-160 mg/l.

The physico-chemical characteristics of Surface water are found within the limits, prescribed by CPCB.

3.3.7 AIR ENVIRONMENT

3.3.7.1 METEOROLOGY

Meteorological study exerts a critical influence on air quality as it is an important factor in governing the ambient air quality. The meteorological data recorded during the study period is used for interpretation of the baseline information as well as input for air quality simulation models. Meteorological data was collected for pre monsoon season. The climate in the region shows broadly four seasonal variations, namely:

Winter	December - February
Pre-monsoon	March – May
Monsoon	June – September
Post-monsoon	October - November

A meteorological station was installed in the project area at about 10m above the ground level. All care was taken to see that the station is free from obstructions to free flow of winds. On-site monitoring was undertaken for various metrological variables in order to generate the site-specific data. Data was collected at site every hour continuously from 1st March to 31st May, 2015 covering post monsoon season.

The maximum and minimum temperatures of the study period are presented in **Table 3.9**

Table 3-9: Summary of metrological data generated at site

Month	Temperature (°C)		Relative Humidity (%)
	Maximum	Minimum	Mean
March 2015	26.6	11.4	63

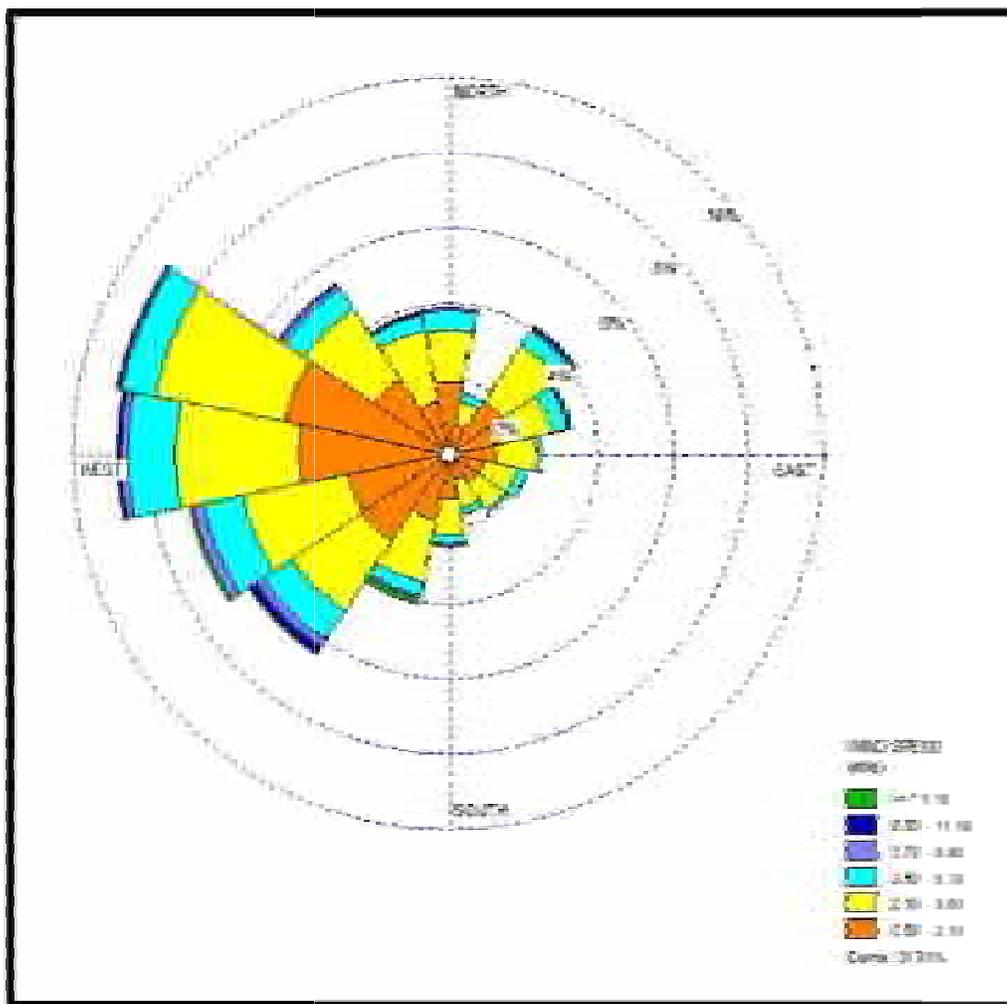
April 2015	32.1	16.3	51
May 2015	35.1	22.3	49

(Source: Field Monitoring)

3.3.7.2 Wind Speed

Wind speed and wind direction data recorded during the study period is useful in identifying the influence of meteorology on the air quality of the area. Based on the collected meteorological data, relative percentage frequencies of different wind directions are calculated and plotted as wind roses of Sixteen directions viz., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW and NNW for eight hourly and twenty four hour duration respectively. The observed wind pattern during the study period is described below and is plotted for the study period. The predominant over all wind patterns for the study period is from West to East direction.

Figure 0-5: Wind-Rose Diagram



• **Frequency Count**

	Directions / Wind Classes (m/s)	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total
1	348.75 - 11.25	42	31	11	2	0	0	86
2	11.25 - 33.75	18	14	5	0	0	0	37
3	33.75 - 56.25	38	39	10	2	1	1	91
4	56.25 - 78.75	29	33	10	1	0	1	74
5	78.75 - 101.25	28	24	3	0	0	0	55
6	101.25 - 123.75	22	19	6	0	0	0	47
7	123.75 - 146.25	21	19	2	0	0	0	42
8	146.25 - 168.75	16	17	4	0	0	0	37
9	168.75 - 191.25	27	21	5	2	0	0	55
10	191.25 - 213.75	40	37	8	2	0	3	90

11	213.75 - 236.25	62	49	20	5	4	1	141
12	236.25 - 258.75	61	62	24	6	0	2	155
13	258.75 - 281.25	88	72	28	4	2	0	194
14	281.25 - 303.75	98	77	20	2	1	0	198
15	303.75 - 326.25	53	49	14	3	1	0	120
16	326.25 - 348.75	32	42	9	1	1	0	85
	Sub-Total	675	605	179	30	10	8	1507
	Calms							701
	Missing/Incomplete							0
	Total							2208

• **Frequency Distribution**

	Directions / Wind Classes (m/s)	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	Total (%)
1	348.75 - 11.25	1.90217	1.40399	0.49819	0.09058	0	0	3.89493
2	11.25 - 33.75	0.81522	0.63406	0.22645	0	0	0	1.67572
3	33.75 - 56.25	1.72101	1.7663	0.4529	0.09058	0.04529	0.04529	4.12138
4	56.25 - 78.75	1.31341	1.49457	0.4529	0.04529	0	0.04529	3.35145
5	78.75 - 101.25	1.26812	1.08696	0.13587	0	0	0	2.49094
6	101.25 - 123.75	0.99638	0.86051	0.27174	0	0	0	2.12862
7	123.75 - 146.25	0.95109	0.86051	0.09058	0	0	0	1.90217
8	146.25 - 168.75	0.72464	0.76993	0.18116	0	0	0	1.67572
9	168.75 - 191.25	1.22283	0.95109	0.22645	0.09058	0	0	2.49094
10	191.25 - 213.75	1.81159	1.67572	0.36232	0.09058	0	0.13587	4.07609
11	213.75 - 236.25	2.80797	2.2192	0.9058	0.22645	0.18116	0.04529	6.38587
12	236.25 - 258.75	2.76268	2.80797	1.08696	0.27174	0	0.09058	7.01993
13	258.75 - 281.25	3.98551	3.26087	1.26812	0.18116	0.09058	0	8.78623
14	281.25 - 303.75	4.43841	3.48732	0.9058	0.09058	0.04529	0	8.96739
15	303.75 - 326.25	2.40036	2.2192	0.63406	0.13587	0.04529	0	5.43478
16	326.25 - 348.75	1.44928	1.90217	0.40761	0.04529	0.04529	0	3.84964
	Sub-Total	30.5707	27.4004	8.10688	1.3587	0.4529	0.36232	68.2518
	Calms							31.7482
	Missing/Incomplete							0
	Total							100

3.3.7.2 METHODOLOGY FOR BASELINE DATA GENERATION

This section describes the sampling locations, frequency of sampling and methodology adopted for monitoring ambient air quality.

Calibrated Respirable Dust Samplers were used for the sampling of PM₁₀, PM_{2.5}, SO₂ and NO_x.

Ambient air sampling was performed continuously for 24 hours to determine 24-hour average concentrations. Ambient air quality monitoring was carried out with a frequency of two days per week at all five locations. The sampling was performed at a height of 1.5 m (approximately) from the ground level. Standard methods specified under "National Ambient Air Quality Standards" notification G.S.R. 176(E) were adopted for sampling and analysis. Five locations within the study area were scientifically selected and are based on the following considerations:

- Meteorological conditions;
- Topography of the study area;
- The direction of the wind;
- Representation of the region for establishing baseline status; and
- Representation with respect to likely impact areas.

The location of the monitoring stations with reference to the proposed plant site is given below in **Table 3.10**.

Table 3-10: Ambient Air Quality Monitoring Locations

S. No.	Location code	Location Name
1.	A1	Mine Site Rudrapur
2.	A2	Rampur
3.	A3	Sahaspur
4.	A4	Herbertpur
5	A5	Vikasnagar

Sampling and Analytical Techniques

Techniques used for ambient air monitoring has been summarized and given below in **Table 3.11**

- **Particulate Matter (10)**

Calibrated 'Respirable Dust Samplers' with Whatman GF/A filter paper (size: 8"x10") was used for the collection of PM (10). A known volume of ambient air is passed through the cyclone to the initially preprocessed filter paper. The centrifugal force in cyclone acts on particulate matter to separate them into two parts and collected as followings: -

- Particles <10 μ size (Respirable) : GF/A Filter Paper
- Particles >10 μ size (Non Respirable) : Cyclone Cup

The differences in final and initial weight of filter paper and cyclone cup are used in estimation of particulate matter. The mass of particulates collected on the GF filter, divided by the volume of air sampled, gives the concentration of PM (10). The results are expressed in $\mu\text{g}/\text{m}^3$.

- **Sulphur Dioxide**

Sampling and analysis of ambient SO_2 was performed by adopting the 'Improved West and Gaeke Method. The ambient air passed through an impinger, containing a known volume of absorbing solution of Sodium Tetrachloromercurate, at a pre-determined flow rate as per sampling duration. SO_2 in ambient air reacts with the tetrachloromercurate to form a stable complex, dichloro-sulphito mercurate. On reacting with formaldehyde and p-rosaniline hydrochloride, the sulphite ion forms an intensely coloured compound, p-rosanilinemethyle sulphonic acid. The intensity of the colour developed is estimated by spectrophotometer at 560 nm wave length. The measured Optical Density (OD) is used to determine the concentration of SO_2 from the calibration curve already prepared against known concentrations of sulphite ion. The mass of SO_2 in the absorbing reagent, divided by the volume of sampled air provides the concentration of SO_2 , which is expressed as $\mu\text{g}/\text{m}^3$.

- **Nitrogen Dioxides**

Sampling and analysis of ambient NO_2 was performed by adopting the Modified 'Jacob Hochheiser' (Na arsenite) method. The ambient air passed through an impinger, containing a known volume of absorbing solution of sodium arsenite and sodium hydroxide. Oxides of nitrogen react with the absorbing reagent to form a stable solution of sodium nitrite. The nitrate ion produced during the sampling is estimated calorimetrically, after reacting with phosphoric acid, sulphanilamide and naphthyl ethylenediamine dihydrochloride (NEDA), using spectrophotometer at 540 nm wavelength. The measured Optical Density is used to determine the concentration of NO_2 from the calibration curve already prepared against known concentrations of nitrite ion. The mass of NO_2 in the absorbing reagent, divided by the volume of air sampled provides the concentration of NO_2 , which is expressed as $\mu\text{g}/\text{m}^3$.

Table 3-11: Techniques Used for Ambient Air Quality Monitoring

Parameters	Technique	Technical Protocol
PM₁₀	Gravimetric method	IS-5182 (Part-23),2006
Sulphur Dioxide	West and Gaeke (Modified)	IS-5182 (Part-II),2001

Nitrogen Oxide	Jacob & Hochheiser (Improved)	IS-5182 (Part-VI),2006
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3.3.7.3 AMBIENT AIR QUALITY

Airborne contaminants can present a significant threat to worker health and safety. Thus, identification and quantification of these contaminants through air monitoring is an essential component of a health and safety program at a hazardous waste site.

The basic mission of the Air Quality monitoring is to preserve and improve the quality of nation's air. To accomplish this, evaluate the status of the atmosphere as compared to clean air standards and historical information.

National Ambient Air quality standards (18 June 2009) along with the prescribed method of measurement is given below in **Table 3.12**.

Table 3-12: National Ambient Air Quality Standards

Pollutants	Time-weighted Average	Concentration in Ambient Air		Method of Measurement
		Industrial Areas, residential, rural and other area	Ecologically Sensitive Areas (notified by Central Govt.)	
Sulphur Dioxide (SO ₂)	Annual Average*	50 µg/m ³	20 µg/m ³	- Improved West and Geake Method
	24 hours**	80 µg/m ³	80 µg/m ³	-Ultraviolet fluorescence
Oxides of Nitrogen as (NO ₂)	Annual Average*	40 µg/m ³	30 µg/m ³	- Modified Jacob & Hochheiser (Na-Arsenite)
	24 hours**	80 µg/m ³	80 µg/m ³	- Gas Phase Chemiluminescence
Particulate PM ₁₀ (µg/m ³)	Annual Average*	60 µg/m ³	60 µg/m ³	- Gravimetric
	24 hours**	100 µg/m ³	100 µg/m ³	-TOEM
				-Beta attenuation

**Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.*

***24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.*

3.3.7.4 RESULT

The results of ambient air quality monitoring for the period of March-May 2015, are presented in **Table 3.13 to Table 3.17**. Various parameters monitored from the study area have been described by their maximum, minimum and average values.

Table 3-13: Ambient Air Quality at A1- Mine Site Rudrapur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	02.03.2015	62	33	6	16
	03.03.2015	64	38	8	13
	09.03.2015	68	35	7	14
	10.03.2015	72	40	5	19
	15.03.2015	78	45	6	21
	16.03.2015	75	41	9	25
	22.03.2015	70	46	7	16
	23.03.2015	76	37	5	14
April	01.04.2015	62	34	8	26
	02.04.2015	59	40	7	18
	08.04.2015	78	46	6	20
	09.04.2015	65	38	8	16
	14.04.2015	72	46	5	20
	15.04.2015	76	39	9	24
	24.04.2015	66	44	6	19
	25.04.2015	69	48	8	17
May	01.05.2015	64	40	5	14
	02.05.2015	70	46	7	21
	08.05.2015	72	50	5	18
	09.05.2015	74	45	7	20
	14.05.2015	70	38	5	17
	15.05.2015	76	44	8	19
	24.05.2015	64	49	7	22
	25.05.2015	78	46	6	18
	Max	78	50	9	26
	Min	59	33	5	13
	Avg	70.00	42.00	6.67	18.63
	98 percentile	78	49.54	9	25.54

Table 3-14: Ambient Air Quality at A2- Rampur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	02.03.2015	66	34	7	16
	03.03.2015	78	40	9	18

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	09.03.2015	60	36	8	12
	10.03.2015	70	45	6	16
	15.03.2015	68	41	8	20
	16.03.2015	64	38	7	17
	22.03.2015	58	36	9	22
	23.03.2015	72	44	8	15
April	01.04.2015	77	35	7	20
	02.04.2015	66	40	8	16
	08.04.2015	71	44	6	24
	09.04.2015	58	36	10	18
	14.04.2015	68	39	8	14
	15.04.2015	72	42	6	19
	24.04.2015	63	37	7	24
	25.04.2015	74	43	9	18
May	01.05.2015	70	37	8	15
	02.05.2015	74	40	7	20
	08.05.2015	67	45	8	16
	09.05.2015	65	38	6	22
	14.05.2015	68	43	9	19
	15.05.2015	72	46	7	16
	24.05.2015	69	44	8	23
	25.05.2015	67	42	9	18
	Max	78	46	10	24
	Min	58	34	6	12
	Avg	68.21	40.21	7.71	18.25
	98 percentile	77.54	45.54	9.54	24

Table 3-15: Ambient Air Quality at A3: Sahaspur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	04.03.2015	69	36	8	20
	05.03.2015	54	44	7	26
	11.03.2015	69	40	10	18
	12.03.2015	60	38	11	21
	17.03.2015	69	41	7	23
	18.03.2015	63	39	9	16
	24.03.2015	67	37	11	22
	25.03.2015	72	42	7	26
April	03.04.2015	70	40	9	28
	04.04.2015	69	34	11	21
	10.04.2015	72	45	8	26

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	11.04.2015	68	41	10	21
	16.04.2015	73	36	7	25
	17.04.2015	68	43	9	18
	27.04.2015	74	42	8	24
	28.04.2015	71	37	7	21
May	03.05.2015	68	44	10	23
	04.05.2015	71	38	8	25
	10.05.2015	68	35	11	19
	11.05.2015	60	40	7	23
	16.05.2015	72	43	9	18
	17.05.2015	67	39	7	22
	26.05.2015	65	41	10	26
	27.05.2015	69	37	8	17
	Max	74	45	11	28
	Min	54	34	7	16
	Avg	67.83	39.67	8.69	22.04
	98 percentile	73.54	44.54	11	27.08

Table 3-16: Ambient Air Quality at A4: Herbertpur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	04.03.2015	72	39	6	20
	05.03.2015	64	35	9	26
	11.03.2015	78	40	7	21
	12.03.2015	60	32	8	23
	17.03.2015	62	36	10	26
	18.03.2015	68	40	6	19
	24.03.2015	74	35	9	24
	25.03.2015	69	39	10	27
April	03.04.2015	57	32	7	20
	04.04.2015	63	38	6	24
	10.04.2015	69	42	8	22
	11.04.2015	72	37	10	18
	16.04.2015	67	35	7	24
	17.04.2015	68	39	6	18
	27.04.2015	70	41	9	12
	28.04.2015	66	36	7	16
May	03.05.2015	69	40	8	24
	04.05.2015	70	43	6	20
	10.05.2015	63	36	9	23
	11.05.2015	68	39	11	25
	16.05.2015	59	46	6	20

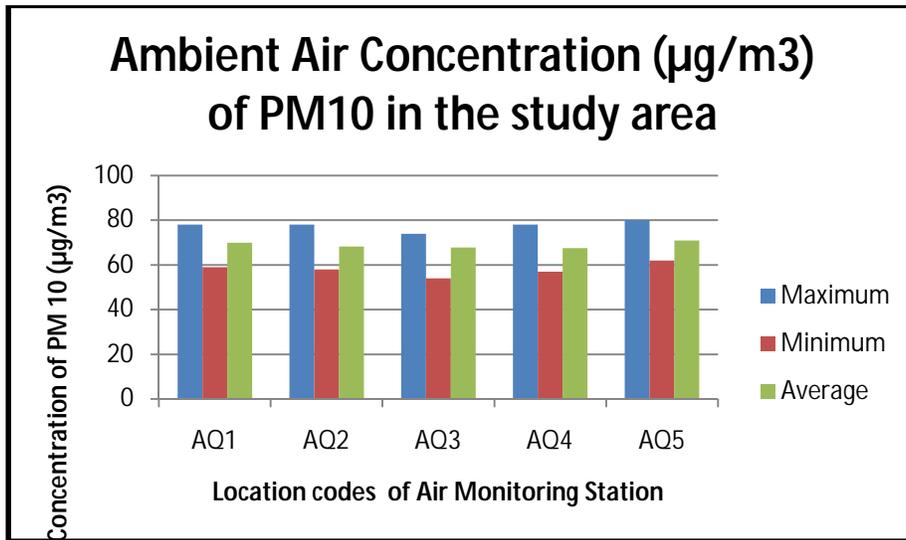
	17.05.2015	62	43	7	14
	26.05.2015	72	38	6	16
	27.05.2015	77	41	9	18
	Max	78	46	11	27
	Min	57	32	6	12
	Avrg	67.46	38.42	7.79	20.83
	98 percentile	77.54	44.62	10.54	26.54

Table 3-17: Ambient Air Quality at A5-Vikasnagar

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	07.03.2015	62	32	10	18
	08.03.2015	71	40	9	20
	13.03.2015	75	41	11	16
	14.03.2015	78	43	9	24
	19.03.2015	80	45	8	20
	20.03.2015	75	38	10	19
	27.03.2015	68	37	8	15
	28.03.2015	72	39	11	23
April	06.04.2015	65	34	9	14
	07.04.2015	73	40	10	20
	12.04.2015	69	34	8	21
	13.04.2015	78	41	12	25
	18.04.2015	72	38	9	17
	19.04.2015	67	34	11	26
	29.04.2015	76	37	9	17
	30.04.2015	63	33	10	15
May	06.05.2015	69	37	8	21
	07.05.2015	65	34	11	16
	12.05.2015	74	36	9	24
	13.05.2015	63	35	8	28
	18.05.2015	70	39	11	22
	19.05.2015	72	42	9	18
	29.05.2015	78	40	8	26
	30.05.2015	69	38	10	21
	Max	80	45	12	28
	Min	62	32	8	14
	Avrg	71.00	37.79	9.50	20.25
	98 percentile	79.08	44.08	11.54	27.08

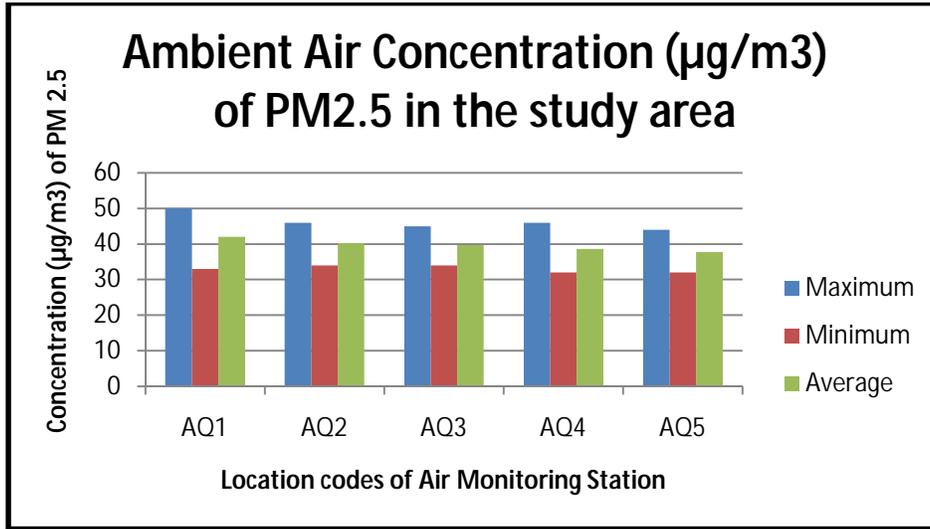
PARTICULATE MATTER 10 (PM₁₀): The maximum value for PM₁₀ is observed, as 80.0 µg/m³ at Vikasnagar and minimum value of 57 µg/m³ at Herbertpur while 24 hours applicable limit is 100µg/m³ for industrial and mixed use areas. The average value ranges between 67.44 to 71.0µg/m³. Graphical representation of PM₁₀ concentration at different locations is shown in **Figure 3.6**

Figure 3-6: Ambient Air Concentration of PM₁₀ in the Study Area



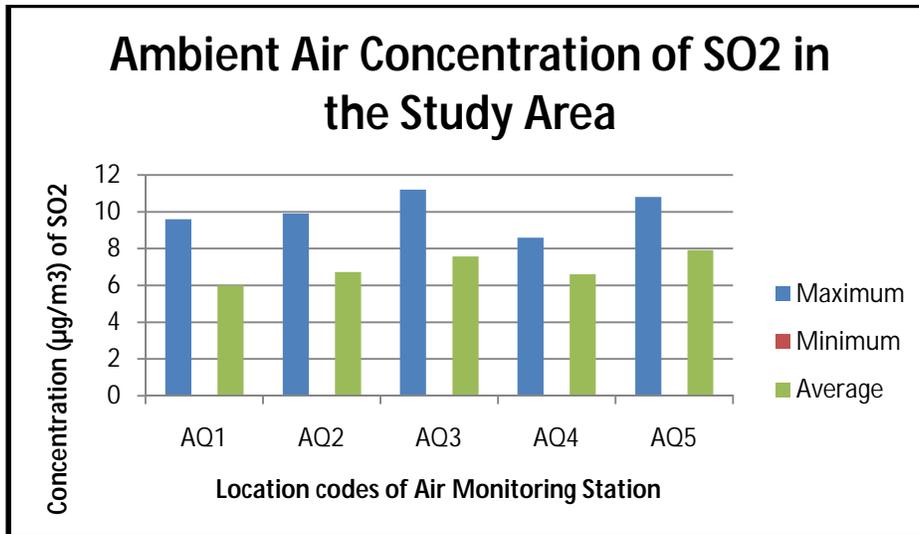
PARTICULATE MATTER 2.5 (PM_{2.5}): The maximum value for PM_{2.5} is observed, as 50.0 µg/m³ at Mine Site Rudrapur and minimum value of 32µg/m³ at Herbertpur while 24 hours applicable limit is 100µg/m³ for industrial and mixed use areas. The average value ranges between 37.71 to 42.0 µg/m³. Graphical representation of PM_{2.5} concentration at different locations is shown in **Figure 3.7**

Figure 3-7: Ambient Air Concentration of PM_{2.5} in the Study Area



SO₂: The maximum value for SO₂ is observed as 10.8 $\mu\text{g}/\text{m}^3$ at Vikasnagar and minimum value is beyond detection limit less than 4 $\mu\text{g}/\text{m}^3$ at all location. Average value of SO₂ is between 6.0 to 6.92 $\mu\text{g}/\text{m}^3$. The area observes SO₂ well below the prescribed range. Graphical representation of SO₂ concentration at different locations is shown in **Figure 3.8**.

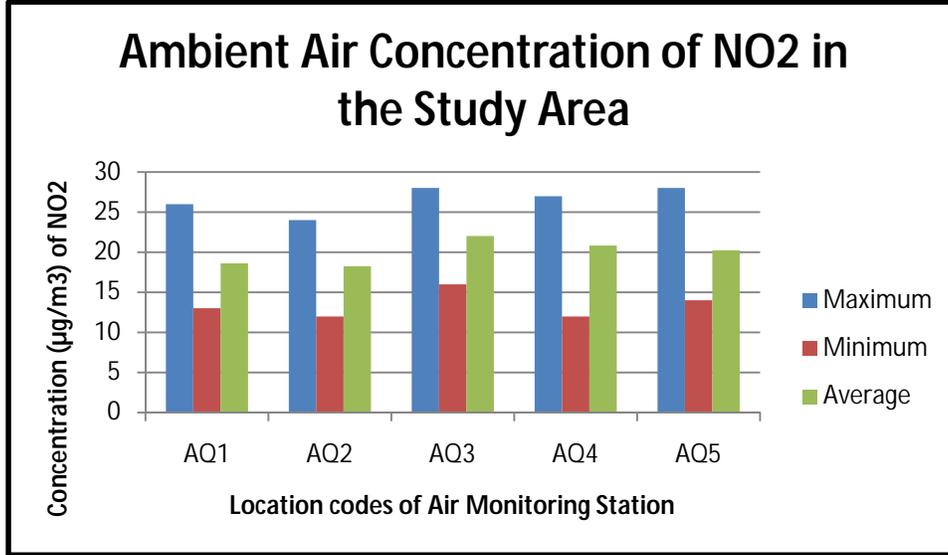
Figure 3-8: Ambient Air Concentration of SO₂ in the Study Area



NO₂: The maximum value for NO₂ is observed, as 28.0 $\mu\text{g}/\text{m}^3$ at Vikasnagar and minimum values is 12 $\mu\text{g}/\text{m}^3$ at Herbertpur and Rampur, while 24 hours applicable limit is of 80 $\mu\text{g}/\text{m}^3$ for residential, industrial and other areas. Average value of NO₂ is from 18.25 - 20.83 $\mu\text{g}/\text{m}^3$. The area observes NO₂

well below the prescribed range. Graphical representation of NO₂ concentration at different locations is shown in **Figure 3.9**

Figure 0-9: Ambient Air Concentration of NO₂ in the Study Area



Conclusion

The study area represents mostly rural environment. The sources of air pollution in the region are vehicular traffic, dust arising from unpaved village roads and domestic fuel burning.

3.3.8 FREE SILICA

Concentration of free silica is negligible around the mine site however; the standard for respirable dust is 3mg/m³ for 8 hour of working period where free silica content should not exceed 5% as prescribed by Directorate General of Mines Safety.

3.3.9 NOISE ENVIRONMENT

Noise is said to be defined as an unwanted sound. It is, therefore, necessary to measure both the quality as well as the quantity of environment noise in and around the mining site.

3.3.9.1 TYPE OF SOUND FIELDS

Based on the distance from the source of sound generation, the types of sound field are identified. They are of three type's viz. (i) Free Field (ii) Near Field and (iii) Far Field.

- **Free Field**

The sound waves that propagate without obstruction from source to the receiver are free field. The sound waves obey the inverse square law so that sound pressure level decreases by 6 dB (A) as the distance is doubled. Such a field is known as free field.

- **Near Field**

This field is located within a few wavelengths of the source and it is also influenced by the dimensions of the source. The inverse square law does not apply in this field.

- **Far Field**

The far field has two parts one is known as free part and the other as reverberation part. In the free part of the far field, the sound pressures level obeys the inverse square law and propagate without obstruction from source to the receiver. The reverberant part of the field exists for enclosed situation where the reflected sound waves are superimposed on the incident sound waves. If there are many reflected waves from all possible direction, a diffuse sound field exists.

The intensity of sound energy in the environment is measured in a logarithmic scale and is expressed in a decibel (dB) scale. Ordinary sound level meter measures the sound energy that reaches the microphone by converting it into electrical energy and then measures the magnitude in dB. In a sophisticated type of sound level meter, an additional circuit (filters) is provided, which modifies the received signal in such a way that it replicates the sound signal as received by the human ear and the magnitude of sound level in this scale is denoted as dB (A). The sound levels are expressed in dB (A) scale for the purpose of comparison of noise levels, which is universally accepted by the international community.

3.3.9.2 METHODOLOGY FOR BASELINE DATA GENERATION

Noise levels were measured using an Integrating sound level meter manufactured by Cygnet (Model No. 2031). It has an indicating mode of Lp and Leq. Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in “A” weighting set the sound level meter was run for one hour time and Leq was measured at all locations.

The sampling locations for noise are confined to residential, commercial and sensitive areas; however, no industrial area is present within the 10 km radius of the project site. 5 sampling locations were selected for the sampling of noise and are shown in **Figure 3.4** and also given in

Table 3.18

Table 3-18: Details of Noise Monitoring Locations

Code	Site Name
N1	Mine Site
N2	Rampur
N3	Sahaspur
N4	Herbertpur
N5	Vikas Nagar

The day noise levels have been monitored during 6.00 am to 10.00 pm and night noise levels during 10.00 pm to 6.00 am, at all the 8 locations covered in 10 km radius of the study area.

The L10, L50, L90, Leq, Ld and Ln were computed based on the sound pressure level recorded.

- Leq - 24 Hourly equivalent continuous noise levels
- Ld - Daytime Leq that has computed from 6.00 am to 10.00 pm
- Ln - Nighttime Leq that is computed from 10.00 pm to 6.00 am

3.3.9.3 NOISE LEVEL SURVEY

A preliminary reconnaissance survey was undertaken to identify the major noise generating sources in the area. The noise survey was conducted in the month of March, 2015 to assess the background noise levels in different zones viz. industrial, commercial, and residential and silence zones.

3.3.9.4 NOISE QUALITY STANDARDS

Ministry of Environment & Forests (MoEF) has notified the noise standards vide gazette notification dated February 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in **Table 3.19**

Table 3-19: Ambient Noise Quality Standards in respect of Noise

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

Note:

1. Daytime from 6.00am to 10.00 pm and Night time from 10.0 0pm to 6.00 am.
2. Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones.

3.3.9.5 NOISE QUALITY

Result

The ambient noise quality result for March 2015 is presented below in **Table 3.20**

Table 3-20: Ambient Noise Quality of the Study Area

Location Name	Date of Sampling	Category	Noise Level dB(A)		Reference Level dB(A)	
			Daytime (Ld)	Night-time (Ln)	Daytime (Ld)	Night-time(Ln)
Mine Site	02.03.2015	Residential Area	55	45	51.8	41.9
Rampur	09.03.2015	Residential Area	55	45	50.6	42.6
Sahaspur	12.03.2015	Residential Area	55	45	52.4	43.4
Herbertpur	18.03.2015	Residential Area	55	45	49.7	41.7
Vikas Nagar	27.03.2015	Residential Area	55	45	52.5	40.6

RESIDENTIAL AREA: In residential area, Leq (day) noise level are ranging between 49.7 dB recorded Herbertpur to 52.5 dB recorded at Vikasnagar during day time and Leq (night) of 40.6 dB recorded at Vikas nagar to 43.4 dB recorded at Sahaspur during night time. During daytime and night time noise level within the residential area are well within the prescribed limit.

3.3.10 BIOLOGICAL ENVIRONMENT

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

relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment.

3.3.10.1 METHODOLOGY

The ecological information has been collected through field studies, consultation with various government departments and collection of available literature with relevant institutions/ organizations.

3.3.10.2 FLORA & FAUNA IN STUDY AREA

- **STUDY AREA**

The study area (of 10km radius) is rich in terms of biodiversity. The project site lies in Dehradun district of Uttarakhand. Uttarakhand is richly endowed with forests and has a number of National parks and Sanctuaries. The proposed mining lease area of 60 ha lies in the river bed of River Kot Mot. The study area lies in the altitudinal range of 595m and 529m above AMSL.

- **FORESTS**

The forest cover in the Uttarakhand state, based on interpretation of satellite data of October-November 2008 mentioned in the India State of Forest Report 2011, is 24,496 km², which is 45.80 % of the state's geographical area. In terms of forest canopy density classes, the state has 4762 km² area under very dense forest, 14167 km² areas under moderately dense forest and 5567 km² area under open forest. Out of 3088 km² total area of Dehradun district, 584 km² area is under very dense forest, 695 km² fall under moderately dense forest and 328 km² area is open forest.

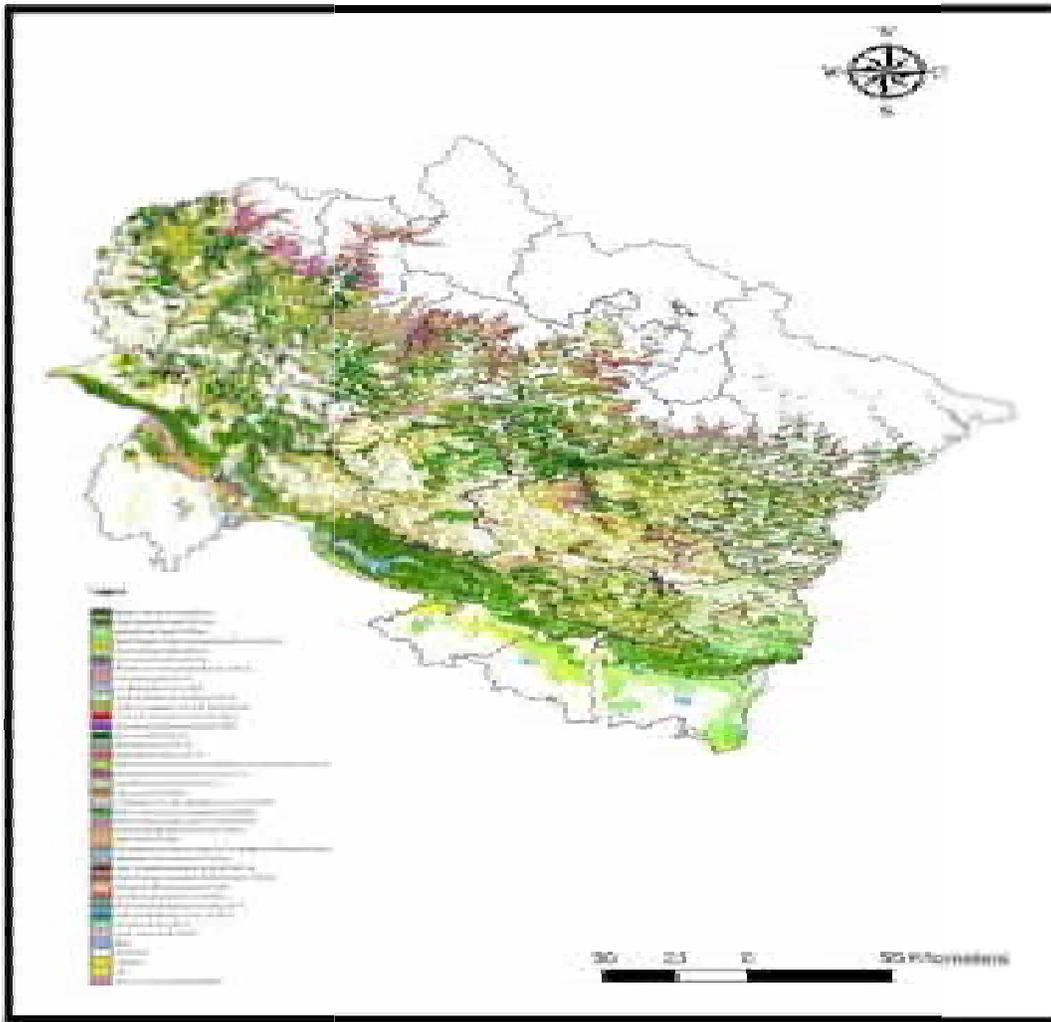
(Source: India State of Forest Report; FSI 2011)

Major forest types occurring in the state are Tropical Moist Deciduous, Tropical Dry Deciduous, Sub Tropical Pine, Himalayan Moist Temperate, Sub Alpine and Alpine Forests. Forests are largely distributed throughout the state with conifers and Sal being major forest formation. Following ten forest sub-types are present in Dehradun district as per Champion and Seth 1968.

1. Moist Siwalik Sal Forest
2. Northern Dry Mixed Deciduous Forest
3. Dry Deciduous Scrub

4. Subtropical Euphorbia Scrub
5. Mohru Oak Forest
6. Moist Deodar Forest
7. Western Mixed Coniferous Forest (Spruce, Blue Pine, Silver Fir)
8. Himalayan Temperate Secondary Scrub
9. Low Level Blue Pine Forest
10. Khair-Sissu Forest

Figure 3-10: Forest Map of District Dehradun



3.3.10.3 FLORA IN CORE ZONE

The core zone comprises of Kot Mot river bed, where mining operation is proposed. This area consists of riparian vegetation in which aquatic and marshland plants are the main component.

Most among them are weeds. No ecologically sensitive plant species has been reported from this area. Riparian vegetation is found along the river side. In stagnant water growth of hydrophytes likes *Hydrolea zeylanica*, *Ipomoea carnea*, *Ludwigia adscendens*, *Sagittaria sagittifolia*, *Spilanthes paniculata*, *Typhalatifolia*, etc. can be commonly observed.

3.3.10.4 FLORA IN BUFFER ZONE

Buffer zone of the proposed project is Doon Valley. The tree observed in the area are Aam (*Magifera Indica*), Jamun (*Syzygium cumini*), Peepal (*Felis religiosa*), Neem (*Azarichta Indica*), Bargad (*Ficus Bangalensis*), Poplar (*Populas deltoids*), Sisham (*Dalbergia sissoo*) etc.

Table 3-21: Floral species observed in Core Zone

	Scientific Name	Family	Habit	Common Name
1.	<i>Ageratum conyzoides</i>	Asteraceae	Herb	Jangli Pudina
2.	<i>Amaranthus spinosus</i>	Amaranthaceae	Herb	Amarnath
3.	<i>Calotropis procera</i>	Asclepiadaceae	Shrub	Kapok
4.	<i>Cannabis sativa</i>	Canabaceae	Herb	Durban
5.	<i>Chenopodium album</i>	Chenopodiaceae	Herb	Baithua
6.	<i>Datura innoxia</i>	Solanaceae	Shurb	Datura
7.	<i>Hydrolea zeylanica</i>	Hydrophylaceae	Herb	Kerit
8.	<i>Ipomoea carnea</i>	Convolvulaceae	Shurb	Bheshram

Table 3-22: Floral species observed in Buffer Zone

	Scientific Name	Family	Habit	Common Name
1.	<i>Adina cordifolia</i>	Rubiaceae	Tree	Haldina
2.	<i>Aegle marmelos</i>	Rutaceae	Tree	Bael
3.	<i>Ageratum conyzoides</i>	Asteraceae	Herb	Jungli Pudina
4.	<i>Albizia lebbeck</i>	Fabaceae	Tree	Siris
5.	<i>Alternanthera paronychioides</i>	Amaranthaceae	Herb	Marathi
6.	<i>Alternanthera pungens</i>	Amaranthaceae	Herb	Kannada
7.	<i>Amaranthus spinosus</i>	Amaranthaceae	Herb	Cholai
8.	<i>Anogeissus latifolia</i>	Combretaceae	Tree	Dhawa

9.	<i>Argemone mexicana</i>	Papaveraceae	Herb	Satyanashi
10.	<i>Artocarpus integrifolia</i>	Moraceae	Tree	Katahal
11.	<i>Azadirachta indica</i>	Meliaceae	Tree	Neem
12.	<i>Bauhinia acuminata</i>	Fabaceae	Tree	Kachnar
13.	<i>Bauhinia variegata</i>	Fabaceae	Tree	Kachnar
14.	<i>Bombax ceiba</i>	Malvaceae	Tree	Semal
15.	<i>Brachiaria ramosa</i>	Poaceae	Herb	Paraghas
16.	<i>Butea monosperma</i>	Fabaceae	Tree	Butea
17.	<i>Cannabis sativa</i>	Cannabaceae	Herb	Bhang
18.	<i>Cassia fistula</i>	Fabaceae	Tree	Amaltas
19.	<i>Cassia tora</i>	Fabaceae	Herb	Charota
20.	<i>Celtis australis</i>	Cannabaceae	Tree	Batkar
21.	<i>Chenopodium album</i>	Chenopodiaceae	Herb	Baithua
22.	<i>Colocasia esculenta</i>	Araceae	Herb	Arvi
23.	<i>Cynodon dactylon</i>	Poaceae	Herb	Doob
24.	<i>Dalbergia sissoo</i>	Fabaceae	Tree	Shisam
25.	<i>Delonix regia</i>	Fabaceae	Tree	Gulmohar
26.	<i>Eleusine indica</i>	Poaceae	Herb	Mandla
27.	<i>Emblica officinalis</i>	Phyllanthaceae	Tree	Amla
28.	<i>Eragrostis tenella</i>	Poaceae	Herb	Bhurbhusi
29.	<i>Erythrina indica</i>	Fabaceae	Tree	Farhad
30.	<i>Ficus racemosa</i>	Moraceae	Tree	Dumar
31.	<i>Ficus religiosa</i>	Moraceae	Tree	Peepal
32.	<i>Ficus tomentosa</i>	Moraceae	Tree	Asna
33.	<i>Garuga pinnata</i>	Burseraceae	Tree	Kharpot

34.	<i>Grangea maderaspatana</i>	Asteraceae	Herb	Manipuri
35.	<i>Grewia optiva</i>	Tiliaceae	Tree	Dhaman
36.	<i>Holoptelea integrifolia</i>	Ulmaceae	Tree	Papri
37.	<i>Imperata cylindrica</i>	Poaceae	Herb	Sirhu
38.	<i>Indigofera gerardiana</i>	Fabaceae	Tree	Sakina
39.	<i>Leucaena leucocephala</i>	Fabaceae	Tree	Safed Babool
40.	<i>Litchi chinensis</i>	Sapindaceae	Tree	Litchi
41.	<i>Mangifera indica</i>	Anacardiaceae	Tree	Aam
42.	<i>Melia azedarach</i>	Meliaceae	Tree	Bakain
43.	<i>Morus alba</i>	Moraceae	Tree	Shahtoot
44.	<i>Nyctanthes arbor</i>	Oleaceae	Tree	Parijat
45.	<i>Ougeinia oojeinensis</i>	Fabaceae	Tree	Sandan
46.	<i>Parthenium hysterophorus</i>	Asteraceae	Herb	Gajar ghas
47.	<i>Physalis minima</i>	Solanaceae	Herb	Rasbhari
48.	<i>Polyalthia longifolia</i>	Annonaceae	Tree	Ashok
49.	<i>Ricinus communis</i>	Euphorbiaceae	Tree	Arandi
50.	<i>Saccharum spontaneum</i>	Poaceae	Herb	Kahuwa
51.	<i>Shorea robusta</i>	Dipterocarpaceae	Tree	Sal
52.	<i>Tectona grandis</i>	Lamiaceae	Tree	Teak
53.	<i>Terminalia belerica</i>	Combretaceae	Tree	Bahera
54.	<i>Terminalia chebula</i>	Combretaceae	Tree	Sinhala
55.	<i>Toona ciliata</i>	Meliaceae	Tree	Red Cedar

Figure 3-11: Flora found in Study Area



Alternanthera pungens



Parthenium hysterophorus



Shorea robusta



Ficus religiosa

3.3.10.5 FAUNA IN CORE ZONE

Buffer zone of project area comprises of Binog Wild life Sanctuary which is situated 9.89 Km from the mine site and supports healthy aquatic bird population. There are many river channels present along with the Asan Barrage in the buffer zone of study area which are the major attraction sites for avifauna.

List of wild fauna of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The conservation value at regional level of identified fauna was gathered from the Wildlife protection Act, 1972 moreover, global conservation status of species was estimated from Red data book of IUCN was used. No established habitats of any mammals or birds are noticed in river bed and along the banks. The fauna of study area can be

grouped in to aquatic and terrestrial as the core area mostly comprises of aquatic fauna and the buffer area provides shelter to the terrestrial animals.

- **AQUATIC FAUNA:**

Aquatic fauna mostly comprises of Avifauna, Amphibians & Fish which cannot survive without water. Detail list of aquatic birds is shown in tabular form.

- **TERRESTRIAL FAUNA:**

MAMMALS: Buffer zone of the proposed mining area is not rich in wild mammal population due high anthropogenic pressure and location of Paonta sahib being a tourist pilgrimage. There is continuous series of human settlements from Dehradun city to project site which restricted any significant wildlife in area. Common grazing livestock like buffalo, cow, goat etc. can be noticed in open grass fields. Small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (*Macaca mulatta*), Indian hare (*Lepus nigricollis*), fruits bat (*Pteropus conspicillatus*), Nilgai (*Boselaphus tragocamelus*), etc. are often seen in the area. Nilgai has become a menace to the farmers in the district due to their rising numbers and damage to agriculture crops.

AVIFAUNA: Water birds like White-breasted Waterhen, Northern Pintail, Northern Shoveler, Common Teal, Falcated Duck, Eurasian Wigeon, Mallard, Spot-billed Duck, Gadwall, Cormorant and Bar Headed Goose are of common occurrence in Binog Wild life sanctuary. Terrestrial birds like Red-vented Bulbul, Magpie Robin, Jungle Babblers, White Wagtail, House Sparrow, House Crow, Wablers and Tits can be easily observed in study area.

REPTILES: The reptilians species commonly reported are Agama (*Laudakia tuberculata*) in settlement area, Garden lizard (*Calotes versicolor*) and Eutropismacularia along shady places in agricultural field or where growth of bushes is noticed. Among non poisonous snakes rat snakes (*Ptyas mucosus*) are commonly noticed in field, followed by poisonous snakes like King Cobra (*Naja naja*) and Banded krait (*Bungarus multicinctus*) are reported to be seen by farmers.

AMPHIBIAN: Amphibians are commonly found at the places along the margin of aquatic and terrestrial systems. Due to presence of water bodies like river, nalas, etc. the study area is providing shelter to many amphibian species. Some of the commonly reported species are *Bufo melanostictus* (common Indian toad), *Euphlyctis cyanophlyctis* (Indian skipper frog), *Hoplobatrachus tigerinus* (Indian bull frog) etc.

FISH: The fish species which are commonly found in the proposed site are *Labeo bata* (Bhangan or Bata), *Gudusia chapara* (Chappera or Palla), *Labeo rohita* (Dumra or Dhambra), *Notopterus notopterus* (Pari or Battu), *Catla catla* (Theila), *Clarius batrachus* (mangur), etc

The study area is largely forested. A large number of fauna are reported from the study area. The animals reported from these forest areas include elephant, bear, tiger, and panther amongst others, many of which are endangered and accorded protection by the Wildlife Protection Act, 1972. A list of mammals found in the study area are and marked as per their protection status are given in

Table 3.23

Table 3-23: Mammals found in the Core Zone

Sl. No.	Local Name	Zoological Name	Status as per Wildlife Conservation Act, 1972 and amendments
1.	Common Mongoose	<i>Herpestes edwardsi</i>	II
2.	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	II
3.	Fivestriped Palm Squirrel	<i>Funambulus pennanti</i>	IV
4.	Indian Field Mouse	<i>Mus booduga</i>	V
5.	Common House Rat	<i>Rattus rattus</i>	V

Table 3-24: Mammals found in Buffer Zone

Sl. No.	Local Name	Zoological Name	Status as per Wildlife Conservation Act, 1972 and amendments
1.	Rhesus Macaque	<i>Macaca mulatta</i>	II
2.	Common Langur	<i>Presbytis entellus</i>	II
3.	Common Mongoose	<i>Herpestes edwardsi</i>	II
4.	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	II
6.	Spotted Deer	<i>Axis axis</i>	III
7.	Indian Wild Boar	<i>Sus scrofa</i>	III
8.	Fivestriped Palm Squirrel	<i>Funambulus pennanti</i>	IV
9.	Indian Field Mouse	<i>Mus booduga</i>	V
10.	Common House Rat	<i>Rattus rattus</i>	V
11.	House Mouse	<i>Mus musculus</i>	V
12.	Rufoustailed Hare	<i>Lepus nigricollis ruficaudatus</i>	IV

13.	Leopard	<i>Panthera pardus</i>	I
14.	Tiger	<i>Panthera tigris</i>	I
15.	Jungle cat	<i>Felis bengalensis</i> Kerr	II
17.	Indian Fox	<i>Vulpes benghalensis</i> Shaw	II
18.	Bluebull	<i>Boselaphus tragocamelus</i>	II

• **AQUATIC FAUNA**

The river dries up considerably and is reduced to a meter wide flow during lean season. A few fishes are reported in the river. Amongst, the fishes found, *Tor putitora* is an endangered species as per IUCN. No fishing activities are reported in the valley.

Table 3-25: Fishes in the study area

S. No.	Local Name	Zoological Name
1.	Rohu	<i>Labeo rohita</i>
2.	Catla	<i>Catla catla</i>
3.	Mahasheer	<i>Barbus (tor) putitora</i>
4.	Mangur	<i>Clarias batrachus</i>

Figure 0-12: Mammals found in the Study Area



Funambulus pennanti



Macaca mulatta

A large number of birds are found in the study area. These are listed in **Table 3.26** below.

Table 3-26: Bird species found in Core zone

S.No.	Common Name	Scientific Name	Status as per Wildlife Conservation Act, 1972 and amendments
1.	Blue rock pigeon	<i>Columba livia</i>	IV
2.	Ring dove	<i>Streptopelia decaocto</i>	IV
3.	Little Cormorant	<i>Phalacrocorax niger</i>	IV
4.	Hobby	<i>Falco subbwrco</i>	IV
5.	Koel	<i>Eudynamys scolopacea</i>	IV
6.	Jungle Myna	<i>Acridotheres fuscus</i>	IV
7.	Tree Pie	<i>Dendrocitta vagabunda</i>	IV
8.	House Crow	<i>Corus splendens</i>	IV
9.	House Sparrow	<i>Passer donesticus</i>	IV
10.	Roseringed Parakeet	<i>Psittaculus eupatria</i>	IV

Table 3-27: Birds found in the Buffer Zone

S.No.	Common Name	Scientific name	IWPA	IUCN
6	Common Sandpiper	<i>Actitishy poleucos</i>	IV	LC
7	Common Iora	<i>Aegithina tiphia</i>	IV	LC
8	Crimson Sunbird	<i>Aethopyga siparaja</i>	IV	LC
9	Common Kingfisher	<i>Alcedo atthis</i>	IV	LC
10	Red Avadavat	<i>Amandava amandava</i>	IV	LC
11	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	IV	LC
12	Northern Pintail	<i>Anas acuta</i>	IV	LC
13	Northern Shoveler	<i>Anasclly peata</i>	IV	LC
14	Common Teal	<i>Anas crecca</i>	IV	LC
15	Falcated Duck	<i>Anas falcate</i>	IV	LC
16	Eurasian Wigeon	<i>Anas Penelope</i>	IV	LC
17	Mallard	<i>Anas platyrhynchos</i>	IV	LC
18	Spot-billed Duck	<i>Anas poecilorhyncha</i>	IV	LC
19	Gadwall	<i>Anas strepera</i>	IV	LC

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20	Darter	<i>Anhinga melanogaster</i>	IV	LC
21	Greater White-fronted Goose	<i>Anser albifrons</i>	IV	LC
22	Greylag Goose	<i>Anser anser</i>	IV	LC
23	Lesser White-fronted Goose	<i>Anser erythropus</i>	IV	LC
24	Bar-headed Goose	<i>Anser indicus</i>	IV	LC
25	Rosy Pipit	<i>Anthus roseatus</i>	IV	LC
26	Water Pipit	<i>Anthus spinoletta</i>	IV	LC
27	Tree Pipit	<i>Anthus trivialis</i>	IV	LC
28	House Swift	<i>Apus affinis</i>	IV	LC
29	Common Swift	<i>Apus apus</i>	IV	LC
30	Grey Heron	<i>Ardea cinerea</i>	IV	LC
31	Purple Heron	<i>Ardea purpurea</i>	IV	LC
32	Indian Pond Heron	<i>Ardeola grayii</i>	IV	LC
33	Spotted Owlet	<i>Athene brama</i>	IV	LC
34	Baer's Pochard	<i>Aythya baeri</i>	IV	LC
35	Common Pochard	<i>Aythya ferina</i>	IV	LC
36	Tufted Duck	<i>Aythya fuligula</i>	IV	LC
37	Ferruginous Pochard	<i>Aythya anyroca</i>	IV	LC
38	Cattle Egret	<i>Bubulcus ibis</i>	IV	LC
39	Yellow-breasted Greenfinch	<i>Carduelis spinoides</i>	IV	LC
40	Common Rosefinch	<i>Carpodacus erythrinus</i>	IV	LC
41	Greater Coucal	<i>Centropus sinensis</i>	IV	LC
42	Pied Kingfisher	<i>Ceryle rudis</i>	IV	LC
	White-capped Water			

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43	Redstart	<i>Chaimarrornis leucocephalus</i>	IV	LC
44	Long-tailed Duck	<i>Clangula hyemalis</i>	IV	LC
45	Rock pigeon	<i>Columba livia</i>	IV	LC
46	Oriental Magpie Robin	<i>Copsychus saularis</i>	IV	LC
47	Indian Roller	<i>Coracias benghalensis</i>	IV	LC
48	HouseCrow	<i>Corvus splendens</i>	IV	LC
49	Northern House Martin	<i>Delichon urbica</i>	IV	LC
50	RufousTreepie	<i>Dendrocitta vagabunda</i>	IV	LC
51	Yellow-crowned Woodpecker	<i>Leiopicus mahrattensis</i>	IV	LC
52	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	IV	LC
53	Ashy Drongo	<i>Dicrurus leucophaeus</i>	IV	LC
54	Black Drongo	<i>Dicrurus macrocercus</i>	IV	LC
55	Black-rumped Flameback	<i>Dinopium benghalense</i>	IV	LC
56	Little Egret	<i>Egretta garzetta</i>	IV	LC
57	Great Thick-knee	<i>Esacus recurvirostris</i>	IV	LC
58	Asian Koel	<i>Eudynamis scolopacea</i>	IV	LC
59	Verditer Flycatcher	<i>Eumyias thalassina</i>	IV	LC
60	Common Coot	<i>Fulica atra</i>	IV	LC
61	Common Moorhen	<i>Gallinula chloropus</i>	IV	LC
62	Jungle Owlet	<i>Glaucidium radiatum</i>	IV	LC
63	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	IV	LC
64	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	IV	LC
65	Black-winged Stilt	<i>Himantopus himantopus</i>	IV	LC
66	Red-rumped Swallow	<i>Hirundo daurica</i>	IV	LC
67	Streak-throated Swallow	<i>Hirundo fluvicola</i>	IV	LC

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68	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	IV	LC
69	Brown-headed Gull	<i>Larus brunnicephalus</i>	IV	LC
70	Pallas's Gull	<i>Larus ichthyaetus</i>	IV	LC
71	Black-headed Gull	<i>Larus ridibundus</i>	IV	LC
72	Black-tailed Godwit	<i>Limosa limosa</i>	IV	LC
73	Indian Silverbill	<i>Lonchura malabarica</i>	IV	LC
74	Scaly-breasted Munia	<i>Lonchura punctulata</i>	IV	LC
75	Marbled Duck	<i>Marmaronetta angustirostris</i>	IV	LC
76	Crested Kingfisher	<i>Megaceryle lugubris</i>	IV	LC
77	Coppersmith Barbet	<i>Megalaima haemacephala</i>	IV	LC
78	Lineated Barbet	<i>Megalaima lineata</i>	IV	LC
79	Brown-headed Barbet	<i>Megalaima zeylanica</i>	IV	LC
80	Crested Bunting	<i>Melophus lathami</i>	IV	LC
81	Green Bee-eater	<i>Merops orientalis</i>	IV	LC
82	Blue-tailed Bee-eater	<i>Merops philippinus</i>	IV	LC
83	Black Kite	<i>Milvus migrans</i>	IV	LC
84	Blue-capped Rock Thrush	<i>Monticola cinclorhynchus</i>	IV	LC
85	Blue Rock Thrush	<i>Monticola solitarius</i>	IV	LC
86	White Wagtail	<i>Motacilla alba</i>	IV	LC
87	Grey Wagtail	<i>Motacilla cinerea</i>	IV	LC
88	Painted Stork	<i>Mycteria leucocephala</i>	IV	LC
89	Purple Sunbird	<i>Nectarinia asiatica</i>	IV	LC
90	Red-crested Pochard	<i>Netta rufina</i>	IV	LC
91	Cotton Pygmy-goose	<i>Nettapus coromandelianus</i>	IV	LC
92	Eurasian Curlew	<i>Numenius arquata</i>	IV	LC
93	House Sparrow	<i>Passer domesticus</i>	IV	LC

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94	Scarlet Minivet	<i>Pericrocotus flammeus</i>	IV	LC
95	Great Cormorant	<i>Phalacrocorax carbo</i>	IV	LC
96	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	IV	LC
97	Little Cormorant	<i>Phalacrocorax niger</i>	IV	LC
98	Tickell's Leaf Warbler	<i>Phylloscopus affinis</i>	IV	LC
99	Lemon-rumped Warbler	<i>Phylloscopus chloronotus</i>	IV	LC
100	Hume's Warbler	<i>Phylloscopus humei</i>	IV	LC
101	Greenish Warbler	<i>Phylloscopus trochiloides</i>	IV	LC
102	Grey-headed Woodpecker	<i>Picus canus</i>	IV	LC
103	Baya Weaver	<i>Ploceus philippinus</i>	IV	LC
104	Plain Prinia	<i>Prinia inornata</i>	IV	LC
105	Black Ibis	<i>Pseudibispapillosa</i>	IV	LC
106	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	IV	LC
107	Alexandrine Parakeet	<i>Psittacula eupatria</i>	IV	LC
108	Rose-ringed Parakeet	<i>Psittacula krameri</i>	IV	LC
109	Red-vented Bulbul	<i>Pycnonotus cafer</i>	IV	LC
110	Himalayan Bulbul	<i>Pycnonotus leucogenys</i>	IV	LC
111	Pied Avocet	<i>Recurvirostra avosetta</i>	IV	LC
112	Plumbeous Water Redstart	<i>Rhyacornis fuliginosus</i>	IV	LC
113	Plain Martin	<i>Riparia paludicola</i>	IV	LC
114	Sand Martin	<i>Riparia riparia</i>	IV	LC
115	Grey Bushchat	<i>Saxicola ferrea</i>	IV	LC
116	Common Stonechat	<i>Saxicola torquata</i>	IV	LC
117	River Tern	<i>Sterna aurantia</i>	IV	LC
118	Spotted Dove	<i>Streptopelia chinensis</i>	IV	LC

119	Asian Pied Starling	<i>Sturnus contra</i>	IV	LC
120	Brahminy Starling	<i>Sturnus pagodarum</i>	IV	LC
121	Little Grebe	<i>Tachybaptus ruficollis</i>	IV	LC
122	Ruddy Shelduck	<i>Tadorna ferruginea</i>	IV	LC
123	Common Shelduck	<i>Tadorna tadorna</i>	IV	LC
124	Common Wood shrike	<i>Tephrodornis pondicerianus</i>	IV	LC
125	Asian Paradise-flycatcher	<i>Terpsiphone paradisi</i>	IV	LC
126	Spotted Redshank	<i>Tringa erythropus</i>	IV	LC
127	Marsh Sandpiper	<i>Tringa stagnatilis</i>	IV	LC
128	Common Redshank	<i>Tringa tetanus</i>	IV	LC
129	Common Babbler	<i>Turdoides caudatus</i>	IV	LC
130	Jungle Babbler	<i>Turdoides striatus</i>	IV	LC
131	Barred Buttonquail	<i>Turnix suscitator</i>	IV	LC
132	Common Hoopoe	<i>Upupa epops</i>	IV	LC
133	River Lapwing	<i>Vanellus duvaucelii</i>	IV	LC
134	Red-wattled Lapwing	<i>Vanellus indicus</i>	IV	LC
135	Indian Pea fowl		I	
136	Oriental White-eye	<i>Zosterops palpebrosus</i>	IV	LC

Figure 3-13: Avifauna found in the study area



Tringa tetanus



Tachybaptus ruficollis



Psittacula krameri



Prinia inornata



Megalaima lineata



Anthus roseatus

The reptiles found in the study area are as given in **Table 3.29**. Ratsnake, Python, King Cobra and Russel's viper amongst these are scheduled animals.

Table 3-28: Reptiles found in the Buffer Zone

S. No.	Local Name	Zoological Name	Status as per Wildlife Conservation Act, 1972 and amendments
1.	Ratsnake	<i>Ptyas mucosus</i>	II
2.	Himalayan pit viper	<i>Ancistrodon himalayanus</i>	IV
3.	Common Toad	<i>Duttaphrynus melanostictus</i>	IV
4.	India bull frog	<i>Rana tigrina</i>	IV
5.	Indian tree frog	<i>Polypedates maculatus</i>	IV

6.	Garden lizard	<i>Calotes versicolor</i>	IV
7.	House lizard	<i>Hemidactylus</i>	IV

3.11 SOCIO-ECONOMIC ENVIRONMENT

Dehradun district pronunciation is a district of Uttarakhand state in northern India. The district headquarters is Dehradun, which has also served as the provisional capital of Uttaranchal since its founding in 2000. The district has 6 Tehsils, 6 community development blocks, 17 towns and 764 inhabited villages, and 18 unpopulated villages. As of 2011 it is the second most populous district of Uttarakhand after Haridwar. Dehradun district also includes the prominent towns of Rishikesh, Mussoorie, Landour and Chakarata. The district stretches from the Ganges river in the east to the Yamuna river in the west, and from the Terai and Shivaliks in the south and southeast to the Great Himalaya in the northwest.

Dehradun is located 230 km from the national capital, Delhi. The national Oil and Natural Gas Commission, Survey of India, Indian Institute of Petroleum is located in Dehradun. In Dehradun, many educational institutions like Forest Research Institute, Rashtriya Indian Military College and Indian Military Academy are situated. The region was seized as a war spoil from the Maharaja of Tehri-Garhwal as a consequence of the Gurkha War of 1814–16, and attached administratively to Saharanpur District to its immediate south, which was already in British hands.

3.11.1 DEMOGRAPHY

As per 2011 census the Dehradun district has a population of the second highest in Uttarakhand after Haridwar (19,27,029). The Decadal growth rate has jumped up from 25% (1991–2001) to 32.48% (2001–2011). This is the third highest in Uttarakhand after Haridwar (33.16%) and Udham Singh Nagar (33.40%). The district has a gender ratio of 902 as against a state average of 963. This has however improved from 887 in the 2001 census. The population density is 550, again the 3rd highest after Haridwar (817) and Udham Singh Nagar (648). The state average is 189. The literacy rate is the highest in the state at 85.24% (90.32 for males, 79.61 for females)

The district has a population density of 550 inhabitants per square kilometre (1,400/sq mi). Its population growth rate over the decade 2001-2011 was 32.48%. Dehradun has a sex ratio of 902 females for every 1000 males, and a literacy rate of 85.24%.

Vikasnagar is a city and a municipality in Dehradun district in the Indian state of Uttarakhand. It is also known as Pachawadoon (Western Doon) as it is the second financial and economic hub of Dehradun district, after the city of Dehradun. Vikasnagar is known for its tea gardens, exporting tea

to American and European Countries. Vikasnagar is also famous for Basmati rice and fruits like litchi and dussehri mangoes. Vikasnagar, along with Herbertpur, is the chief marketplace for Jaunsar Bawar. According to Hindu mythology, Lord Ram visited Vikasnagar during the treta yug and relieved Ahilya from the curse given to her by her husband, Gautam Rishi.

3.11.2 APPROACH & METHODOLOGY ADOPTED

Study has been conducted based on the primary as well as Secondary Data: Socio-economic profile has been compiled from census data (2001 & 2011), while primary verification has been carried out by using sample site survey. As the study area is too large so the study has been carried out at district level representing the whole study area for detailed socio-economic analysis.

3.11.3 CONCEPTS & DEFINITION

a. Study Area: The study area, also known as impact area has been defined as the sum total of core area and buffer area with a radius of 10 Kilometers from the periphery of the core area. The study area includes all the land marks both natural and manmade, falling therein.

b. Household: A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person is treated as a separate household. There may be one member households, two member households or multi-member households.

d. Sex Ratio: Sex ratio is the ratio of females to males in a given population. It is expressed as 'number of females per 1000 males'.

e. Literates: All persons aged 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.

f. Literacy Rate: Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.

g. Labor Force: The labor force is the number of people employed and unemployed in a geographical entity. The size of the labor force is the sum total of persons employed and

unemployed. An unemployed person is defined as a person not employed but actively seeking work. Normally, the labor force of a country consists of everyone of working age (around 14 to 16 years) and below retirement (around 65 years) that are participating workers, that is people actively employed or seeking employment. People not counted under labor force are students, retired persons, and stay-at home people, people in prisons, permanently disabled persons and discouraged workers.

h. Work: Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The work may be part time, full time, or unpaid work in a farm, family enterprise or in any other economic activity.

i. Worker: All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation or milk production even solely for domestic consumption are also treated as workers.

j. Main Workers: Those workers who had worked for the major part of the reference period (i.e. 6 months or more in the case of a year) are termed as Main Workers.

k. Marginal Workers: Those workers who did not work for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers.

l. Work participation rate: The work participation rate is the ratio between the labor force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

3.11.4 STUDY AREA OVERVIEW

The following sections present the socio-economic profile of the village falling in the study area (demography, literacy, occupation, etc) based on secondary data available from primary census abstract, census of India, 2001 and 2011, village directory of Uttarakhand census of India 2011, Administrative Atlas of Uttarakhand 2011, for detailed socio-economic analysis, tehsil has been taken as the minimum unit. The study area covers Dehradun, District in the state of Uttarakhand.

3.11.5 DESCRIPTION OF THE STUDY AREA

The study area covers Dehradun District in the state of Uttarakhand. Area and the villages/part of villages located in the 10 Km radius around the project area periphery. The following sections present the socio-economic profile of the village falling in the study area (demography, literacy, occupation, etc) based on secondary data available from primary census abstract, census of India, 2001 and 2011, village directory of Uttarakhand census of India 2011, Administrative Atlas of Uttarakhand 2011, for detailed socio-economic analysis, tehsil has been taken as the minimum unit. There are 80 villages that fall under the study area of the proposed project. Out of these 80 villages come under tehsil Vikas Nagar, in Dehradun District. One city and one Nagar Panchyat cover under the study area. The details is presented in **Table 3-30**

Table 3-29: Village List

Village	Sub District	District	Village	Sub District	District
Vikasnagar	Vikasnagar	Dehradun	Kalyanpur	Vikasnagar	Dehradun
Dumet	Vikasnagar	Dehradun	Hashanpur	Vikasnagar	Dehradun
Anfield Jungle	Vikasnagar	Dehradun	Shisham Bara	Vikasnagar	Dehradun
Prithvipur Jungle	Vikasnagar	Dehradun	Misraspatti	Vikasnagar	Dehradun
Bulaki Wala	Vikasnagar	Dehradun	Bakrana	Vikasnagar	Dehradun
Dakpathar	Vikasnagar	Dehradun	Kotra Kalyanpur	Vikasnagar	Dehradun
Badam Wala	Vikasnagar	Dehradun	Bhagwanpur Julo	Vikasnagar	Dehradun
Bahadur Garh	Vikasnagar	Dehradun	Ramshahwala	Vikasnagar	Dehradun
Prithvipur	Vikasnagar	Dehradun	Jagatpur	Vikasnagar	Dehradun
Khera Pahuwa	Vikasnagar	Dehradun	Rampur Bhauwala	Vikasnagar	Dehradun
Jaman Khata	Vikasnagar	Dehradun	Bhanwala	Vikasnagar	Dehradun
Jamni Pur	Vikasnagar	Dehradun	Manduwala	Vikasnagar	Dehradun
Athan Bagh	Vikasnagar	Dehradun	Navgaon	Vikasnagar	Dehradun
Dhummpur Gang Mewa	Vikasnagar	Dehradun	Baronwala	Vikasnagar	Dehradun
Fatehpur	Vikasnagar	Dehradun	Rampur Khurd	Vikasnagar	Dehradun
Lakhanwala Nevat	Vikasnagar	Dehradun	Tilwari	Vikasnagar	Dehradun
Katapatthar	Vikasnagar	Dehradun	Karimpur	Vikasnagar	Dehradun

Rudra Pur	Vikasnagar	Dehradun	Dhoomnagar	Vikasnagar	Dehradun
Barwa	Vikasnagar	Dehradun	Binaspur	Vikasnagar	Dehradun
Dhalani	Vikasnagar	Dehradun	Kutubpur	Vikasnagar	Dehradun
Koti	Vikasnagar	Dehradun	Abdullapur	Vikasnagar	Dehradun
Horawala	Vikasnagar	Dehradun	Rajawala	Vikasnagar	Dehradun
Chandpur Khurd	Vikasnagar	Dehradun	Podwala	Vikasnagar	Dehradun
Chandpur Kala	Vikasnagar	Dehradun	Banshiwala	Vikasnagar	Dehradun
Kedarawala	Vikasnagar	Dehradun	Dhulkotkhalsa	Vikasnagar	Dehradun
Baluwala	Vikasnagar	Dehradun	Balawala	Vikasnagar	Dehradun
Bairagiwala	Vikasnagar	Dehradun	Mehreka Gaun	Vikasnagar	Dehradun
Lakhanwala Khash	Vikasnagar	Dehradun	Dhulkot Mafi	Vikasnagar	Dehradun
Jassowala	Vikasnagar	Dehradun	Chharba	Vikasnagar	Dehradun
Parteetpur Kalyanpur	Vikasnagar	Dehradun	Shankerpur Hakumatpur	Vikasnagar	Dehradun
Dharmawala	Vikasnagar	Dehradun	Atakfarm	Vikasnagar	Dehradun
Shahpur Kalyanpur	Vikasnagar	Dehradun	Rampur Kala	Vikasnagar	Dehradun
Aduwala	Vikasnagar	Dehradun	Lakshmi Pur	Vikasnagar	Dehradun
Mednipur Badripur	Vikasnagar	Dehradun	Indripur	Vikasnagar	Dehradun
Majri	Vikasnagar	Dehradun	Sahas Pur	Vikasnagar	Dehradun
Jatowala	Vikasnagar	Dehradun	Dhakimay Chak	Vikasnagar	Dehradun
Tiparpur	Vikasnagar	Dehradun	Ghamauli	Vikasnagar	Dehradun
Peerwala	Vikasnagar	Dehradun	Khushal Pur	Vikasnagar	Dehradun
Sabhawala	Vikasnagar	Dehradun	Herbertpur (NP)	Vikasnagar	Dehradun
Vikasnagar	Vikasnagar	Dehradun	Jiwangarh (CT)	Vikasnagar	Dehradun

3.11.6 DEMOGRAPHIC PROFILE OF THE STUDY AREA

The Proposed Sand, Bajri And Boulder (Minor Minerals) mining in Kot mot River bed (60.00 Ha.) project covers 80 major villages of Dehradun District in the state of Uttarakhand. A study was undertaken with respect to demography, occupational pattern, literacy rate and other important socio-

economic indicators of these districts to reveal the socio-economic structure of the entire project area.

- **Population**

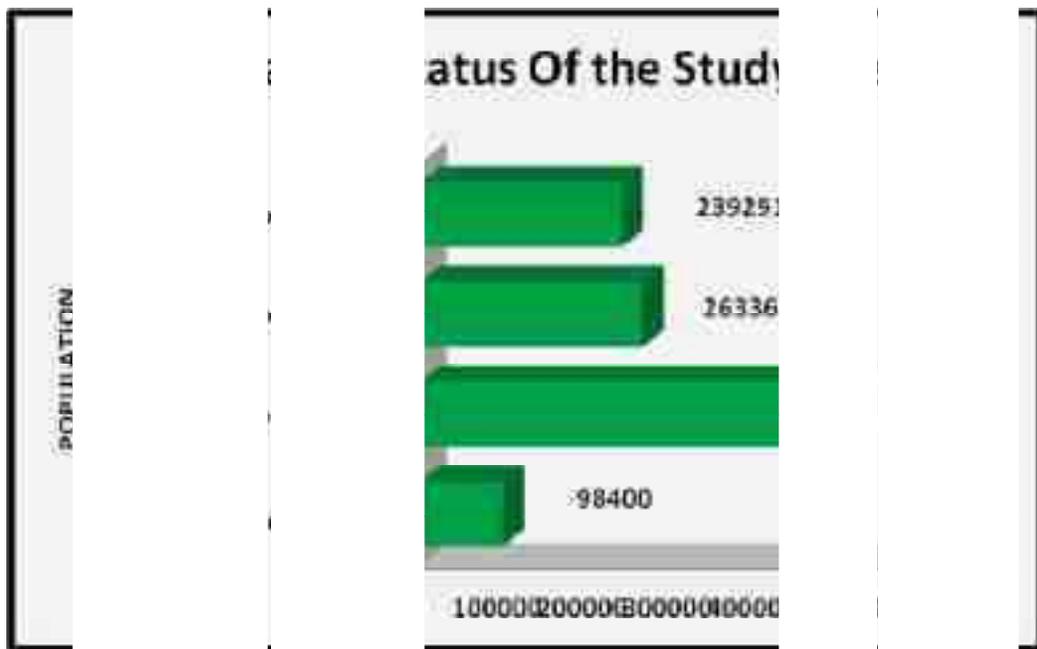
The total population of study area is **502658** the percentages of male & female population are **52.38%** & **47.61%** respectively. Breakup of the population for male and female is given in following **Table 3.31**- consisting of gender-wise details of population as per census data 2011.

Table 3-30: Population Status of the Study Area

Total House Hold	Total Population	Total Male Population	Total Female Population
98400	502658	263367	239291

(Source: As per Census Data 2011)

Figure 3-14: Population Status of the Study Area



- **Social Structure**

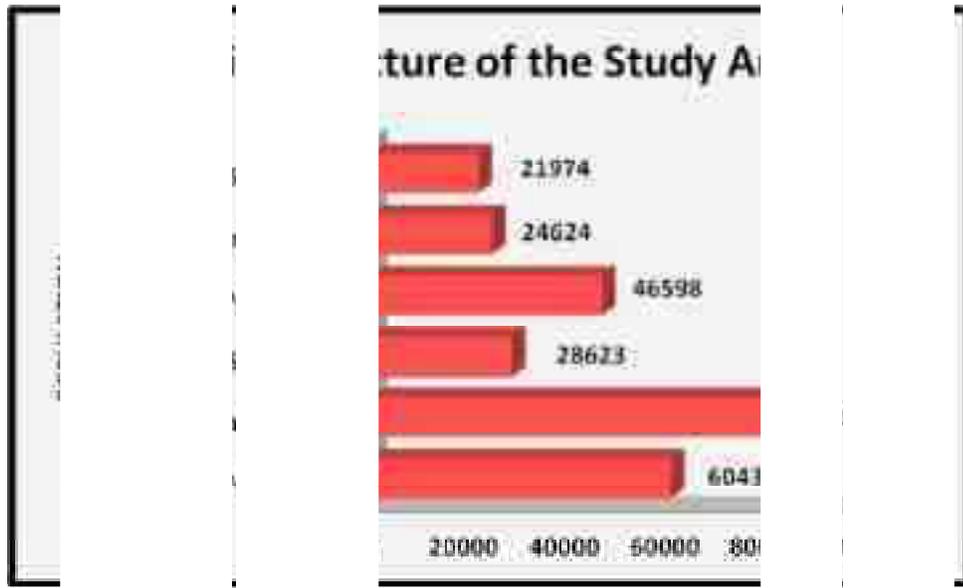
The Schedule Caste (SC) population within the study area is **12.02 %** of the total population with **52.64%** Male and **47.36 %** are female. The Schedule Caste (SC) population within the study area is **12.02%** of the total population with a sex ratio of **900** female/**1000** males. Schedule Tribe (ST) population in the study area is **9.27%** out of a sex ratio of **892** female/ 1000 male.

Table 3-31: Gender Wise Social Structure of the Study Area

Total Population	SC Male	Total Female	Total SC Population	Total ST Male	Total ST Female
60432	82809	28623	46598	24624	21974

(Source: As per Census Data 2011)

Figure 3-15: Social Structure of the Study Area



Literacy

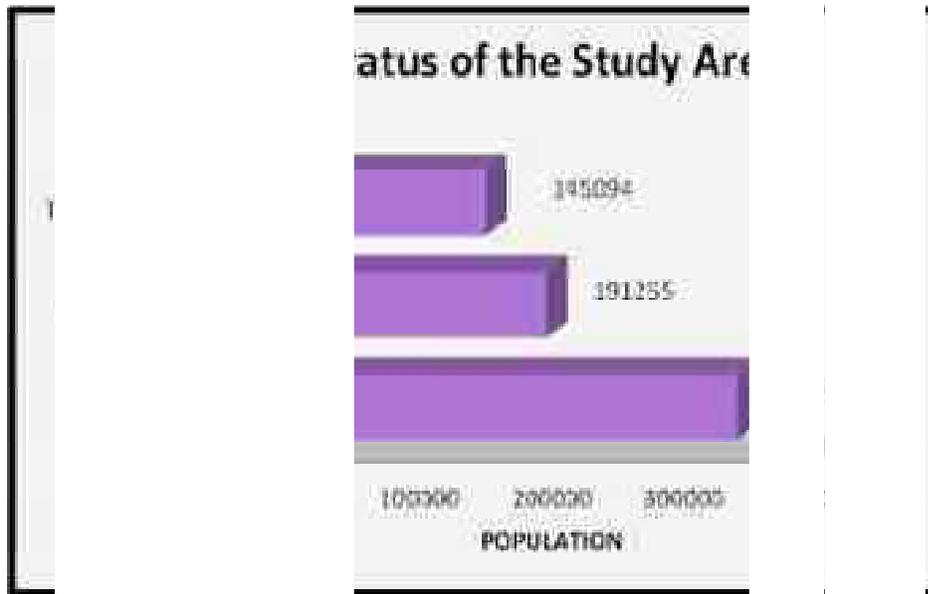
The total number of literate within the study area is **336349** which are **66.91%** of total population. Male literacy rate of the study area is **56.86%** and female literacy rate is **43.14%**. Detailed status of literacy is given below in **Table 3.33**

Table 3-32: Literacy Status of the Study Area

Total Literate	Total Male Literate	Total Female Literate
336349	191255	145094

(Source: As per Census Data 2011)

Figure 3-16: Literacy Status of the Study Area



Occupation Pattern

The occupational structure of the population in the study area has been studied with reference to the total workers and non-workers. Further, total workers grouped into two categories, main workers and marginal workers. Main workers have been grouped into four categories namely: Cultivators, agricultural laborers, household workers and other workers. The details of these groups are discussed given below in **Table 3.34**.

- **Total workers**

Work is defined as participation in any economically productive activity with or without compensation, wage. Such participation may be physical and/ or mental in nature. Work involves not only actual work but also include supervision and direction of work. It even includes part time help or unpaid work on farm, family enterprise or its economic activity. All persons engaged in 'work' as defined above are workers.

The number of total workers in the study area is **157785** which is **31.39%** of total population. Out of which **82.94%** is male and only **17.06%** is female. Total workers further divided into main workers and marginal workers.

- **Main workers**

Those workers who had worked for the major part of the reference period (i.e. 6 months or more) are term main workers. Total number of main workers in the study area is **125933** which are **79.81%** of total workers and **25.05 %** of total population.

- **Marginal Workers**

The marginal workers are those workers, who are engaged in some work for a period of less than six months, during the reference year prior to the census survey. Total number of marginal workers in study area is **31852** which is approximately **20.19%** of the total workers.

- **Cultivators**

A person is classified as cultivator if he or she is engaged in cultivation of land own or from government or held from private persons or institutions for payment in money, kind or share. Cultivation work includes effective supervision or direction in cultivation. A person who has given out her/his land to another person or institution(s) for cultivation for money, kind or share of crop and who does not even supervise or direct cultivation process is not treated as cultivator. Similarly, a person working on another person's land for wages in cash or kind or combination of both is not treated as cultivator.

Total cultivators in study area are **18984** out of which **80.70%** is male and **19.30%** is female.

- **Household Worker**

Persons working in others household for wages are treated as household worker .the total workers of this category are about **4122 (2.61%** of total workers) in which **79.94%** are male and **20.06%** are female.

- **Non Workers**

The non-workers include those engaged in unpaid household duties, students, retired persons, dependants, beggars etc. The total number of non-workers population is **344873** which are **68.61%** of the total population. Out of which **38.42%** is male and **61.58%** is female.

- **Agricultural Laborers**

Persons working on the land of others for wages or share in the yield have been treated as agricultural laborers. The total workers of this category are about **16454** in which **85.40%** are male and **14.60%** are female.

- **Other Workers**

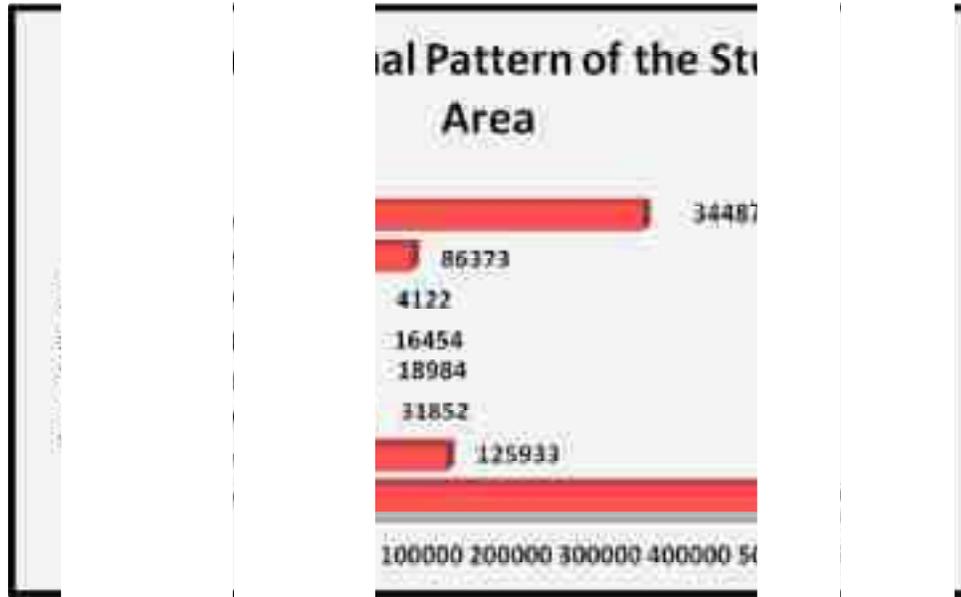
All workers, i.e., those who have been engaged in some economic activity during the last one-year are other workers. The type of workers that come under this category is government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trading, transport, banking, mining, construction, political or social work, priests, entertainment artist, etc. In effect, all workers except cultivators or agricultural laborers or household industry workers are other workers. The total workers of this category are about **86373** (**54.74%** of total workers) in which **87.53%** are male and **12.47%** are female.

Table 3-33: Occupational Pattern of the study area

S. No.	Particulars	Number of Workers in the study area			Proportion (%)
		Total	Male	Female	
1.	Total Workers	502658	130873	26912	20.56
2.	Main Workers	125933	108271	17662	16.31
3.	Marginal Worker	31852	22602	9250	40.93
4.	Cultivators	18984	15321	3663	23.91
5.	Agricultural Labor	16454	14051	2403	17.10
6.	Household Worker	4122	3295	827	25.10
7.	Other Worker	86373	75604	10769	14.24
8.	Non-workers	344873	132494	212379	160.29
Total		1131249	502511	283865	56.49

(Source: As per Census Data 2011)

Figure 3-17: Occupational Pattern of the study area



Infrastructure Facilities

Many of the villages in the study area have primary schools, middle schools and secondary schools. Medical facilities (primary health centre, allopathic & Ayurvedic dispensary, maternity and child welfare centre) are good enough in the study area. Water supply in the study area is mainly from taps, well, tube well and hand pumps. Electricity is being supplied for domestic, agriculture, industrial and public lighting purposes. Electricity and telephone connections are available within the study area.

(a) Education Facilities

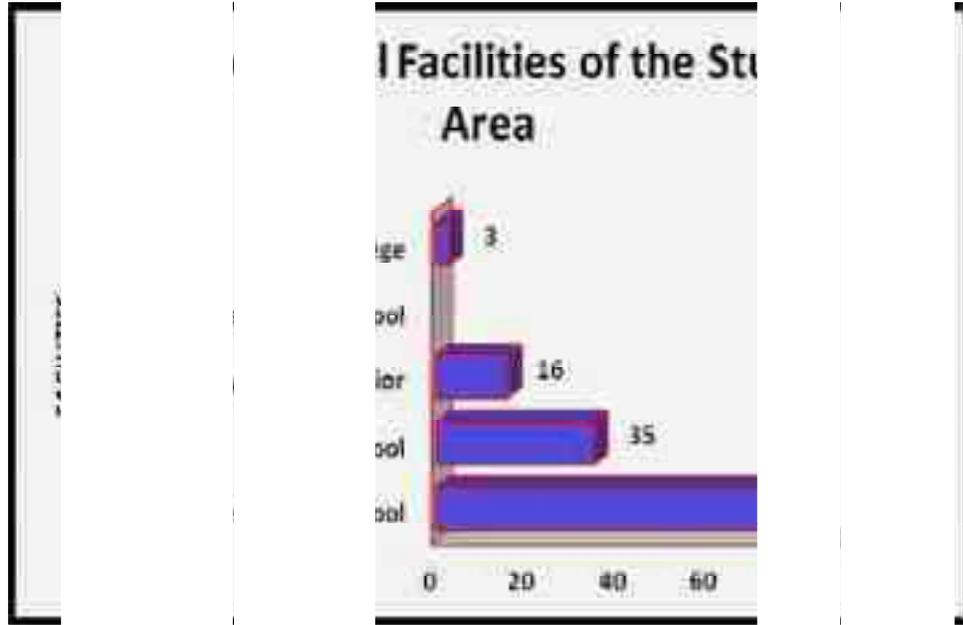
Primary schools, middle schools / secondary schools and college are good enough in the study area. The educational facilities within the study area are presented in **Table no.3.35** and represented in the form of a bar chart as given in **figure: 3.18**

Table 3-34: Educational Facilities

S. No.	EDUCATIONAL FACILITIES	NO. OF INSTITUTION
1.	Primary / Elementary school	82
2.	Middle school	35
3.	Secondary School/ Senior Secondary School	16
4.	College	3
TOYAL		136

(Source: As per Census Data 2011)

Figure 3-18: Educational Facilities



(b) Health and Medical Facilities

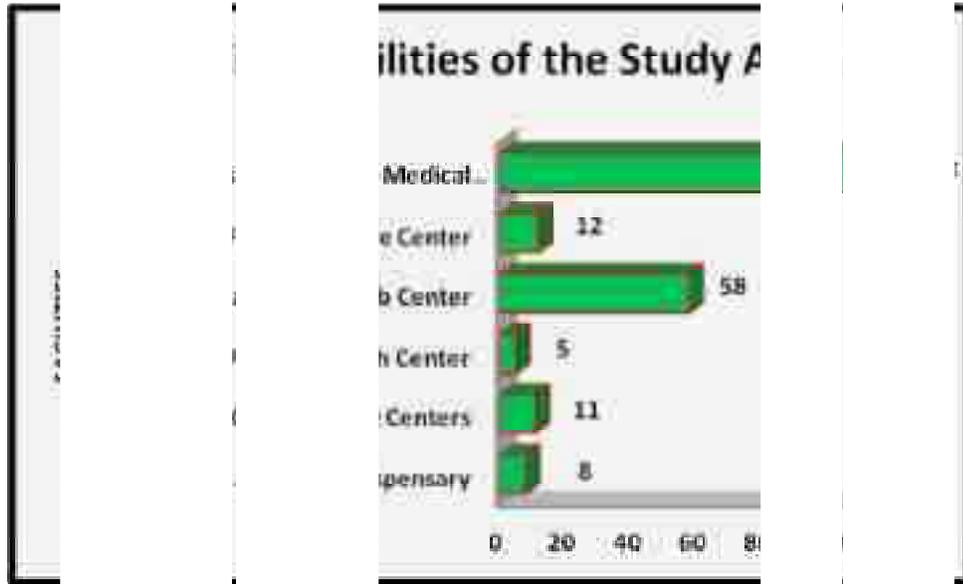
According to the village directory, census data of 2011, medical facilities (primary health centre, allopathic & homeopathic dispensary, maternity and child welfare centre) are poor in the study area. The status of study area is given in **Table 3.36** and represented in the form of a bar chart as given in figure:

Table 3-35: Medical Facilities

S. No.	MEDICAL FACILITIES	Number
1.	Allopathic Dispensary	8
2.	Maternity & Child Welfare Centers	11
3.	Primary Health Center	5
4.	Primary Health Sub Center	58
5.	Family Welfare Center	12
6.	Registered Private Medical Practitioners	118
Total Numbers		212

(Source: As per Census Data 2011)

Figure 3-19: Medical Facilities



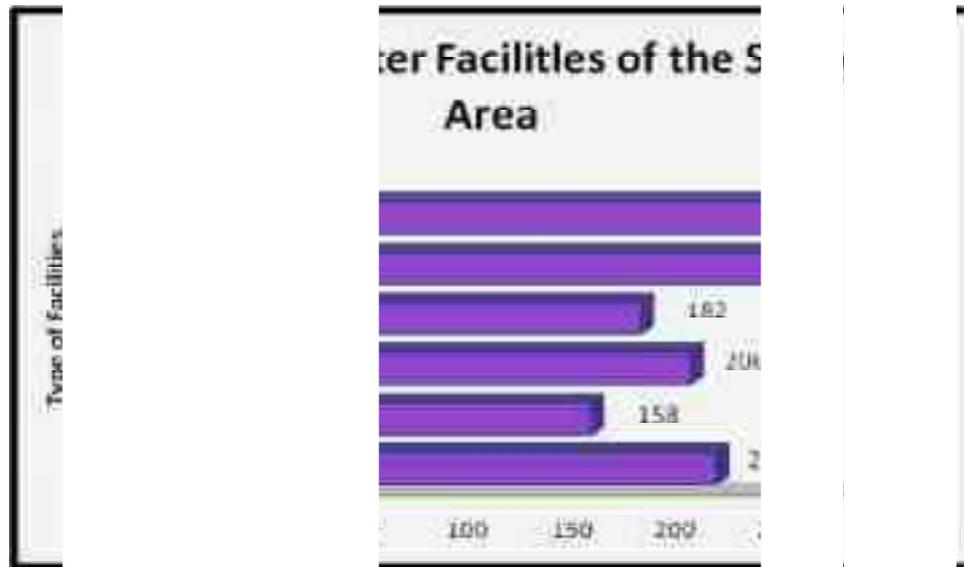
(c) Water Facilities

The entire villages in the study area have various sources of drinking water. The number of well, hand pumps and tube well supply in the study area are given in the **Table 3.37** and represented in the form of a bar chart as given in **Figure: 3.20**

Table 3-36: Drinking Water

S. No.	DRINKING WATER FACILITIES	NUMBER
1.	Hand pump	218
2.	Tube well	158
3.	Tap water	206
4.	Well Water	182
5.	Canal Water	266
6.	River Water	266
TOTAL		1296

Figure 3-20: Drinking Water



Main crops

The major crops produced in Dehradun district are Basmati rice, tea and litchi orchards are some of the major agricultural crops.

Livestock

The livestock predominantly consists of cattle, Cow, Ox, Buffalo, and Goat with minor proportion of Horses. Cattle provide an important source of livelihood, particularly for the people of the villagers are obliged to keep large herds both for their domestic and agricultural needs as well as to augment their meagre agricultural income. A few heads of cow, ox, buffalo, and goat are a common possession of most rural families.

3.11.6 SUMMARY OF IMPACTS ON SOCIAL ENVIRONMENT

- As the project is proposed at Government land, no resettlement and rehabilitation (R&R) is required.
- From the primary Socio-economic survey & through secondary data available from established literature and census data 2001 & 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area.
- It is suggested that during mining, all safety provisions has to be ensured to negate any likely impacts on social environment due to associated hazards.

3.11.7 BENEFICIAL IMPACTS CAN INCLUDE

- A better standard of living due to increased access to employment, business opportunities, training and education.
- Increased funding to improve social infrastructure and cultural maintenance programs. Since the surrounding study area is an undeveloped area, the overall Socio-economic status of the local population is below average. People are mostly engaged in farming activities and primarily involve in various social activities. Since manpower will be required for the proposed project. This in turn will have positive impact on the socio-economic environment as local population will get employment during mining.

CHAPTER4

ANTICIPATED ENVIRONMENTAL IMPACT & MITIGATION MEASURES

4.1 GENERAL

Identification of all potential environmental impacts due to project is an essential step of Environmental Impact Assessment. In case of mining projects, impacts on biodiversity, air pollution, water pollution, waste management and social issues are significant. Both direct and indirect environmental impacts will be created on various environmental attributes due to proposed mining activity in the surrounding environment, during the operational phase.

The occurrence of sand, bajri, boulder (minor mineral) deposits, being site specific, their exploitation often does not allow for any choice except adoption of eco-friendly operation. Positive impacts on socio-economic environment are expected due to creation of employment opportunities. Mining activities are normally carried out over a long period which also encourages development in the area such as roads, schools, hospitals etc.

Several scientific techniques and methodologies are available to predict impacts of physical environment. Mathematical models are the best tools to quantitatively describe the cause and effect relationships between sources of pollution and different components of environment. In cases where it is not possible to identify and validate a model for a particular situation, predictions have been arrived at based on logical reasoning/consultation/extrapolation.

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail:

1. Land Environment
2. Water Environment
3. Air Environment
4. Noise Environment
5. Biological Environment
6. Socio-Economic Environment
7. Solid Waste
8. Traffic Environment

4.2 LAND ENVIRONMENT

Since mining is being carried out by opencast manual method, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, topography, drainage pattern and geological features of the mine site as well as the study area.

4.2.1 ANTICIPATED IMPACT

- Mining activity will impact river bed topography by formation of excavation voids.
- River bed mining may bring in some change in topography at the nearby area of the mine lease.
- Stacks of solid waste generated from mining activity may hinder the flow of water in monsoon season.

4.2.2 MITIGATION MEASURES

Adopting suitable, site-specific mitigation measures can reduce the degree of impact of mining on land. Some of the land-related mitigation measures are as follows:

- Excavated pits will get replenished annually in monsoon itself & will be restored to original.
- The mine working will remain confined to allotted river bed only, so it will not disturb any surface area outside the mine lease area which may affect topography or drainage.
- Solid waste will not be stacked on the bank side as it will hinder the flow of water in monsoon season.

4.3 WATER ENVIRONMENT

The impact of mining project on groundwater hydrology and surface water regime are site specific and depends upon the characteristics of the mineral, hydrogeology and requirement of groundwater for other uses.

4.3.1 ANTICIPATED IMPACT

- River recharges the groundwater; excessive mining will reduce the thickness of the natural filter materials (sediments), through which the ground water is recharged.
- Mining activity may intersect groundwater level.
- Waste water generated from the mining activity will cause water pollution.

4.3.2 MITIGATION MEASURES

- Restriction in excavation depth will be made compulsory to avoid reduction in the thickness of the natural filter materials.
- Mining in the area will be done well above the water table as well as river bed water level therefore; much impact on water regime is not anticipated.
- No waste water will be generated from the mining activity of minor minerals as the project only involves extraction of Sand, Bajri & boulders from river bed.

4.4 AIR ENVIRONMENT

4.4.1 Impact through Mathematical Modeling for Mining Project

4.4.4.1 Air Quality Models- ISCST3 Dispersion Model

The Industrial Source Complex (ISC) Short Term model provides options to model emissions from a wide range of sources that might be present at a typical industrial source complex. ISCST3 is US-EPA approved model to predict the air quality. The model uses urban dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). Emission sources are categorized into four basic types of sources, i.e., point sources, volume sources, area sources, and open pit sources. The volume source option and the area source option may also be used to simulate line sources. The model assumes receptors on flat terrain. The ISC short term area source model is based on a numerical integration over the area in the upwind and cross wind directions of Gaussian plume formula. This can be applied to the Point, Area, Line or Volume sources simultaneously and their resultant incremental concentration of the pollutant can be predicted.

4.4.4.2 Gaussian Plume Model

The ISC Short Term area source model is based on a numerical integration over the area in the upwind and crosswind directions of the Gaussian point source plume formula given in below Equation. Individual area sources may be represented as rectangles with aspect ratios (length/width) of up to 10 to 1. In addition, the rectangles may be rotated relative to a north-south and east-west orientation. The effects of an irregularly shaped area can be simulated by dividing the area source into multiple areas. Note that the size and shape of the individual area sources varies; the only requirement is that each area source must be a rectangle. As a result, an irregular area source can be represented by a smaller number of area sources than if each area had to be a square shape. Because of the flexibility in specifying elongated area sources with the Short Term model, up to an aspect ratio of about 10 to 1, the ISCST area source algorithm may also be useful for modeling certain types of line sources.

The ground-level concentration at a receptor located downwind of all or a portion of the source area is given by a double integral in the upwind (x) and crosswind (y) directions as:

$$K = \frac{Q_A K}{2\pi u_z} \int \frac{VD}{\sigma_y \sigma_z} \left(\int \exp \left[-0.5 \left(\frac{y}{\sigma_y} \right)^2 \right] dy \right) dx$$

Where:

Q_A = Area source emission rate (mass per unit area per unit time)

K = Units scaling coefficient

V = Vertical term

D = Decay term as a function of x

In general, h_e should be set equal to the physical height of the source of emissions above local terrain height. For example, the emission height h_e of a slag dump is the physical height of the slag dump.

Since the ISCST algorithm estimates the integral over the area upwind of the receptor location, receptors may be located within the area itself, downwind of the area, or adjacent to the area. However, since F_z goes to 0 as the downwind distance goes to 0, the plume function is infinite for a downwind receptor distance of 0. To avoid this singularity in evaluating the plume function, the model arbitrarily sets the plume function to 0 when the receptor distance is less than 1 meter. As a result, the area source algorithm will not provide reliable results for receptors located within or adjacent to very small areas, with dimensions on the order of a few meters across. In these cases, the receptor should be placed at least 1 meter outside of the area.

The integral in the lateral (i.e., crosswind or y) direction is solved analytically as follows:

$$\int \exp \left[-0.5 \left(\frac{y}{\sigma_y} \right)^2 \right] dy = \text{erfc} \left(\frac{y}{\sigma_y} \right)$$

Where, erfc is the complementary error function.

The integral in the longitudinal (i.e., upwind or x) direction is approximated using numerical methods based on Press, et al (1986). Specifically, the ISCST model estimates the value of the integral, I, as a weighted average of previous estimates, using a scaled down extrapolation as follows:

$$I = \int \frac{VD}{\sigma_y \sigma_x} \operatorname{erfc} \left(\frac{Y}{\sigma_y} \right) dx = I_{2N} + \frac{(I_{2N} - I_N)}{3}$$

Where the integral term refers to the integral of the plume function in the upwind direction, and I_N and I_{2N} refer to successive estimates of the integral using a trapezoidal approximation with N intervals and 2N intervals. The number of intervals is doubled on successive trapezoidal estimates of the integral. The ISCST model also performs Romberg integration by treating the sequence I_k as a polynomial in k. The ISCST model uses a set of three criteria to determine whether the process of integrating in the upwind direction has "converged." The calculation process will be considered to have converged, and the most recent estimate of the integral used, if any of the following conditions is true:

- 1) If the number of "halving intervals" (N) in the trapezoidal approximation of the integral has reached 10, where the number of individual elements in the approximation is given by $1 + 2^{N-1} = 513$ for N of 10;
- 2) If the extrapolated estimate of the real integral (Romberg approximation) has converged to within a tolerance of 0.0001 (i.e., 0.01 percent), and at least 4 halving intervals have been completed; or
- 3) If the extrapolated estimate of the real integral is less than 1.0E-10, and at least 4 halving intervals have been completed.

The first condition essentially puts a time limit on the integration process, the second condition checks for the accuracy of the estimate of the integral, and the third condition places a lower threshold limit on the value of the integral. The result of these numerical methods is an estimate of the full integral that is essentially equivalent to, but much more efficient than, the method of estimating the integral as a series of line sources, such as the method used by the PAL 2.0 model (Petersen and Rumsey, 1987).

4.4.3 Model Setup

4.4.3.1 Mining Data for Source Strength Estimation

An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

Where:

E = emissions;

A = activity rate;

EF = emission factor, and

ER =overall emission reduction efficiency, %

The proposed mining activity includes various activities like excavation, handling and transport of Gypsum.

These activities have been analyzed systematically basing on USEPA-Emission Estimation Technique Manual, for Mining AP-42, to arrive at possible emissions to the atmosphere and estimated emissions are given in **Table 4.1**

Table 4-1: Emission rate estimation

Estimated emission rate of PM10	
Emission source	Details
Mineral excavation	
1. Production capacity of the mine, TPA	360000
2. Operational hours,	2160
3. Activity rate, TPH	166.6666667
4. Activity rate (A), T/second	0.046296296
5. USEPA emission factor (EF), kg/MT	0.94021669
6. Emission rate (A*EF*1000), g/second	43.52855046
7. Area of activity, m2	600000
8. Uncontrolled emission rate, g/m2/s	7.25476E-05
9. Controlled (80%)emission rate, g/m2/s	1.45095E-05
10. Controlled PM10 (50%) emission, g/m2/s	7.25476E-06
Mineral Loading	
1. US EPA emission factor, kg/MT	0.00434373
2. Emission rate, g/s	0.201098611

3. Area of activity, m ²	6000000
4. Uncontrolled emission rate, g/m ² /s	3.35164E-08
5. Controlled (80%) emission rate, g/m ² /s	6.70329E-09
6. Controlled PM10 (50%) emission, g/m ² /s	3.35164E-09
Haulage emission	
1. Truck capacity, MT	25
2. No. of truck trips	6.666666667
3. Road length travelled, km	5
4. Emission factor, g/VkmT	0.00952821
5. Emission rate, g/s	8.82242E-05
6. Activity area of haulage, m ²	600000
5. Uncontrolled emission rate, g/m ² /s	1.4704E-10
7. Controlled emission rate, g/m ² /s	2.94081E-11
8. Controlled PM10 (50%) emission, g/m ² /s	1.4704E-11
Overall emission rate, g/m ²	7.25812E-06

4.4.3.2 Modeling Procedure

Prediction of Ground Level Concentrations (GLC's) due to proposed mines has been made by Industrial Source Complex, Short Term (ISCST3) as per CPCB guidelines. ISCST3 is US-EPA approved model to predict the air quality. The model uses rural dispersion and regulatory defaults options as per guidelines on air quality models (PROBES/70/1997-1998). The model assumes receptors on flat terrain.

4.4.3.3 Model Options Used For Computations

- Plume rise has not been considered;
- Calms processing routine is used by default;
- Flat terrain is used for computations;
- It is assumed that the pollutants do not undergo any physico-chemical transformation and that there is no pollutant removal by dry deposition;
- Washout by rain is not considered
- Meteorological inputs required are hourly wind speed and direction, ambient temperature, stability class, and mixing height.

4.4.3.4 Mixing Height

As site specific mixing heights were not available, mixing heights based on IMD publication, "Atlas of Hourly Mixing Height and Assimilative Capacity of Atmosphere in India", has been considered for Industrial Source Complex model to establish the worst case scenario.

4.4.3.5 Meteorological Data

Data recorded at the continuous weather monitoring station on wind speed, direction, and temperature at one hour interval for the monitoring period was used as meteorological input.

4.4.4 Presentation of Results

Model simulations have been carried out using the hourly Triple Joint Frequency data viz., stability, wind speed, mixing height and temperature. Short-term simulations were carried to estimate concentrations at the receptors to obtain an optimum description of variations in concentrations over the site in 10-km radius covering 16 directions.

The maximum incremental GLCs for PM₁₀, due to mining are found to be 7.0 µg/m³, within the mine lease area. The maximum incremental GLCs are superimposed on the maximum baseline PM₁₀ concentrations recorded during monitoring period i.e. Pre monsoon season 2015 to arrive at the likely resultant concentrations after implementation of the proposed mining. The cumulative concentrations (baseline + incremental) after implementation of the project are tabulated below in

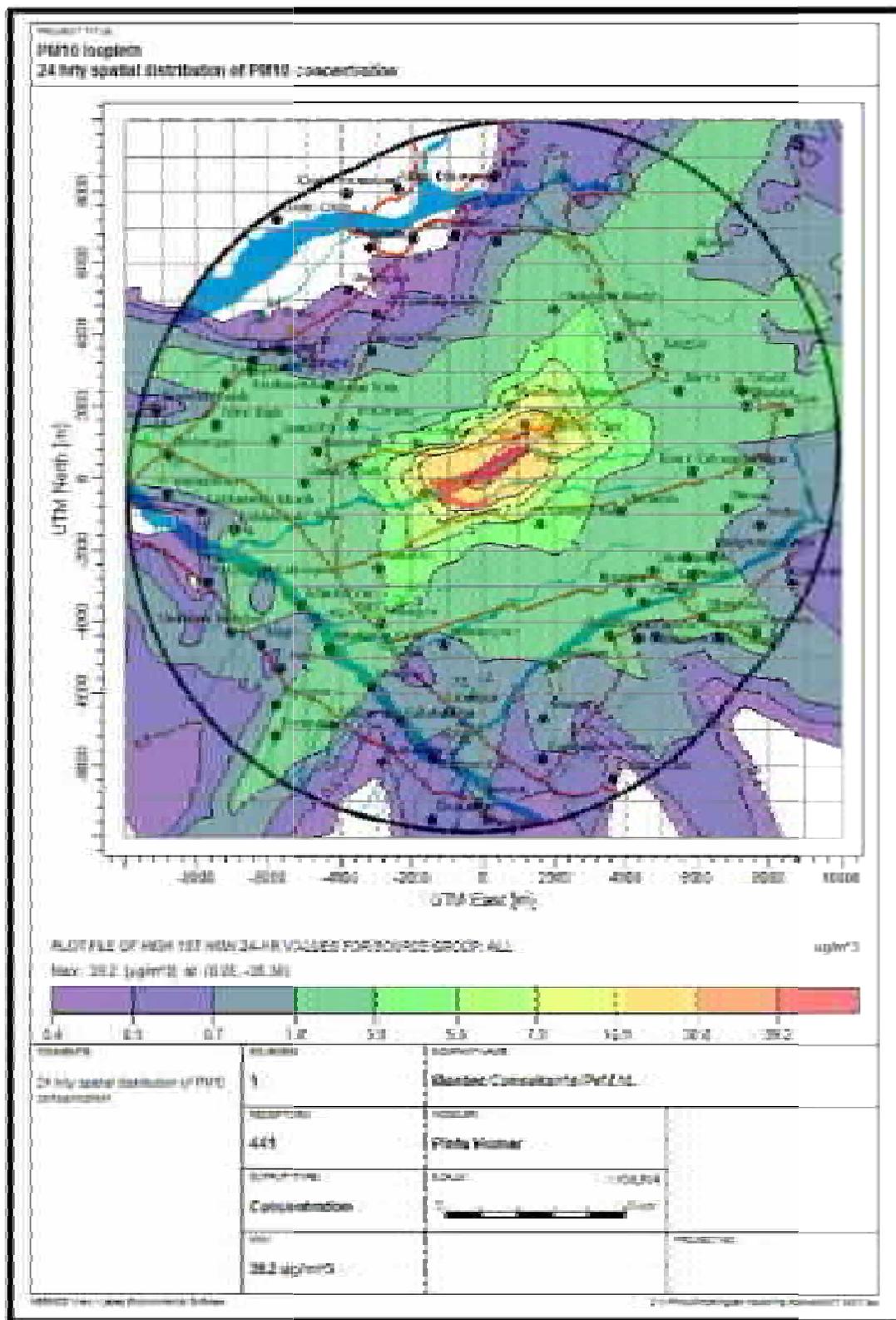
Table 4.4.

Table 4.1: Incremental Concentration of PM10 in the Study Area

Site Code	Site Name	PM ₁₀ concentration (µg/m ³)		
		Baseline	Incremental	Cumulative
A1	Rudrapur	78	7.0	85
A2	Rampur	78	1.0	79
A3	Sahaspur	74	3.0	77
A4	Herbetpur	78	Nil	78
A5	Vikaspur	80	1.0	81
Maximum		80	7.0	85

The resultant concentrations of PM₁₀ at all locations are well within the NAAQS standard limits. Isopleths were drawn for the pollutant distribution in the area and are shown in **Figure 4.1**

Figure 4-1: Isopleths showing Incremental Concentration of PM10 in Study Area



From the above, it could be clearly seen that due effective implementation of various control measures, there will not be any significant impact on the ambient air quality in the region.

4.4.2 MITIGATION MEASURES

- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.
- Masks will be provided to workers.
- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.

4.5 NOISE ENVIRONMENT

The area is general represents calm surroundings. There is no heavy traffic, industry or noisy habitation in the area except the existing mine. As the project is proposed for open cast manual mining method there will be no blasting or drilling activities.

4.5.1 ANTICIPATED IMPACT

- The source of Noise pollution will be the vehicular movements.
- Noise will be generated by the digging of mine area using shovels, crowbars etc.

4.5.2 MITIGATION MEASURES

- Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations. No other equipments except the transportation vehicles will be allowed.
- Noise generated by hand equipments shall be intermittent and does not cause much adverse impact.

4.6 BIOLOGICAL ENVIRONMENT

4.6.1 ANTICIPATED IMPACT

4.6.1.1 FLORA

The proposed project of river bed sand, bajri, boulder mining shall be carried out on the riverbed of Kot Mot. There are no trees in the project area. The project shall also not lead to any change in land use and will be replenished every year after successive rains. The proposed mining activity, which although is an economically gainful activity, also constitutes river training work. It allows for necessary dredging activity which may otherwise lead to flooding of the valley.

There shall be negligible air emissions or effluents from the project site during loading of the truck. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

4.6.1.2 FAUNA

Animals are sensitive to noise and avoid human territory. The project stretch of the river is not an identified drinking water point for the animals. However, any animal desirous of accessing the river can continue to do so upstream or downstream of the stretch during the mining activities, as there will not be any damming or diverting of water.

Hence, no significant impact is anticipated from the proposed project.

4.6.1.3 MITIGATION MEASURES

FLORA

Although, the project will not lead to any tree cutting, plantation activities shall be undertaken to improve the vegetation cover of the area. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

FAUNA

The workers shall be directed to not venture out of the leased area for collecting fuel wood, or hunting. They shall also be trained not to harm any wildlife. No work shall be carried out after sunset.

4.7 SOCIO-ECONOMIC ENVIRONMENT

The Socio-Economic Impact Assessment is the systematic analysis used during EIA to identify and evaluate the potential socio-economic and cultural impacts of a proposed development on the lives and circumstances of people, their families and their communities. It can identify and distinguish numerous measurable impacts of a proposed development but not every impact may be significant. The populations who are impacted either directly or indirectly have a say whether the impacts are significant or not.

4.7.1 ANTICIPATED IMPACT

- From the primary Socio-economic survey & through secondary data available from established literature and census data 2001 & 2011, it is found that there would be positive impact on

Socio-economic condition of the nearby area.

- As the project is proposed Government forest land, no Resettlement & Rehabilitation is required.
- Increased funding to improve social infrastructure and cultural maintenance programs. Since the surrounding study area is an undeveloped area, the overall Socio-economic status of the local population is below average. People are mostly engaged in farming activities and primarily involve in various social activities.
- There are some people who are engaged in trading of sand, stone and bajri, therefore due to mining of sand, stone and bajri the per capita income of local people have been improved.
- The area is poor in the health care facilities. The project authorities would provide mobile vans for emergency services in the area.
- Various direct and indirect employment opportunities will be generated.

4.7.2 MITIGATION MEASURES

- Increased funding to improve social infrastructure and cultural maintenance programs.
- It is suggested that during mining all safety provision has to be ensured to negate any likely impact on social environment due to associated hazards.
- A better standard of living due to increased access to employment, business opportunities training and education.

4.8 SOLID WASTE

4.8.1 ANTICIPATED IMPACT

- This RBM project does involve negligible quantity of waste generation in form of slit/silty clay which gets deposited as crust material on the bed profile and is extracted during mining process.
- No municipal waste other than domestic sewage shall be generated,
- However, there will be about 600 workers on site. While cooking at site will not be allowed, some food wastes can be expected to be generated which if not disposed properly will render the site dirty.

4.8.2 MITIGATION MEASURES

- Silt/Silt clay generated during mining process will be either back-filled into mine pits/in the upper terraces or can be used for plantation purpose.

- Only domestic sewage shall be generated, which shall be treated with the help of Bio-Digester Toilets and the recycled water shall be used for horticulture and dust suppression.
- However, solid wastes generated from the personal habits of people such as used bidi, waste paper, food remains etc. cannot be ruled out. Dustbins shall be provided at the rest places. These dustbins shall be emptied daily at the nearest dumping areas from the site.

4.9 TRAFFIC ENVIRONMENT

4.9.1 ANTICIPATED IMPACT

- Increase in traffic density will lead to air pollution.
- Movement of vehicles will cause noise pollution.
- Increased traffic may cause accidental incidences.

4.9.2 MITIGATION MEASURES

- Vehicles with PUC Certificate will be hired. Regular maintenance of vehicles will be done to ensure smooth running of vehicle.
- Un- necessary blowing of horn will be avoided.
- To avoid accidents the speed of vehicles will be low near habitation areas.

4.10 TRAFFIC DENSITY

The sand, bajri & boulder excavated from the lease area will be loaded directly into trucks and transported to the concerned market. For the transportation of minerals one evacuation routes has been proposed, distributing the traffic load to reduce the traffic congestion.

4.10.1 ANTICIPATED IMPACT

Evacuation route: The lease area is connected to NH-72 by an un-metalled road of about 60m then by a metalled road near village Rampur.

Table 4.2: Impact of Traffic density

Hours	Fast Moving Vehicles-NH 72									
	Two-Wheelers		Three Wheelers		Cars/Vans		Buses		Trucks Two Axle/ Three Axle	
	Up	DN	Up	DN	UP	DN	UP	DN	UP	DN
1	6	5	5	7	16	10	01	01	10	15
2	7	4	4	6	14	11	01	02	12	15
3	8	6	6	7	14	9	03	02	11	10

4	8	7	5	6	12	10	01	02	9	8
5	10	12	6	7	15	12	03	05	6	7
6	27	25	15	18	26	32	04	06	4	5
7	28	26	18	16	34	28	05	04	3	2
8	24	32	12	16	36	32	06	05	2	3
9	22	30	16	18	34	30	07	05	3	2
10	24	28	18	16	32	36	05	04	1	2
11	26	27	21	20	35	37	06	05	2	1
12	21	24	22	21	34	36	04	05	3	2
13	34	32	17	18	38	36	07	06	2	1
14	35	36	18	19	34	32	07	06	2	2
15	38	35	21	17	31	30	05	05	2	1
16	34	45	18	21	32	31	05	07	1	1
17	37	38	15	18	34	28	05	04	3	2
18	39	41	16	14	30	27	03	04	4	1
19	35	42	13	12	34	35	05	03	5	6
20	23	26	7	9	34	32	04	05	7	9
21	21	18	6	4	35	31	05	04	12	10
22	16	18	5	3	28	28	03	02	16	12
23	11	14	3	4	25	24	01	02	14	13
24	9	11	4	5	18	21	01	01	17	19

S.No	Vehicles Distributionm	Number of Vehicles Distributed/Day	Passanger Car Unit(PCU)	Total Number of Vehicles/Hours
1.	Car	1313	1.0	1313
2.	Two-Wheeler	1125	1.5	1688
3.	Three-Wheeler	593	0.5	297
4.	Buses	192	1.50	288
5.	Trucks	300	3.0	900
		3523		4486/24=187 PCU/hr

Existing Traffic Scenario & LOS

Road	V	C	Existing V/C ratio	LOS
NH-72	187	15,000	0.012	A

V- Volume of PCU/hr day

C- Capacity of PCU/hr day

V/C	LOS	Performance
0.0-0.2	A	Excellent
0.2-0.4	B	Very Good
0.4-0.6	C	Good/Average/Fair
0.6-0.8	D	Poor
0.8-1.0	E	Very Poor

Note: Capacity as per IRC: 64-1990

During the Mining Operation:

Total Capacity of the Mine: 3, 60,000 Tonnes/Annum

No. of Working Day: 270

Total Capacity of the Mine: 1333 Tonnes/Day

Total Capacity of the Mine: 166.66 Tonnes/Hr

Total Working Hours per day: 8 Hrs

Capacity of the Trucks: 15 Tonne

No. of Truck/hr: 12 Trucks

Modified Traffic Scenario & LOS

Road	V	C	Existing V/C ratio	LOS
NH-72	194	15,000	0.012	A

Conclusion

Not much impact on local transport, as only 12 dumpers/hr will be required for transport of mineral from mine. The LOS value from the proposed mine may be “Excellent” on NH-72. So the additional load on the carrying capacity of the concern roads is not likely to have any significant adverse affect.

4.10.2 MITIGATION MEASURE

- It is being ensured that all transportation vehicles will carry a valid PUC certificate.
- Speed limit of the vehicles will be followed. To avoid accidents the speed of vehicles will be low near habitation areas.
- Un- necessary blowing of horn will be avoided.

CHAPTER 5

ANALYSIS OF ALTERNATIVES

5.1 GENERAL

Consideration of alternatives to a project proposal is a requirement of EIA process. During the scoping process, alternatives to a proposal can be considered or refined, either directly or by reference to the key issues identified. A comparison of alternatives help to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options.

5.2 ALTERNATIVE FOR MINE LEASE

Points for consideration of suitability of alternate site for mining of sand, bajri, boulder other than the proposed site are as follows:

- ✓ During monsoon season, when rivers reach high stage, Kot Mot River also bears significant catchment area and it transports river bed material (sand, bajri, and boulder) which gets accumulated at such stretch which widens river width and concave banks. Thus, it is evident that the proposed site shall be mined for the purpose of preventing land cutting during heavy rainfall and floods.
- ✓ Sand/Bajri/Boulder (minor mineral) deposits are site specific and in Kot Mot river bed, mining of the material will be done by open cast manual method. No new technology is involved. The mining shall be done as per laid down procedures by IBM. Solid Waste generated during mining will consist of silt mixed soil which will be backfilled in the excavated pits. The mined out area will get replenished annually after monsoon.

Therefore, no alternate site is suggested as existing land use of mine lease area belongs to forest land which is further classified as “River body” and shall continue to be so even after the current mining project is over.

5.3 ALTERNATIVE FOR TECHNOLOGY AND OTHER PARAMETERS

Some alternatives considered during EIA study are discussed below in **Table 5.1**

Table 5-1: Alternatives Considered During EIA Study

S. No	Particular	Alternative Option 1	Alternative Option 2	Remarks
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1	Technology	Open-cast Manual mining	Open-cast Mechanical mining	Open-cast Manual Mining is preferred. Benefits No electrical power requirement. Minimal noise will be generated Minimal air pollution will be generated. Overburden will not be generated.
2	Employment	Local Employment	Outsource Employment	Local Employment is preferred. Benefits Provides employment to local people along with Financial Benefits. No residential building/housing is required.
3	Laborer Transportation	Public Transport	Private Transport	Local labors will be deployed so they will either reach mine site by bicycle or by foot. Benefits Cost of transportation of men will be negligible.
4	Material Transportation	Public Transport	Private Transport	Material will be transported through truck/trolley on the contract basis. Benefits It will give indirect employment.
5	Water Requirement	Tanker Supply	--	Tanker supply will be preferred. Benefits No change in the surface water or ground water quality. It will provide indirect employment

6	Road	Haul Road	Metallic Road	<p>Haul road will be considered for linking mine site from metallic road for transportation purpose. Minimum distance will be measured along with less number of trees for considering optimum haul road route.</p> <p>Benefits Less distance; less fuel used Minimum or negligible number of trees will be cut in best opted haul road route.</p>
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CHAPTER 6

ENVIRONMENTAL MONITORING PROGRAM

6.1 GENERAL

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, which will enable to take suitable mitigation steps in time to safeguard the environment.

Monitoring is important to measure the efficiency of control measures. An environmental impact assessment study is carried over for a specified period of time and the data generated for that specific period cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality. The objectives of monitoring are to:-

- Verify effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Confirm statutory and corporate compliance; and
- Identify unexpected changes.

6.2 IDENTIFY UNEXPECTED CHANGES, ENVIRONMENTAL MONITORING & REPORTING PROCEDURE

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

The preventive approach by management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control

performance etc. Monitoring will also be required to meet compliance with statutory and corporate requirements. Finally, monitoring results will provide the basis for auditing.

6.3 ENVIRONMENTAL MONITORING SCHEDULE

Post project monitoring will be carried out as per conditions stipulated in Environmental Clearance Letter issued by MoEF, Consent issued by SPCB as well as according to CPCB guidelines.

Details of the proposed environmental monitoring schedule, which will be undertaken for various environmental components, are detailed below in **Table 6.1**.

Table 0-1: Proposed Environmental Monitoring Programme

S. N.	Activity	Schedule
Air Pollution Monitoring		
1.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time within the mining lease	Twice in a year on 6 month interval basis
2.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time at stations outside the mining lease	Twice in a year on 6 month interval basis
Water Quality Monitoring		
3.	Monitoring of Ground Water sample as per IS: 10500	Once in six month
4.	Monitoring of Surface Water sample as per IS: 2296	Once in six month
Noise Quality Monitoring		
5.	Noise in the ambient atmosphere near the mine lease area	Once in six month
Greenbelt Maintenance		
6.	Monitor schedule for Greenbelt development as per approved mining plan	Once in a year
Soil Quality Monitoring		
7.	Soil quality analysis from the samples collected from the mine site and nearby areas	Twice in a year on the basis of 6 months interval

6.4 MONITORING OF VARIOUS PARAMETERS

The Mine site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone.

6.4.1 SLOPE FAILURE

The proposed mining for sand, bajri, boulder from the river bed of Kot Mot River will be done by opencast manual method up-to the depth of 1.5 m from the ground level. There will be no slope formation as the excavated pits will be backfilled by the solid waste (soil) generated during the mining of sand, bajri, boulder and it will get replenished during monsoon. Hence there will be no slope failure.

6.4.2 DRAINAGE

Local workers will be deployed for the project. Therefore no concrete based sewerage system will be constructed. Bio-toilets shall be used and the water hence generated shall be used for the dust suppression and greenbelt development. No domestic waste water will be disposed into the river body or near area. Regular checking will be carried out to find any blockage due to silting or accumulation of loose materials. The drains will also be checked for any damage in lining/stone pitching etc.

6.4.3 BLASTING EFFECTS

The proposed project is for extraction of sand, bajri, boulder which will opt for an open cast manual method of mining. Hence blasting is not required.

6.4.4 COMPENSATORY AFFORESTATION

Plantation is proposed along the slope on both bank of the river. Plantation will be carried out on approach roads and nearby vicinity of river bank. Rehabilitation of extracted land has to be designed skillfully in order to restore it to its formal use, or to an alternative use that is compatible with the surroundings. Plantation with grasses, herbs, shrubs and trees is an important means for restoring such areas. Stabilizing and re-vegetate the de-vegetated areas viz. debris, dumps and slopes which get degraded due to vehicle movement, rolling stones, etc are important for conservation of soil, regulation of surface and underground water and for rehabilitation of wild life habitat. These generally are extracting operations and need planting in various phases by select species. Protective engineering measures, in conjunction, become necessary.

6.4.5 AIR QUALITY MONITORING

Ambient air quality should be monitored both upwind & downwind directions along with adequate meteorological measurement for proper interpretation of data of PM₁₀, SO₂ and NO_x. The number of

monitoring stations, air pollutants and frequency of monitoring will be decided as per the CPCB guidelines in 2009. Meteorological stations will be monitored for wind direction and speed, rainfall, temperature & humidity and evaporation.

6.4.6 WATER QUALITY MONITORING

Monitoring of surface run-off and ground infiltration will be done once in every season except monsoon. Quality of ground water and surface water samples will be analyzed for all the parameters as per IS-10500 and IS-2296 respectively.

6.4.7 NOISE QUALITY MONITORING

Noise level monitoring will be done at the work zone to assess the occupational noise exposure levels. Noise levels will also be monitored at the noise generating sources like mineral handling arrangements, vehicle movements and also nearby villages for studying the impact due to higher noise levels for taking necessary control measures at the source.

6.4.8 OCCUPATIONAL HEALTH & SAFETY

Health check-up for the workers will be conducted at regular intervals of two months in a year. The health camps status will be monitored and the information will be furnished to the approving authority. Environment Management Cell will also coordinate with general public, regulatory authorities, local administration to appraise environmental performance of the mine.

CHAPTER 7 ADDITIONAL STUDIES

7.1 GENERAL

All types of industries face certain types of hazards like failure of machinery, explosion etc. and disasters like fires, inundation, earthquake etc. which can disrupt normal activities abruptly. Mining and allied activities are associated with several potential hazards to both the employees and the public at large. Therefore, it is necessary to consider specific issues as applicable to individual projects to take precautions against these issues. A worker in a mine should be able to work under condition, which are adequately safe and healthy. At the same time the environmental conditions should be such as not to impair his working efficiency. Therefore, the EIA report and EMP address such issues.

7.2 ITEMS IDENTIFIED BY THE PROJECT PROPONENT

The project proponent has identified some issues beyond those included in the ToR which are important from environmental point of view for the proposed project or site selected. A sedimentation study has also been carried out for the proposed project.

Points of consideration are given below.

- Mining unwanted material including mineral or spillage (if any) should not be stacked on the banks as it will hinder the flow of water in monsoon season.
- The minerals will be mined out in a uniform way so that the river flow/course shall not get disturbed.
- River banks will not be excavated to form access ramps.
- Only excavated river gravel should be used to deposit against the river bank to form access ramps.

7.3 ITEMS IDENTIFIED BY THE REGULATORY AUTHORITY

During the scoping process, the regulatory authority MoEF&CC has directed specific issues, which are specifically considered important from environmental point of view. ToR approved by MoEF&CC for this project of mining of sand, bajri, boulder (minor minerals) from river bed has been adopted and those issues have been incorporated as additional studies in the EIA report.

7.4 ITEMS IDENTIFIED BY THE PUBLIC AND OTHER STAKEHOLDERS

The proposed project is required to obtain Environment Clearance as this project is covered under amended EIA Notification dated 14th September 2006, of the Ministry of Environment and Forests, Government of India, New Delhi.

As Advertisement regarding public hearing for the publication was published 30 days prior to Public hearing in Hindi and English daily newspaper “Danik Jagran” and “Times of India” respectively dated 19.12.2015. The Public Hearing was conducted on 19.01.2016 at 11:30 AM at Village: - Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand, in the close proximity of the project site.



Figure 7-1:- Public Hearing Photographs

The hearing was attended by the District Magistrate, Dehradun, who was the chairman of the Public hearing, Mr. Subhash Pawar (Executive Engineer) and Mr. Sunil Dabraal (Assistant Engineer), representative of Uttarakhand Environment Protection and Pollution Control Board (UEPPCB), Dr.

V.N. Singh (Deputy General Manager), representative of Mantec Consultants Pvt. Ltd., many officials of UKFDC & general public and was presided by Dr. V.N. Singh.

At the outset of the hearing Mr. Subash Pawar welcomed the District Magistrate Uttarakand, and all other officials & the general public and thereafter sought the permission from Chairman to start with the public Hearing. He briefed about EIA Notification dated 14.09.2006 and the process of public hearing. He also requested the public to speak one by one and put up their questions after presentation and assured the public that their questions will be answered by the project proponent and that the proceeding and video recording of the public hearing will be submitted to MoEF&CC, New Delhi. Thereafter he asked the project proponent to make the presentation of the project and then handed over to Dr. V.N. Singh, representative of Mantec Consultants Pvt. Ltd.

The minutes of public hearing and action plan is given below in Table:-50. The public hearing proceedings along with attendance sheets of officers & participants who attended & could sign are enclosed as **Annexure-IX**.

Table 7-1:- Public Hearing Minutes

S. No.	Name of the Person	Points Raised	Replies	Action Plan
1	Mr. Imran Khan, Pradaan, Village- Kedaarwala	He welcomed the project and said that there is discount for the villagers and B.P.L card holder on mineral and a part of royalty should be given to Gram Panchayat. From the royalty money road conditions will be improved and local people will be employed through mining area. He expressed concern for the environment should not harm through mining activities.	There is no provision for discount for construction of local's house and social work but we will discuss with the Additional District Magistrate regarding discount. Environment will not pollute due to mining activities.	-- Water sprinkling is to be done.
2	Ramcharan Pal, Social	He welcomed the project and said that their village is	Inspite of CSR activities, According to	Rule 5% of the overall received

	worker, Village Charba	<p>situated near river and due to no mining there is possibility of havoc of flood in the village so for better channelization of river and protect village from flood necessary action should be taken place.</p> <p>He said that Local people get discount in royalty.</p> <p>He said that mining is to be done in scientific manner and avoid illegal mining.</p> <p>He said that in case of Mining activities Government takes royalty but now royalty should not be taken.</p>	<p>State Government Mining Rule 5% of the overall received amount will be used for improvement of village facilities.</p> <p>There is no provision for discount for local's house and social work but we will discuss with the higher District Magistrate regarding discount.</p> <p>Mining will be done in scientific manner.</p> <p>Village and area representative can demand for the minor minerals discount to the State Government.</p>	<p>amount will be used for improvement of villages.</p> <p>Mining will be done according to scientific manner.</p>
3	Mr. Gyanchand, Baduwala	<p>He said that there is discount in the royalty of mining material for the construction of house of the locals.</p>	<p>Inspite of CSR activities, According to State Government Mining Rule 5% of the overall received amount will be used for improvement of villages.</p>	<p>5% of the overall received amount will be used for improvement of villages.</p>
4	Mr. Ravindra Singh, Village Pradaan, Horawala	<p>He welcomed and said that for the local people there should be some royalty or free minor minerals for the use of local people.</p> <p>He also said that for the social work there is provision to give royalty on minor minerals and</p>	<p>There is no provision for discount for local people but we will discuss with the higher District Magistrate regarding discount.</p>	---

		mining area should be demarcated.		
5	Bahadur Singh, Ex-Pradaan, Village- Sorna	He also said that Standard Rules of the mining should be followed, so we are agree for the mining work.	Mining will be done in scientific manner.	Mining will be done in scientific manner.
6	Mr. Sanjay Kumar, Village- Chandpur	I am agreeing with the mining work. He suggested that mining work is to be done on Forest land in spite of private land.	We ensure you that work will be carried out in Forest Land.	Mining work will be carried out in Forest Land.

7.4.1 RISK ANALYSIS, DISASTER MANAGEMENT AND PREVENTIVE/CORRECTIVE MEASURES

7.4.1.1 RISK ANALYSIS & DISASTER MANAGEMENT PLAN

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The possible risks in the case of river bed mining project following natural/industrial problems which may be countered during the mining operation are given below:

- Inundation at mine lease area due to excessive rains
- Possibility of earthquake as mine lease lies in Seismic Zone-IV
- Accident due to excavated pits
- Accident due to movement of vehicles
- Occupational injuries
- Fires on large surface vehicles through ignition of fuel/hydraulic fluids

Keeping the above points of high risk accidents like landslides, subsidence flood etc. in consideration, and all the statutory precautions will be taken for quick evacuation. Hence, safety of the mine and employees will be taken care of by the mining rules & regulations, which are well defined with laid down procedure for safety.

7.4.1.2 PREVENTIVE/CORRECTIVE MEASURES

- **Preventive Measures for Inundation**

Mining will be done during the non-monsoon periods; therefore problem of flood is not likely to happen during operational phase i.e. round the year excluding June-August.

- **Measures for Earthquake Disaster**

Proper training will be given to the labors for earthquake and the area will be evacuated as soon as there is any news or signal for earthquake.

- **Preventive and Corrective Measures for Accidents Due To Excavated Pits**

Pits will be created of limited depth of 1.5 m only. Excavated pits will be backfilled with the solid waste generated in the form of silt mixed sand during operational phase of mine. Thus, the chance of failure of pit slope does not exist.

- **Preventive and Corrective Measures for Accidents Due To Trucks & Dumpers**

- ✓ All transportation within mine lease should be carried out directly under the supervision and control of the management
- ✓ The vehicles will be maintained in good condition and checked thoroughly at least once a month by the competent person authorized for the purpose by the management
- ✓ Road signs will be provided at each and every turning point up to the main road
- ✓ A statutory provision of the demarcation, constant education, training etc. will go a long way in reducing the incidents of such accidents

- **Preventive and Corrective Measures for Occupational Injuries**

- ✓ Training will be given to the workers on how to use hand equipments
- ✓ First aid will be provided on-site only if any accident occurs
- ✓ In-case of poor condition of any equipment, it will be changed immediately

- **Preventive and Corrective Measures for Fires on large surface vehicles through ignition of fuel/hydraulic fluids**

- ✓ Availability of fire extinguishers on-site throughout the operational phase of mine
- ✓ Maintenance of vehicles on monthly basis

7.5 NATURAL RESOURCE CONSERVATION

The plan of action for conservation of natural resources and recycle of waste materials has been formulated and given as below:

- Groundwater or surface water will not be abstracted as water requirement will be met by tanker supply
- Groundwater will not get polluted as the mining depth is 1.5 m bgl

- Solid waste generated in form of silt mixed sand during mining will be utilized for plantation purpose
- All the machineries and equipments shall be properly maintained so as to reduce the green house gas emissions and to conserve the fuel & energy

7.6 REHABILITATION & RESETTLEMENT (R&R)

The existing mine lease area is designated as river body and has no human settlements or hutments in the mine lease area. Hence, no Rehabilitation & Resettlement (R&R) is envisaged.

7.7 CORPORATE SOCIAL RESPONSIBILITY

UKFDC will organize Medical/Health Check-up camps each year for the people in the nearby area(Rudrapur and Khera Pahuwa Village) of mine lease area. It will be done with coordination of the Government Hospital in the nearby area whose equipment facilities can be used for this purpose. Medicines will be provided free of cost. A total of Rs. 4.8 Lacs is being earmarked for the CSR activities.

CSR Budgeting and Implementation details

Sl. No.	Proposed Activities	Installation Cost (in lacs)	Recurring cost (in lacs)
1.	Health Check up camps, once in a year, at Rudrapur Village (at Rs. 10,000/yr)	00	0.5
2.	Assistance to local schools, scholarship to students at Govt. Primary School, Muslim basti Vikasnagar (at Rs. 10,000/yr)	00	0.5
3.	Provision of toilet & urinal, separately for boys and girls, and drinking water facilities in Govt. Primary School, Muslim basti Vikasnagar (with installation cost Rs. 40,000 and recurring cost Rs 10,000/yr)	0.4	0.5
4.	Provision of toilet & urinal and drinking water facilities in Khera Pahuwa Village(with installation cost Rs. 40,000 and recurring cost Rs 10,000/yr)	0.4	0.5
5.	Vocational training to local people for income generation(at Rs. 20,000/yr)	00	1
6.	Assistance (seed capital) to self help groups(at Rs. 20,000/yr)	00	1
Total		0.8	4.00
Grand Total		4.8	

CHAPTER 8

PROJECT BENEFITS

8.1 GENERAL

Various benefits are envisaged while planning for the mining of sand, bajri, boulder from Kot Mot River Bed. Sand/Bajri/Boulder are very important minor mineral and is the principal raw material for meeting the huge demand of construction material required in building construction and infrastructure works, road material for construction and maintenance of roads / highway; elastic ballast material for rail tracks in the State of Uttarakhand and nearby cities and towns of Uttar Pradesh. The natural available materials in shoal deposits of Kot Mot River bed quarry site have been found suitable from techno-economic consideration.

- **Social Infrastructure**

- ✓ Project will help to channelize the river course.
- ✓ Extraction of sand, bajri, boulder will help in land cutting from nearby agricultural fields and forests.

- **Employment Potential**

- ✓ The proposed project will provide direct employment to skilled/unskilled and semi-skilled laborers.
- ✓ The proposed project will also provide indirect employment to local people in different activities such as transportation, food points, plantation activities, water tanker supply, hand equipments etc.
- ✓ Besides labors managerial and administrative staff will also be employed.

- **Tangible Social Benefits**

- ✓ Company will undertake awareness program and community activities like health camps, medical aids, family welfare camps, AIDS awareness programme etc.
- ✓ A massive plantation will be done in Dehradun district

- **Direct/Indirect Benefits**

- ✓ It will generate revenue for the State of Uttarakhand

It will cater the demand of raw material for construction purpose

CHAPTER 9

ENVIRONMENT MANAGEMENT PLAN

9.1 GENERAL

The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. The Environmental Management Plan (EMP) consists of a set of monitoring programme, mitigation measures, and management control strategies to minimize adverse environmental impacts.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, an EMP has been prepared which is to be implemented in the project and covers the following phases of the project:

- Air Pollution
- Water Pollution
- Noise Pollution
- Biological reclamation measures
- Land use planning and mine closure
- Occupational Safety and Health
- Socio-economic and cultural environment
- EMP Budget

9.2 AIR ENVIRONMENT

During the course of sand, bajri, boulder mining, no toxic substances are released into the atmosphere, so there seems to be no potential threat to health of human beings. In river bed mining activities, dust will be generated during mining, loading and transportation. The only source of fugitive gaseous emission during mining is vehicles which will be used for transportation. The environmental management for air pollution control includes:

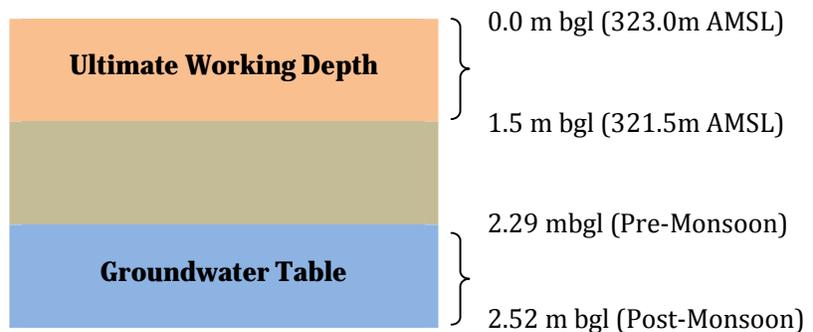
- The un-metalled haul roads should be adequately compacted before being put into use.
- Water should be sprinkled on these roads periodically every-day (twice in a day), to wet the surface.
- Over loading of transport equipments should be avoided to prevent spillage.
- Transportation of sand should be in covered vehicles to prevent fugitive dust emission.
- Regular checking and maintenance of vehicles should be conducted once in every two months and pollution under control certificate be obtained.
- It will be ensured that all transportation vehicles carry a valid PUC certificate.
- Masks will be provided to the workers daily during working hours of the mine.

- Plantation will be taken up along the approach roads and vicinity of river bank. The plantation arrests dust.

9.3 WATER ENVIRONMENT

During the operational phase of mine no waste water or industrial effluent will be generated. The environmental management for water pollution control includes:

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.
- Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be treated with the help of Bio-Digester Toilets and the recycled water shall be used for horticulture and dust suppression.
- Mining in the area will be done up to depth of 1.5m from the surface level well above the ground water table, therefore impact on water regime is not anticipated.



9.4 NOISE ENVIRONMENT

No drilling or blasting will be done in the proposed project of sand, bajri, boulder mining. Minimal noise will be generated during the operational phase of mine due to transportation and hand equipments to be used for mining purpose. The environmental management for noise pollution control includes:

- Proper maintenance of hand equipments will be carried out every month, which will help in reducing generation of noise during operations.
- Regular checking and maintenance of vehicles should be conducted once in every two month to avoid noise pollution.
- Ear plugs will be provided to workers during the operational hours of mine.
- Periodical monitoring of noise will be done to adopt corrective actions wherever needed.

- Plantation will be taken up along the approach roads and vicinity of river bank. The plantation minimizes propagation of noise and also arrests dust.

9.5 BIOLOGICAL ENVIRONMENT

Although, there are no significant adverse impacts from the project, the following measures are proposed to minimize anticipated impacts: The project area shall be strictly used for only the activities permitted.

Boundary demarcation: The boundary of the leased area will be marked prior to start of work at the site. All workers shall be informed of the boundary of the project and the forest. No trespassing of the workers into the adjoining forest land shall be permitted.

Greenery development: Plantation is proposed along the slope on both bank of the river. Plantation will be carried out on approach roads and nearby river vicinity of river bank. Rehabilitation of extracted land has to be designed skillfully in order to restore it to its formal use, or to an alternative use that is compatible with the surroundings. Plantation with grasses, herbs, shrubs and trees is an important means for restoring such areas. Stabilizing and re-vegetate the de-vegetated areas viz. debris, dumps and slopes which get degraded due to vehicle movement, rolling stones, etc are important for conservation of soil, regulation of surface and underground water and for rehabilitation of wild life habitat. These generally are extracting operations and need planting in various phases by select species. Protective engineering measures, in conjunction, become necessary.

Restricted activities: All mining activity shall be carried out manually. No explosives and heavy machineries shall be used.

Dust Suppression: The sand being transported will be wet for a significant part of the year. No dust generation is anticipated during this period. On other occasions, all loaded trucks shall be covered with tarpaulin prior to transportation to avoid sand deposition on roadside vegetation and agriculture farms.

Project Timings: Animals are sensitive to noise. Hence, no project activities shall be carried out at night (sunset to sunrise). At daytime, public addressing system (other than during emergency conditions) shall be avoided.

Training: All workers shall be trained on the do's and don'ts of working on forest land. They shall not be allowed to collect fuel-wood from the adjoining forests. They shall be informed of the animals, they might spot in the project area and instructed against harming any of them. The workers shall be directed to use sanitation facilities provided and not litter the project site.

9.6 LAND USE PLANNING

Deviation from planned mining procedure can lead to bank erosion/cutting and thereby river channel shifting degradation of land, causing loss of properties and degradation surrounding of landscape. Thus for environment friendly river bed mining the following control/abatement measures will be followed:

- Mineral will be mined out in central position of stream and sufficient safety barrier say 25% of width will be left towards bank side, So that the river flow/course will not get disturbed.
- The pits from where the material will be picked should not get deeper than 1.5 meter & shall follow the normal channel direction of the river.
- Pits will get replenished naturally every year after monsoon.

9.7 OCCUPATIONAL HEALTH & SAFETY

The chronic silicosis caused by silica exposure poses unique dangers for employees working at sand, bajri, boulder mining sites. Guidelines issued by Labor Department's Occupational Safety and Health Administration (OSHA) will be followed strictly to reduce the health risk because long-term exposure can be fatal.

Concentration of respirable dust in the workplace will be regularly measured as laid down by DGMS. Health check up for the workers will be conducted at regular intervals of two months in a year. UKFDC will provide free medicine to needed patient. Environment Management Cell will also coordinate with general public, regulatory authorities, local administration to appraise environmental performance of the mine.

Safety of employees during operation of mines should be as per the mines rules and as per guideline of Director General of Mines Safety (DGMS). The following measures relating to safety and health should be incorporated.

- Conduct of mock drill
- First Aid facility and training to workers
- Provisions of rest shelter for mine workers with facility of drinking water.
- Periodical medical examination of all workers

UKFDC will try to achieve targets of zero fatalities and injuries, silicosis elimination and the elimination of noise-induced hearing loss by constant and continuous improvement, at least equivalent performance levels to current national benchmarks.

Budgetary Allocation for Health checkup

Amount of Rs. 2 Lakh per year has been allocated for occupational health and safety of workers by UKFDC.

9.8 SOCIO-ECONOMIC ENVIRONMENT

Study on socio economic status has already been carried out using primary socio economic survey for generating the base line data of socio economic status.

HUMAN SETTLEMENT

The villages and their inhabitants in the buffer zone will not be disturbed from their settlements due to the mining operations. There is no inhabitation within the lease area being on riverbed. Therefore neither villages nor any part of village or any hamlet will be disturbed during the entire life of the mine. As the mining operations will not disturb or relocate any village or settlement, no adverse impact is anticipated on any human settlement

EMPLOYMENT

The area is considered as industrially backward in the absence of any high employment potential activates, the people are economically backward. The mining operation will provide employment to local people various indirect employment opportunities, will also we generated. Such as employment through contractors, running of trucks, tractors and buses on hire different kind of shop and transport related business avenues.

RECOMMENDATIONS

- Need to Established vocational training programs for the local workforce to promote development of skills.
- Need to develop instructional materials for use in area schools to educate the local communities.
- Medical and health care facilities in the industry need to be extended to the residents of nearby areas.
- Need to encourage Infrastructural Development Activities in its Operational Area. This would include construction of Water Supply & Transportation Facilities like Roads, Permanent Shelters for Bus Stops etc.

9.9 SOLID WASTE MANAGEMENT

No solid waste is generated from the mining operations. Unwanted material including silt mixed sand will not be stacked on the banks sides as it will hinder the flow of water in monsoon season. It will be backfilled in the excavated pits or used for plantation purpose. Thus, no waste dump sites are needed for the project. Domestic sewage shall be generated, which shall be treated with the help of Bio-Digestor Toilets and the recycled water shall be used for horticulture and dust suppression.

9.10 COST OF ENVIRONMENT CONTROL MEASURES

As a part of responsibility towards protection of environment, project proponent has allocated budget for regular Environment monitoring and Environmental management. The same is detailed in **Table 9.1**.

Table 0-1: Proposed Cost of Environment Control Measures

Components	Schedule and Duration of Monitoring/Execution	Implementing Agency	Approximate Unit Cost (per location)	Total Cost (per year)
Air	Once in every Six Month except monsoon	UKFDC	Rs. 5,000/-	75,000
Water	Once in every season	UKFDC	Rs. 3,000/-	52,000
Noise	Once in every season	UKFDC	Rs. 3,000/-	84,000
Soil	Twice in a year	UKFDC	Rs. 3,000/-	30,000
TOTAL				2,41,000

9.11 ENVIRONMENT MANAGEMENT SYSTEM

UKFDC shall conduct all its operations in a manner that is protective of the environment and health & safety of employees, customers and the community. In fulfillment of this commitment, they shall maintain continuing efforts to:

- Comply with all applicable safety, health and environment laws and regulations
- Enhance Safety, Health and Environment (SHE) awareness among employees and associated stakeholders through effective communication and training
- Investigate all workplace incidents and illness in order to promptly correct any unsafe conditions or practices
- Integrate SHE considerations into business planning and decision making
- Champion SHE responsibility among our employees in their practices, and promote and value their involvement in achieving the goals of this policy

Environment Policy of UKFDC is attached as **Annexure-V**

Environment Management Cell

Environment management cell of UKFDC is given below:



CHAPTER 10 SUMMARY & CONCLUSION

10.1 INTRODUCTION

Mine has been allotted in the name of M/s UKFDC vide Letter of Intent (LOI) no. 584/BHU/KANI/E/2012-13 dated 23.01.2013 by Director of Mines & Geology Department, Uttarakhand.

The proposed project is categorized under category "A" 1 (a) (mining lease area \geq 50 hectare) - {Mining of Minerals} as the lease area is 60 ha and will be considered at MoEF, New Delhi.

Mine lease area is located in the bed of river Kot Mot at near villages Rudrapur Tehsil- Vikasnagar District Dehradun, Uttarakhand.

The total lease area is 60 ha and has been proposed for an annual production of 3,60,000 tonnes of Sand/Bajri/Boulder by open cast manual extraction method in river bed.

Total number of working days will be 270. The mine will be worked in the day shift only.

This project will provide employment to 600 Person including skilled, semi- skilled & unskilled. Total water requirement will be 15 KLD for domestic purpose, dust suppression & green belt development which shall be met by tanker supply.

The baseline collected data for land, soil, water, air and noise shows all values found are within the limits, prescribed by CPCB. Plantation is proposed along the slope on both bank of the river. Plantation was carried out on approach road and nearby vicinity of the river bank.

All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Thus implementing this project will have positive impacts.

10.2 PROJECT DESCRIPTION

The project for collection of minor minerals (sand, bajri, boulder) from the river bed of Kot Mot has been proposed for an annual production of 3,60,000 TPA by Open Cast Manual Extraction method. The lease area measuring 60 ha is falling totally under the forest land. Some of the salient features of the project are given below in the **Table no-10.1**

Table 10-1: Salient Features of the Proposed Project

Project Name	Extraction/Collection of Sand, Bajri & Boulder (minor minerals) from Kot Mot River Bed
---------------------	--

Area	60 ha
Coordinates	Latitude 30°26'34.69"N to 30°25'40.72"N Longitude 77°52'47.00"E to 77°49'39.22"E
Capacity	3,60,000 TPA
New/Expansion/Modernization	New Mine
Category	A
Land Use	River bed in Forest land
Elevation	595 m AMSL (highest) & 529 m AMSL (lowest)
Seismic Zone	Zone-IV (As per 1893:2002)
Method of Mining	Open-cast Manual
Minerals to be Mined	Sand, Bajri, Boulder
Life of Mine	Continuous, being replenished yearly
Water Demand	15 KLD
Sources of Water	Tanker supply
Man Power	600
No of Working Days In A Year	270

10.3 RESERVE ESTIMATION & YEARWISE PRODUCTION

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90 % of total excavation. The net saleable production of RBM will be 360,000 Tons. The Year wise proposed quantity, production and closing recoverable reserves are given below:

Table 10-2: The Year wise proposed quantity, production and closing recoverable reserves

Years	Bench Level(m)	Quantity of the mineral(Tonnes)	Production (Tonnes)	Balance (Tonnes)
I Year	529-593.5	365400.83	360,000	5400.83
II Year	529-593.5	365400.83	360,000	5400.83
III Year	529-593.5	365400.83	360,000	5400.83
IV Year	529-593.5	365400.83	360,000	5400.83
V Year	529-593.5	365400.83	360,000	5400.83

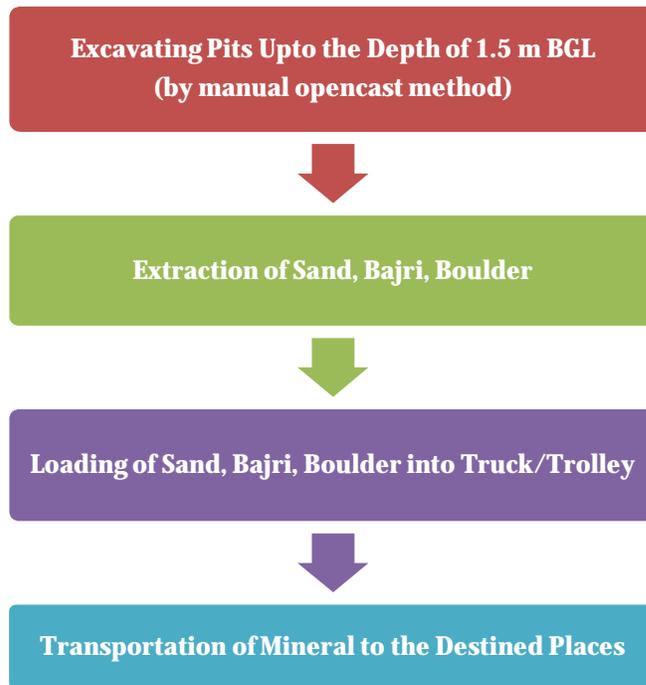
10.4 METHOD OF MINING

The project does not involve any processes such as drilling, blasting and beneficiation. The mining process involves collection of material by simple hand tool such as shovel, pans and

sieves. This is followed by sorting and manual picking, stacking and loading into trucks/tractor-trolley for transporting.

The pits from where the material is picked are not deeper than 1.5m as allowed in mining area and shall follow the normal channel direction of the river. These get replenished during monsoon. The only waste is silt/clay which is recycled back to the pits. Mining will be carried out only during the day time. The mineral extraction will be done for a period of 270 days in a year.

Figure 10-1: Schematic Flowchart of Mining Process



10.5 PROJECT REQUIREMENT

10.5.1 EMPLOYMENT POTENTIAL

About 600 workers including skilled, semi-skilled & unskilled labors shall be engaged through project proponent for extraction of sand, bajri, boulder (minor mineral) and loading & handling of mineral in mining area.

Table 10-3: Manpower Requirement

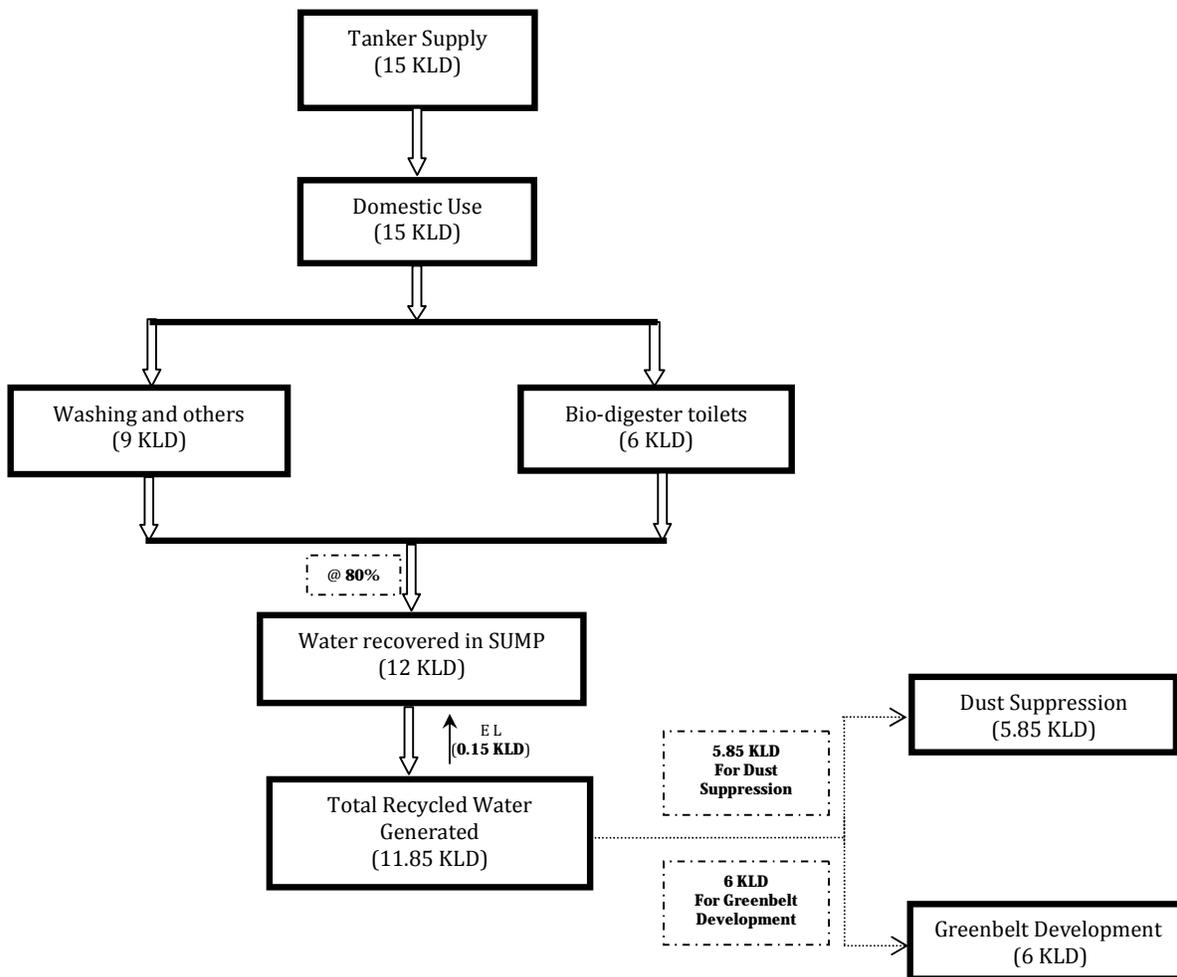
S. No.	Type of Manpower	Number
1	Manager/Foreman	11
2	Skilled	59
3	Unskilled Labours	530
	Total	600

10.5.2 WATER REQUIREMENT

Water requirement for the proposed project for domestic use, dust suppression and plantation, Total water requirement shall be 15 KLD.

Table10-4: Total Water Requirement

S. No.	Activity	Water Required (KLD)	Source
1.	Domestic	15	Tanker Supply
2.	Dust Suppression	5.85	Recycled water obtained by bio-digester toilets.
3.	Green Belt	6.0	



10.6 DESCRIPTION OF THE ENVIRONMENT

Study area of proposed mine for baseline study covers the total area covering a 10 Km radius from the mine lease periphery. Further the study area has been divided into two zones namely

“Core Zone” and “Buffer Zone”. Core zone comprises of the mine lease area within the mine lease boundary while the area around the mine lease periphery covering 10 Km radius area constitutes the Buffer Zone.

10.6.1 LAND USE/ LAND COVER PATTERN OF THE STUDY AREA

The existing land use pattern of the study area based on the latest satellite imagery is given in **Table 10.6**

Table 10-5: Land Use Pattern of the Study Area

S.No	Classes	Area (sq.km)	Area in %
1	Agriculture	390.87	63.29
2	Settlement	21.79	3.53
3	Forest Land	175.45	28.41
4	Waste Land	1.51	0.25
6	Water Bodies	27.95	4.53
Total		617.58	100

10.6.2 SOIL ENVIRONMENT

Monitoring data shows that the texture of soil at all locations is Sandy Loam. The monitoring sites have sand ranging from 76% to 80% in soil samples. Silt content varies from 10% to 12%, while Clay content varies from 10% to 13% in the soil samples.

- The data shows that value of pH ranges from 7.45 at Mine site and Khusalpur to 7.65 at Rampur indicating that all soil samples are Slightly Alkaline.
- Khusalpur location shows maximum conductivity of 512 $\mu\text{mhos/cm}$, while Rampur shows minimum conductivity of 381 $\mu\text{mhos/cm}$.
- Values of CEC ranges from 2.2 meq/100g as lowest at Mine Site U/S and 2.8 meq/100g maximum at Khusalpur and Vikasnagar.

10.6.3 WATER ENVIRONMENT

Ground water quality comprises the physical, chemical and biological qualities of ground water. Temperature, color, turbidity, odor and taste make up the list of physical water quality parameters.

The physico-chemical characteristics of groundwater were analyzed as per relevant parts of IS: 3025 and compared with the drinking water specifications, prescribed in IS: 10500. The groundwater analysis data for the monitoring period i.e. March-May 2015.

The value of Ground Water pH ranges from 7.42 to 7.56, indicating that water is neutral to slightly alkaline in the study area. Maximum Conductivity observed is 448 $\mu\text{mhos/cm}$ at Vikasnagar whereas minimum conductivity was observed at Rampur as 436 $\mu\text{mhos/cm}$. Total hardness of ground water ranges from 3.58 to 3.6 meq. The observed values of Chloride vary from 14 mg/l at Vikasnagar to 15 mg/l at Rampur. The ground water quality is in good conditions at mostly all locations.

The value of Surface Water pH ranges from 7.47-7.65, indicating that water is neutral to slightly alkaline in the study area. Conductivity of surface water ranges from 400-405 $\mu\text{mhos/cm}$. Total hardness of surface water ranges from 3.2 meq -3.14 meq. TDS ranges from 157-160 mg/l.

The physico-chemical characteristics of Surface water are found within the limits, prescribed by CPCB.

10.6.4 AIR ENVIRONMENT

PARTICULATE MATTER 10 (PM₁₀): The maximum value for PM₁₀ is observed, as 80.0 $\mu\text{g/m}^3$ at Vikasnagar and minimum value of 57 $\mu\text{g/m}^3$ at Herbertpur while 24 hours applicable limit is 100 $\mu\text{g/m}^3$ for industrial and mixed use areas. The average value ranges between 67.44 to 71.0 $\mu\text{g/m}^3$.

PARTICULATE MATTER 2.5 (PM_{2.5}): The maximum value for PM_{2.5} is observed, as 50.0 $\mu\text{g/m}^3$ at Mine Site Rudrapur and minimum value of 32 $\mu\text{g/m}^3$ at Herbertpur while 24 hours applicable limit is 100 $\mu\text{g/m}^3$ for industrial and mixed use areas. The average value ranges between 37.71 to 42.0 $\mu\text{g/m}^3$.

SO₂: The maximum value for SO₂ is observed, as 10.8 $\mu\text{g/m}^3$ at Vikasnagar and minimum value is 0 at all location. Average value of SO₂ is between 6.0 to 6.92 $\mu\text{g/m}^3$. The area observes SO₂ well below the prescribed range.

NO₂: The maximum value for NO₂ is observed, as 28.0 $\mu\text{g/m}^3$ at Vikasnagar & minimum values is 12 $\mu\text{g/m}^3$ at Herbertpur and Rampur, while 24 hours applicable limit is of 80 $\mu\text{g/m}^3$ for residential, industrial and other areas. Average value of NO₂ is from 18.25 to 20.83 $\mu\text{g/m}^3$. The area observes NO₂ well below the prescribed range.

10.6.5 NOISE ENVIRONMENT

In residential area, Leq (day) noise level are ranging between 49.7 dB recorded Herbertpur to 52.5 dB recorded at Vikas nagar during day time and Leq (night) of 40.6 dB recorded at Vikas nagar to 43.4 dB recorded at Sahaspur during night time. During daytime and night time noise level within the residential area are well within the prescribed limit.

10.6.6 BIOLOGICAL ENVIRONMENT

The core zone comprises of Kot Mot river bed, where mining operation is proposed. This area consists of riparian vegetation in which aquatic and marshland plants are the main component. Most among them are weeds. No ecologically sensitive plant species has been reported from this area. Riparian vegetation is found along the river side. In stagnant water growth of hydrophytes likes *Hydrolea zeylanica*, *Ipomoea carnea*, *Ludwigia adscendens*, *Sagittaria sagittifolia*, *Spilanthes paniculata*, *Typhalatifolia*, etc. can be commonly observed.

Buffer zone of the proposed project is Doon Valley. The tree observed in the area are Aam (Magifera Indica), Jamun (*Syzygium cumini*), Peepal (*Felis religiosa*), Neem (*Azadirachta Indica*), Bargad (*Ficus Bangalensis*) Popular (*Populus deltoids*) Sisham (*Dalbergia sissoo*) etc

Small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse (*Apodemus sylvaticus*) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (*Macaca mulatta*), Indian hare (*Lepus nigricollis*), fruit bat (*Pteropus conspicillatus*), Nilgai (*Boselaphus tragocamelus*), etc. are often seen in the area.

10.6.7 SOCIO-ECONOMIC ENVIRONMENT

The Proposed Sand, Bajri And Boulder (Minor Minerals) mining in Kot mot River bed (60.00 Ha.) project covers 80 major villages of Dehradun District in the state of Uttarakhand. A study was under taken with respect to demography, occupational pattern, literacy rate and other important socio-economic indicators of these districts to reveal the socio-economic structure of the entire project area. The total population of study area is **502658** the percentages of male & female population are **52.38%** & **47.61%** respectively. The total number of literate within the study area is **336349** which are **66.91%** of total population. Male literacy rate of the study area is **56.86%** and female literacy rate is **43.14%**. Peoples of that area are engaged with agriculture and other allied activities for their livelihood.

10.7 ANTICIPATED IMPACT & MITIGATION MEASURES

10.7.1 LAND ENVIRONMENT

Since mining is being carried out by opencast manual method, it is expected to affect the land environment essentially. Impact assessment study on land environment can be done by considering land use pattern/ land cover, topography, drainage pattern and geological features of the mine site as well as the study area.

Anticipated Impact

- Mining activity will impact river bed topography by formation of excavation voids.
- River bed mining may bring in some change in topography at the nearby area of the mine lease.

- Stacks of solid waste generated from mining activity may hinder the flow of water in monsoon season.

Mitigation Measures

- Excavated pits will get replenished annually in monsoon itself & will be restored to original.
- The mine working will remain confined to allotted river bed only, so it will not disturb any surface area outside the mine lease area which may affect topography or drainage.
- Solid waste will not be stacked on the bank side as it will hinder the flow of water in monsoon season.

10.7.2 WATER ENVIRONMENT

Anticipated Impact

- River recharges the groundwater; excessive mining will reduce the thickness of the natural filter materials (sediments), through which the ground water is recharged.
- Mining activity may intersect groundwater level.
- Waste water generated from the mining activity will cause water pollution.

Mitigation Measures

- Restriction in excavation depth will be made compulsory to avoid reduction in the thickness of the natural filter materials.
- Mining in the area will be done well above the water table as well as river bed water level therefore; much impact on water regime is not anticipated.
- No waste water will be generated from the mining activity of minor minerals as the project only involves extraction of Sand, Bajri & boulders from river bed.

10.7.3 AIR ENVIRONMENT

Anticipated Impact

- Mining Operation carried out by opencast manual method generate dust particles due to loading & unloading of sand/bajri/boulder and during transportation.
- The dust liberated in mining and other related operations is injurious to health if inhaled in sufficient quantity.
- Gases, such as, Sulfur Dioxide, Oxides of Nitrogen etc. from vehicular exhaust.

Mitigation Measures

- Proper mitigation measures like water sprinkling will be adopted to control dust emissions.

- Masks will be provided to workers.
- To control the emissions regular preventive maintenance of equipment will be carried out on contractual basis.

10.7.4 NOISE ENVIRONMENT

Anticipated Impact

- The source of Noise pollution will be the vehicular movements.
- Noise will be generated by the digging of mine area using shovels, crowbars etc.

Mitigation Measures

- Proper maintenance of all transportation vehicles will be carried out which help in reducing noise during operations. No other equipments except the transportation vehicles will be allowed.
- Noise generated by hand equipments shall be intermittent and does not cause much adverse impact.

10.7.5 BIOLOGICAL ENVIRONMENT

Anticipated Impact

Flora

The proposed project of river bed sand, bajri, boulder mining shall be carried out on the riverbed of Kot Mot. There are no trees in the project area. The project shall also not lead to any change in land-use and will be replenished every year after successive rains. The proposed mining activity, which although is an economically gainful activity, also constitutes river training work. It allows for necessary dredging activity which may otherwise lead to flooding of the valley.

There shall be negligible air emissions or effluents from the project site during loading of the truck. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

Fauna

Animals are sensitive to noise and avoid human territory. The project stretch of the river is not an identified drinking water point for the animals. However, any animal desirous of accessing the river can continue to do so upstream or downstream of the stretch during the mining activities, as there will not be any damming or diverting of water.

Hence, no significant impact is anticipated from the proposed project.

Mitigation Measures

Flora

Although, the project will not lead to any tree cutting, plantation activities shall be undertaken to improve the vegetation cover of the area. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

Fauna

The workers shall be directed to not venture out of the leased area for collecting fuel wood, or hunting. They shall also be trained not to harm any wildlife. No work shall be carried out after sunset.

10.7.6 SOCIO-ECONOMIC ENVIRONMENT

The Socio-Economic Impact Assessment is the systematic analysis used during EIA to identify and evaluate the potential socio-economic and cultural impacts of a proposed development on the lives and circumstances of people, their families and their communities. It can identify and distinguish numerous measurable impacts of a proposed development but not every impact may be significant. The populations who are impacted either directly or indirectly have a say whether the impacts are significant or not.

Anticipated Impact

- From the primary Socio-economic survey & through secondary data available from established literature and census data 2001 & 2011, it is found that there would be positive impact on Socio-economic condition of the nearby area.
- As the project is proposed Government forest land, no Resettlement & Rehabilitation is required.
- Increased funding to improve social infrastructure and cultural maintenance programs. Since the surrounding study area is an undeveloped area, the overall Socio-economic status of the local population is below average. People are mostly engaged in farming activities and primarily involve in various social activities.
- There are some people who are engaged in trading of sand, stone and bajri, therefore due to mining of sand, stone and bajri the per capita income of local people have been improved.
- The area is poor in the health care facilities. The project authorities would provide mobile vans for emergency services in the area.
- Various direct and indirect employment opportunities will be generated.

Mitigation Measures

- Increased funding to improve social infrastructure and cultural maintenance programs.
- It is suggested that during mining all safety provision has to be ensured to negate any likely impact on social environment due to associated hazards.
- A better standard of living due to increased access to employment, business opportunities training and education.

10.7.7 SOLID WASTE

Anticipated Impact

- This RBM project does involve negligible quantity of waste generation in form of slit/silty clay which gets deposited as crust material on the bed profile and is extracted during mining process.
- No municipal waste other than domestic sewage shall be generated,
- However, there will be about 600 workers on site. While cooking at site will not be allowed, some food wastes can be expected to be generated which if not disposed properly will render the site dirty.

Mitigation Measures

- Silt/Silt clay generated during mining process will be either back-filled into mine pits/in the upper terraces or can be used for plantation purpose.
- Only domestic sewage shall be generated, which shall be treated with the help of Bio-Digester Toilets and the recycled water shall be used for horticulture and dust suppression.
- However, solid wastes generated from the personal habits of people such as used bidis, waste paper, food remains etc. cannot be ruled out. Dustbins shall be provided at the rest places.

10.7.8 TRAFFIC ENVIRONMENT

Anticipated Impact

- Increase in traffic density will lead to air pollution.
- Movement of vehicles will cause noise pollution.
- Increased traffic may cause accidental incidences.

Mitigation Measures

- Vehicles with PUC Certificate will be hired. Regular maintenance of vehicles will be done to ensure smooth running of vehicle.
- Un- necessary blowing of horn will be avoided.

- To avoid accidents the speed of vehicles will be low near habitation areas.

10.8 ENVIRONMENTAL MONITORING

Details of the proposed environmental monitoring schedule, which will be undertaken for various environmental components, are detailed below in **Table 10.6**

Table 10-6: Proposed Environmental Monitoring Programme

S. N.	Activity	Schedule
Air Pollution Monitoring		
8.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time within the mining lease	Once in every season except monsoon
9.	Ambient air monitoring of parameters specified by CPCB in their air consents from time to time at stations outside the mining lease	Once in every season except monsoon
Water Quality Monitoring		
10.	Monitoring of Ground Water sample as per IS: 10500	Once in every season
11.	Monitoring of Surface Water sample as per IS: 2296	Once in every season
Noise Quality Monitoring		
12.	Noise in the ambient atmosphere near the mine lease area	Once in every season
Greenbelt Maintenance		
13.	Monitor schedule for Greenbelt development as per approved mining plan	Once in a year
Soil Quality Monitoring		
14.	Soil quality analysis from the samples collected from the mine site and nearby areas	Twice in a year on the basis of 6 months interval

10.9 ENVIRONMENTAL MANAGEMENT

The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. The Environmental Management Plan (EMP) consists of a set of monitoring programme, mitigation measures, and management control strategies to minimize adverse environmental impacts.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, an EMP has been prepared which is to be implemented in the project and covers the following phases of the project:

- Air Pollution
- Water Pollution
- Noise Pollution
- Biological reclamation measures
- Land use planning and mine closure
- Occupational Safety and Health
- Socio-economic and cultural environment
- EMP Budget

10.10 CONCLUSION

The project has positive impact to the local people as direct and indirect employment opportunity have been generated. There will be no significant pollution of air, water, soil and noise. Regular monitoring of all the components of environment will be done. Increased social welfare measures taken by the company. All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirement.

CHAPTER 11

DISCLOSURE OF CONSULTANTS ENGAGED

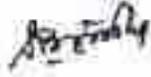
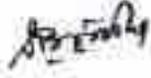
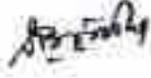
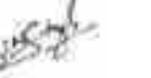
M/s Mantec consultants Pvt. Ltd, New Delhi was engaged as consultant for carrying out Environmental Impact Assessment Study. Brief Description of the organization is given below:

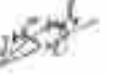
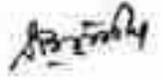
Name of the Firm	M/s Mantec Consultants Pvt. Ltd, New Delhi
Registered Address	805, Vishal Bhavan 95, Nehru Place, New Delhi-110019
Services Rendered	Environmental Monitoring, Secondary Data Collection, Impact Assessment and Preparation of EIA/EMP reports
QCI Accreditation status	Accredited from NABET; S.No. 105 (as per List of Accredited Consultant Organizations/Rev. 39/ March. 08, 2016)
EIA Coordinator	MR. A.S. Brara

Names of the Functional Area Experts engaged with their brief resume and nature of consultancy rendered is provided below.

Functional Area Experts engaged in the project

Functional Area Experts

S.No.	Functional Areas	Name of the Experts	Involvement (task & period)	Signature & Date
1.	AP*	Mr. S.B. Sinha	Consultancy provided in functional area of Air Pollution Prevention, Monitoring & Control.	
2.	WP*	Mr. S.B. Sinha	Consultancy provided in functional area of Water Pollution Prevention, Control & Prediction of impacts.	
3.	SHW*	Mr. S.B. Sinha	Consultancy provided in functional area of Solid Waste & Hazardous Waste Management.	
4.	SE*	Mr. Anil Kumar	Consultancy provided in functional area of Socio Economics	
5.	EB*	Dr. Vivek N. Singh	Consultancy provided in functional area of Ecology & Biodiversity.	
6.	HG*	Mr. R. K. Khanna	Consultancy provided in functional areas of	

			Hydrology, Ground Water & Water Conservation.	
7.	GEO*	Mr. B.M. Sinha	Consultancy provided in functional area of Geology.	
8.	SC*	Dr. Vivek N. Singh	Consultancy provided in functional area of Soil Conservation.	
9.	AQ*	Mr. S.B. Sinha	Consultancy provided in functional area of Meteorology, Air Quality Modeling & Prediction.	
10.	N*	Mr. A.S. Brara	Consultancy provided in functional area of Noise study.	
11.	LU*	Mr. Deepak Srivastav	Consultancy provided in functional area of Land Use.	

I, hereby, certify that I was a part of the EIA team in the above capacity that developed the EIA Report of Kot Mot River Bed Mining- 60 ha.

EIA Coordinator

Name : Mr. A.S. Brara

Signature : 

*List of Functional Areas

- | | | |
|-----|-----|--|
| 1. | LU | : Land Use |
| 2. | AP | : Air Pollution Monitoring, Prevention & Control |
| 3. | AQ | : Meteorology, Air Quality Modeling & Prediction |
| 4. | WP | : Water Pollution Monitoring, Prevention & Control |
| 5. | EB | : Ecology & Biodiversity |
| 6. | NV | : Noise |
| 7. | SE | : Socio-Economics |
| 8. | HG | : Hydrology, Ground Water & Water Conservation |
| 9. | GE | : Geology |
| 10. | SC | : Soil Conservation |
| 11. | RH | : Risk Assessment & Hazard Management |
| 12. | SHW | : Solid & Hazardous Waste Management |

By Speed Post

No. J-11015/239/2014-IA.II (M)
Government of India
Ministry of Environment, Forests & Climate Change
Impact Assessment Division

Indira Paryavaran Bhavan,
Aliganj, Jor Bagh Road,
New Delhi-110 003

Dated: 27th October, 2014

To

M/s Uttarakhand Forest Development Corporation,
Aranya Vikas Bhawan, 73-Nehru Road,
Dehradun, Uttarakhand – 248001

Ph.: 0135-2657610; Fax: 0135-2655488;
Email: uafdcmd@yahoo.com

Sub.: Sand, Bajri, Boulder mining from River Bed of Kot Mot Mine lease with production capacity of 3,60,000 TPA by M/s Uttarakhand Forest Development Corporation, located at Choharpur forest range, Village- Rudarpur, Tehsil - Vikasnagar, District - Dehradun, Uttarakhand (60 ha)- TORs regarding

This has reference to your letter No. U-2485/EIA 38 Rivers, dated 21.08.2014 received in the Ministry on 29.08.2014. The Proposal is to determine the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining environmental clearance in accordance with the provisions of the EIA Notification, 2006. The proposal was appraised in the Reconstituted Expert Appraisal Committee in its 23rd meeting held during September, 25-26, 2014.

2. The proposal of M/S Uttarakhand Forest Development Corporation (UKFDC) is for mining of sand, boulder and bajri in the River bed Kot Mot with production capacity of 3.60 Lakhs TPA in mine lease area of 60ha. The mine lease area is located in Choharpur forest Range near village- Rudrapur, Tehsil- Vikasnagar, District-Dehradun, Uttarakhand. The Latitudes and Longitudes of mine lease are 30°26'34.69"N to 30°25'40.72"N, 77°52'47.00"E to 77°49'39.22"E respectively on toposheet no 53F/4. The project is located in seismic zone-IV. Proponent reported that the Rajaji National Park is located 9.53 Km South and interstate boundary of Himachal Pradesh is located at 9.5 Km.

3. The proposed project is an open-cast mining project, confined to extraction of sand bajri and boulder from the proposed site. The operation will be manual with use of hand tools like shovel, pan, sieves, etc. Sand will be separated from bajri and boulders by sieving process. Excavation will be carried out up to a maximum depth of 1 meter. Extraction of sand, bajri and boulder will be done only during the day time

and during the non-monsoon season only. The lease area has been decided as per the letter of intent (letter no. 584/BHU. KHANI.I./2012-13 dated 23th January, 2013). Life of mine is 10 years. Ten Reserved Forests exist within the study area. The total water requirement is 30 KLD including water demand for domestic purpose, dust suppression & green belt development which shall be met by tanker supply. The total cost of project would be around Rs. 2 Lakhs.

4. Based on the information content in the documents submitted and the presentation made before the Committee for mining projects, the following TORs are prescribed for undertaking detailed EIA study: -

1. Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification, 1994 came into force w.r.t. the highest production achieved prior to 1994.
2. A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
3. All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.
4. All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
5. Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large may also be detailed in the EIA report.
6. Issues relating to Mine Safety and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
7. The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
8. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
9. Details of the land for any Over Burden Dumps outside the mine lease, such

- as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
10. A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
 11. Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
 12. Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
 13. The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
 14. A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly detailed mitigative measures required, should be worked out with cost implications and submitted.
 15. Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Tiger/Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the State Wildlife Department/Chief Wildlife Warden under the Wildlife (Protection) Act, 1972 and copy furnished.
 16. A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any schedule-I fauna found in the study area, the necessary plan for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost. The Conservation Plan for Schedule-I species shall be approved by the Chief Wildlife Warden of the State Government.
 17. PROXIMITY TO AREAS DECLARED AS 'CRITICALLY POLLUTED' OR THE PROJECT AREA IS KEELY attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
 18. R&R Plan/compensation details for the Project Affected People (PAP) should

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

19. One season (non-monsoon) primary baseline data on ambient air quality (PM₁₀, SO₂ and NO_x), water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM₁₀, particularly for free silica, should be given.
20. Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
21. Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.
22. The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
23. Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
24. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
25. Impact of the project on the water quality, both surface and groundwater should be assessed and necessary safeguard measures, if any required, should be provided.
26. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
27. Details of any stream, seasonal or otherwise, passing through the lease area

- and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
28. Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
 29. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project.
 30. Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered.
 31. Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.
 32. Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
 33. A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given.
 34. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP.
 35. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
 36. Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
 37. Detailed environmental management plan to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
 38. Public hearing points raised and commitment of the project proponent on the same along with time bound action plan to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
 39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the project should be given.

40. The cost of the project (capital cost and recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.
 41. Provide a brief background of the project, financial position, group companies and legal issues etc.; past and current important litigations.
 42. Details of replenishment studies.
 43. Details of Transportation of mined out materials as per the Indian Road Congress for both the ways (loaded as well as unloaded trucks) load and its impact on Environment.
 44. Proper species specific Conservation plan for Schedule-I and II species.
 45. Impact of mining on plankton.
 46. Details of excavation schedule & sequential mining plan.
 47. Appropriate Disaster Management safeguards in view of the high seismicity of the area.
 48. Authenticated map with regard to distance of Sanctuary/National Park from the mine lease area.
5. Besides the above, the below mentioned general points are also to be followed:-
- a) All documents to be properly referenced with index and continuous page numbering.
 - b) Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
 - c) Where the documents provided are in a language other than English, an English translation should be provided.
 - d) The Questionnaire for environmental appraisal of industrial projects as devised earlier by the Ministry shall also be filled and submitted.
 - e) While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should also be followed.
 - f) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the F.R for securing the TOR) should be brought to the attention of MoEF with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
 - g) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, you are requested to submit certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project by the Regional Office of Ministry of Environment & Forests, if applicable.
6. The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.
7. The prescribed TORs would be valid for a period of two years for submission of the EIA/EMP reports, as per the O.M. No. J-11013/41/2006-IA.II(I) dated 22.3.2010.

8. After preparing the draft EIA (as per the generic structure prescribed in Appendix- III of the EIA Notification, 2006) covering the above mentioned issues, the proponent will get the public hearing conducted and take further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.

(Dr. V.P. Upadhyay)
Director

Copy to:

1. **The Secretary**, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. **The Secretary**, Department of Mines & Geology, Government of Uttarakhand, Secretariat, Dehradun.
3. **The Secretary**, Department of Environment, Government of Uttarakhand, Secretariat, Dehradun.
4. **The Secretary**, Department of Forest, Government of Uttarakhand, Dehradun, Uttarakhand.
5. **The Chief Wildlife Warden**, Government of Uttarakhand, Secretariat, Dehradun.
6. **The Additional Principal Chief Conservator of Forests**, Ministry of Environment, Forests & Climate Change Regional Office, B-1/72, Sector-A, Aliganj, Lucknow- 226020.
7. **The Member Secretary**, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
8. **The Chairman**, Uttarakhand Environment Protection & Pollution Control Board, E-115, Nehru Colony, Hardwar Road, Dehradun, Uttarakhand.
9. **The Controller General**, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
10. **The District Collector, Dehradun District**, State of Uttarakhand.
11. **Guard File.**
12. **MoEF&CC website.**

(Dr. V.P. Upadhyay)
Director

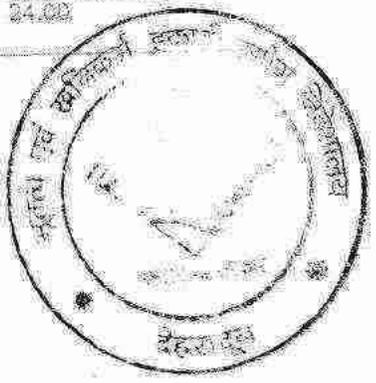
मृदात्म एवं खनिकर्म इकाई
उद्योग निदेशालय उत्तराखण्ड भोपालबानी, देहरादून
 संख्या: 60/खनि01/2012-13, दिनांक: 23 जनवरी, 2013
कार्यालय भाषा
आशय पत्र (Letter of Intent)

उत्तराखण्ड खनिज नीति, 2011 के बिन्दु-2 के प्रसार-1 के अनुसार राज्य के वन नदी सम्बन्धित क्षेत्रों में उपखनिज को सुगम को खनन परटे वन क्षेत्र में उत्तराखण्ड वन विभाग निगत को उत्तराखण्ड बायोमिनिज पब्लिक निगमवली 2001 के नियमानुसार निर्धारित प्रपत्र एण0एम-1 में आवेदन करने को उपखनन क्षेत्र बंध हेतु प्रीकृत निधि के आवेदन को प्राधिकार के युक्तिगत वन क्षेत्र के वन नदी सम्बन्धित क्षेत्रों में उपखनिजों को सुगम को खनन परटे वन क्षेत्र हेतु आवेदनक प्रपत्र निदेशक, उत्तराखण्ड वन विभाग विकास निगत, देहरादून द्वारा प्रस्तुत आवेदन पत्रों को उत्तराखण्ड व इस आशय पत्र (Letter of Intent) के माध्यम को राज्य सरकार आवेदनक प्रपत्र निदेशक, उत्तराखण्ड वन विकास निगत को पत्र में उत्तराखण्ड द्वारा आवेदित क्षेत्रों यथा जनपद देहरादून के 18 उपखनिज ब्लॉकों तथा उत्तराखण्ड जिला गढ़वाल के 02 उपखनिज ब्लॉकों में उत्तराखण्ड पीडी गढ़वाल के 01 जनपद नैनीताल के 02 उपखनन उपखनिज नगर के 02 जनपद प्रतापगढ़ के 01 तथा जनपद रामपुर के 02 उपखनन ब्लॉकों जिनका विवरण तालिका-1 में प्रिलिखित है, को 05 (पांच) वर्ष की अवधि हेतु उपखनिज सुगम हेतु खनन परटे प्रीकृत करने को मंजूर किया है-

तालिका-1

क्र०सं०	नदी का नाम	जनपद का नाम	क्षेत्रफल (है०)
1.	गढ़वाल		42.00
2.			
3.	रामपुर बायाँ किनारा लावा		70.00
4.	रामपुर बायाँ किनारा कुरुवाल		32.00
5.	आमलावा		30.00
6.	रामपुर रामपुर नदी		20.11
7.	दोष हरिपुर		51.73
8.	सौरना नदी		23.75
9.	बागना री		20.00
10.	आरी री		30.00
11.	खजनावर री		30.00
12.	हामाड री		8.00
13.	कालुधाला री		18.00
14.	बाली जी + मुरली री		8.00
15.	बडासरा		30.00
16.	भोली री		30.00
17.	सुखरी री		16.00
18.	कुसुमधरा री		24.00

JPBWA (12)
61A to 60/13/13
23-01-2013



19	बालगंगा नदी	दिहरी गढ़वाल	7.908
20	पुष्पागाढ़		10.00
21	खी नदी		7.98
22	मालन नदी		45.00
23	सुखरी नदी	पीड़ी गढ़वाल	73.00
24	कोल्हू नदी / कोल्हू		24.50
25	लौंगर झरना		570.00
26	राधिका नदी-2		245.55
27	घोसला नदी	नैनीताल	88.00
28	जाखन नदी		15.88
29	खेर नदी		235.00
30	भाकड़ा		170.00
31	दाबका नदी-3	उधमसिंह नगर	65.00
32	शारदा नदी-2		186.00
33	भगार-सखी नदी	अल्मोड़ा	8.7
34	लक्ष्मिया नाला	चम्पावत	10.00
35	लक्ष्मिया नाला किता साहब		15.48
	योग		2313.37

2. आवेदन प्रकाश निदेशक, उत्तराखण्ड वन विकास निगम यदि उक्त तालिकाओं में उल्लिखित सभी उपखनिज सुतान का खनन पट्टा लेने हेतु सहमत हो तो शम्भुनादेश संख्या 922/VII-1/11-सि/2012 दिनांक 26 फरवरी, 2012 में दिये गये निर्देशानुसार EIA Notification, 2006 के अन्तर्गत पर्यावरणीय स्वीकृति प्राप्त कर पर्यावरणीय स्वीकृति की प्रति इस कार्यालय को प्रस्तुत करना सुनिश्चित करें, ताकि नियमानुसार खनन पट्टा स्वीकृति हेतु उपरोक्त कार्यवाही की जा सके।

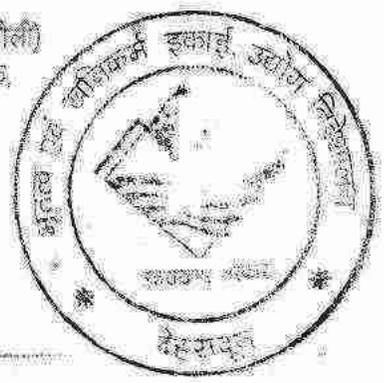
भवदीय
(सैलेश बंगोली)
निदेशक

प्रकाशन संख्या (1)/सूचिनांकित।

प्रतिलिपि: निम्नलिखित को सूचनाएं एवं आवश्यक कार्यवाही हेतु प्रेषित।

1. प्रमुख सचिव, औद्योगिक विकास विभाग, उत्तराखण्ड शासन।
2. सिलाधिकारी, देहरादून/दिहरी गढ़वाल/पीड़ी गढ़वाल/चम्पावत/नैनीताल/उधमसिंह नगर।
3. प्रमुख निदेशक, उत्तराखण्ड वन विकास निगम देहरादून को इस आशय से प्रेषित कि EIA Notification, 2006 के अन्तर्गत पर्यावरणीय स्वीकृति प्राप्त कर इस कार्यालय को उक्तवचन ज्ञात सुनिश्चित करें।
4. गार्ड फाईल।

(सैलेश बंगोली)
निदेशक



405

संयुक्त निरीक्षण आख्या

भारत सरकार से अनुमति प्राप्त करने के लिये भूमी संरक्षण वन प्रभाग कोटमोट नदी, (आरक्षित वन क्षेत्र) से उपखनिज चुगान हेतु संयुक्त निरीक्षण आख्या।

प्रभागीय वनाधिकारी, भूमी संरक्षण वन प्रभाग की पत्र संख्या 111/2018/वन/प्रभागीय के क्रम में निर्धारित तिथि दिनांक 12/08/2018 से 15/08/2018 तक भूमी संरक्षण प्रभाग की चौहडपुर रेंज की कोटमोट नदी, चौहडपुर का संयुक्त निरीक्षण वन प्रभाग वनाधिकारी, कालसी, प्रभागीय वन विकास प्रबन्धक, खनन देहरादून, उत्तराखण्ड विकासनगर व उप जिलाधिकारी, विकासनगर द्वारा किया गया।

निरीक्षण के दौरान उक्त क्षेत्र में उपखनिज (रत्ता, बजरी, पत्थर) मिलीजुली अवस्था में विद्यमान है। जिसका वर्तमान में चुगान/खनन कार्य कायदा के द्वारा किये गये निर्देशों के अनुसार किया जाना है। वर्षाकाल में कोटमोट नदी जल में उपखनिज (रत्ता, बजरी, पत्थर) एकत्र होने से पानी का बहाव मुख्य धारा में नदी के दोनों तटों पर कटाव कर रहा है। जिससे कोटमोट नदी, चौहडपुर के आसपास आबादी प्रभावित हो रही है व कोटमोट नदी, चौहडपुर का क्षरण हो रहा है, जो चौहडपुर नदी से उपखनिज चुगान कार्य में बड़ी संख्या में अर्निंक कार्य करके रोजगार का सृजन होगा, यदि खनन चुगान नहीं किया जाता है तो इन क्षेत्रों का स्रोत कम हो जायेगा। साथ ही स्थानीय आपूर्ति सहज/नियन्त्रण कार इससे नदियों में आये नलबे को चुगान से नदियों की अविरलता प्रभावित नहीं होगी।

उपरोक्त नदी से उपखनिज चुगान कार्य उत्तराखण्ड राज्य के क्षेत्र में राज्य को भारी राजस्व की प्राप्ति होगी।

अतः संयुक्त निरीक्षण के दौरान संयुक्त रूप से यह निर्णय लिया कि कोटमोट नदी, चौहडपुर क्षेत्र से 60 हे० क्षेत्र में उपखनिज चुगान कार्य भारत सरकार को प्रस्ताव प्रस्तुत किया जा सकता है।

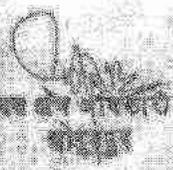
उपरोक्त 60 हे० में उपखनिज चुगान की अनुमति भारत सरकार द्वारा दशा में नियमानुसार चुगान कार्य किये जाने पर पर्यावरण की दृष्टिकोण से प्रभाव पड़ने की सम्भावना प्रतीत नहीं होती है।

चुगान कार्य हेतु वन संरक्षण अधिनियम 1980 की धारा-2 एवं EIA के प्राविधानों के अनुरूप भारत सरकार से अनुमति प्राप्त किये जाने की संज्ञित है।


प्रभागीय वन विकास प्रबन्धक, उत्तराखण्ड का विकास विभाग, कालसी वन प्रभाग, देहरादून


तहसीलदार, विकासनगर





उत्तराखण्ड वन विभाग, कालसी



जनपद देहरादून कोटमोट नदी, चौहड़पुर में उपलब्ध उपखनिज के चुगान के सम्बन्ध में
भूगर्भीय/तकनीकी आख्या

कार्यालय प्रभागीय वन विकास प्रबन्धक (खनन), देहरादून के पत्रांक 375/दि० 10.07.2013 के क्रम में जनपद देहरादून के कोटमोट नदी, चौहड़पुर उपखनिज युक्त क्षेत्र का निरीक्षण दि० 09-08-13 को श्री आर०एस०कहेड़ा, प्रभागीय वन विकास प्रबन्धक एवं श्री आई०पी० सिंह, उप लौगिंग अधिकारी, खनन प्रभाग, देहरादून की उपस्थिति में उपलब्ध कराये गये मानचित्रानुसार विभागीय सर्वेक्षण के सहयोग से किया गया। क्षेत्र की भूगर्भीय/तकनीकी आख्या निम्नवत् है:-

उक्त प्रस्तावित क्षेत्र, देहरादून से 28 कि०मी० दूरी पर सहसपुर लाघाँ रोड के उत्तर दिशा में 2 कि०मी० दूरी पर है, प्रस्तावित क्षेत्र कोटमोट नदी, चौहड़पुर के पूर्व दिशा एवं पश्चिम दिशा में आरक्षित वन क्षेत्र है, इस क्षेत्र में उपखनिज रेत, बजरी, पत्थर, मिला-जुली अवस्था में है जिसका चुगान किया जा सकता है। इस क्षेत्र में उपखनिज का अनुमानित अनुपात लगभग 20:40:40 है। यह उपखनिज विभिन्न निर्माण कार्यों में प्रयोग किया जा सकता है। इस क्षेत्र के मध्य भाग से चुगान करते हुए प्रतिवर्ष लगभग 2:00 लाख 0मी० उपखनिज निकाला जा सकता है। उपखनिज निकाले जाने से नरौखाला नदी द्वारा किनारों पर किये जा रहे कटाव को कम किया जा सकता है।

सुव्यवस्थित चुगान कार्य किये जाने से भूगर्भीय/तकनीकी दृष्टिकोण के प्रभाव पड़ने की सम्भावना प्रतीत नहीं होती है। विगत वर्षों में इस क्षेत्र में खनन अनुमति प्राप्त नहीं हुई है। खनन अनुमति प्राप्त होने पर राजस्व प्राप्ति की जा सकती है। क्षेत्र में उपखनिज की उपलब्धता को दृष्टि गोचर रखते हुए नियमानुसार प्रस्ताव तैयार किये जाने से सम्बन्धी आवश्यक कार्यवाही करना चाहें।



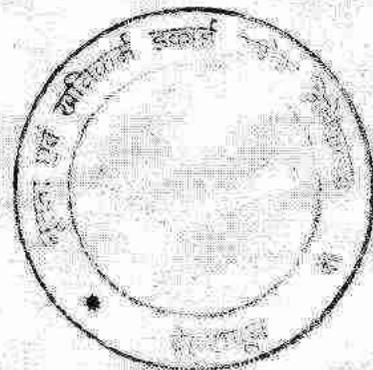
(आई०पी० सिंह)
उप लौगिंग अधिकारी
उ०वनविकासनिगम, देहरादून



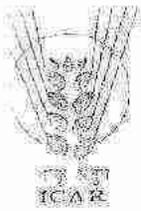
(आर०एस०कहेड़ा)
प्रभागीय वन विकास प्रबन्धक (खनन)
उ०वन विकास निगम, देहरादून



(राजेन्द्र प्रसाद शुक्ला)
मू वैज्ञानिक
भूतत्व एवं खनिकर्म इकाई,
जिला टास्क फोर्स, देहरादून



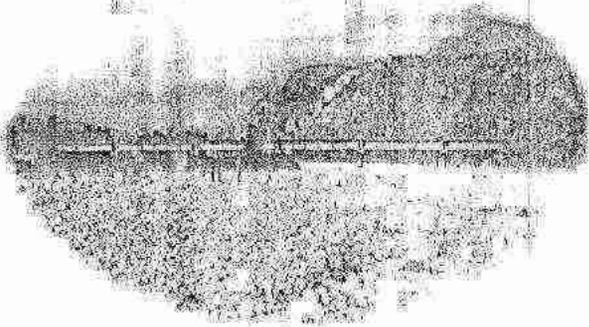
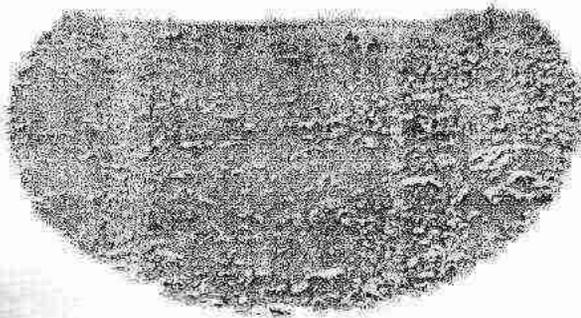
REPORT



EXTRACTION OF RBM IN DIFFERENT RIVERS OF DEHRADUN DISTT. (UTTARAKHAND) UNDER THE JURISDICTION OF VAN VIKAS NIGAM, DEHRADUN (UTTARAKHAND)

FOR

VAN VIKAS NIGAM, DEHRADUN (UTTARAKHAND)



C. B. NIGAM

R. K. ARYA

C. B. NIGAM

R. K. ARYA

EXECUTIVE SUMMARY

Vide Letter No.1193/Khanan dated 11th July 2013, Van Vikas Nigam, Dehradun had requested the Director, Central Soil and Water Conservation Research and Training Institute, 218, Kaulagarh Road, Dehradun, to take up the work for estimation of annual rate of sedimentation and permissible limits for extraction of minor minerals in some rivers/torrents in Doon valley viz., Kot, Mot, Narokhala, Yamuna Dhola, Song, Ramgarh Rao and Swarna. In response to it, a MoU was signed between Director, CSWCRTI, Dehradun and Regional Manager Van Vikas Nigam (Tehri region), Dehradun for undertaking the above study on consultancy basis as per the norms of the ICAR Institute.

Survey of the area was conducted by CSWCRTI consultants alongwith concerned UFDC/forest officials during post-monsoon period 2013 and based on the survey, assessment of the fresh sediment deposits and the safe limit for extraction/removal of deposited river bed material (RBM) available in the various rivers under the study has been recommended (Table 1.2 to Table 7.2). This quantity has been arrived upon considering that hydrological profile of the river flow is guided to the centre of the river so as to minimize risk of stream bank erosion. The quantity of RBM extraction varies from 178934 cum at Narokhala to 594614 cum at Swarna Rao.

The following recommendations for future are also made for the assessment of permissible quantity of RBM to be extracted from the rivers and the methodology of extraction to be followed so as to maintain the hydrological profile of the river along with the safe extraction of the RBM.

1. As the method and depth of extraction of RBM to be made will depend upon the pattern and quantity of RBM deposited during the monsoon period, hence the quantity of RBM for extraction is to be estimated by surveying the river before the monsoon (after previous extraction of RBM is over i.e. in the month of June) and after the monsoon is over (before the next extraction of RBM starts i.e. in the month of November/December).
2. The extraction duration of RBM in the seasonal rivers may be kept from January to May.
3. The very big boulders in the river should not be removed from the junction of the hill area and plain area as these big boulders serve for dissipating the energy of the flowing water.
4. The extraction may be carried out as per the methodology explained in the report and the concerned authorities responsible for extraction may be communicated accordingly.

5. As explained to the staff present during the survey, permanent R.C.C. pillars on both sides of the river at every one kilometer of length may be erected as permanent bench post. Further the pillars constructed to demarcate width of extraction leaving 25 % of river width from the banks may be erected with a depth of 1.5 m below the ground and 1.2 m above the ground. Probably this may not be carried over by river during monsoon and hence avoid the periodical construction of pillars every year. However, this year only 5-6 such pillars may be erected to observe its stability. While erecting the pillar, the corner of the pillar may face upstream.
6. The four pillars are to be constructed to help in confining the extraction of RBM may be marked from the right hand side of the river to the left hand side of the river as 1/1, 1/2, 1/3, and 1/4 starting from zero length of the river and then at the interval of about 1 Km distance in the river length till the last of the river reach up to which the extraction of RBM is made. These will serve as the permanent bench marks for the survey of the cross section.
7. In future, the report on possible extraction of quantity of RBM shall be based on the two surveys (1st survey during the month of April/May i.e. after the extraction of the RBM is completed followed by the 2nd survey during the month of October/November i.e. after the fresh deposition of the RBM in the river). The report on possible extraction of RBM will be made available to the forest department during the month of Nov./Dec. i.e. before the initiation of the extraction of RBM.

Report

on

Consultancy project on "Extraction of RBM in Different rivers of Dehradun Distt. (Uttarakhand) under the jurisdiction of Van Vikas Nigam, Dehradun (Uttarakhand)"

1. Introduction

In Doon valley, a number of seasonal streams descend hill slopes to relatively flat plains of the valley. Upon reaching a plain drainage course, these rivers/ streams usually transform to wide river width, and transport high sediment/bed load during high flow events in the monsoon season. The suspended sediment as well as bed load comprising of sand, gravels and boulders carried by the streams/rivers is deposited in certain topographic suitable reaches whereas finer suspended sediment is carried further downstream. Thus river bed in certain reaches (length) of such Himalayan streams contains good quality building material. Safe extraction of such material, however, must be commensurate with material transported by the river and in a non-damaging pattern so that the river morphology and other environmental conditions are not disturbed along the drainage course of the river.

Study Area

Under this study a total of seven rivers/torrents in Doon Valley (viz. Kot, Mot, Naini Khala, Yamuna Dhola, Song, Ramgarh Rao and Swarna) were taken up for survey to assess the sustainable extractable quantity of river bed material (RBM) while improving the river morphology. Description of the rivers taken for survey in the present study is given as under (Fig. 1).

River Kot

River Kot originates at an altitude of 2174 m from Bhadraj range. This is an ephemeral stream. It meets river Mot near village Rudrapur and further downstream from the confluence point, the river is known as Kotmot. Kotmot river drains to Asan river which is a tributary of Yamuna river. In the plain reaches of valley, Kot and Mot rivers are separated by about 1/2 km wide patch of forest land and agricultural fields.

Kot river brings down heavy amount of sediment from its catchment areas which is deposited in the downstream valley areas in the form of river bed material (RBM) consisting of sand, gravel and boulders. The upper catchment of river has very steep slopes. Though the catchment has good forest cover, it is fragile and vulnerable to problem of landslides and moderate to high erosion.

Team of CSWCRTI consultants surveyed the river reach from the bridge at upper reach to confluence point of Mot River as per the request of the client agency in which extraction of RBM is proposed. River reach studied is covered between 77° 52' 46.96"E to 77° 49' 42.33"E longitude and 30° 26' 28.75" N to 30° 25' 43.93" N latitude. Based on the ground observations, a total of 5.47 km length from the confluence point was found suitable with extractable RBM depositions. At places in the river course, stabilized islands with regenerating vegetation were found. These islands were excluded from the assessment as they should not be disturbed.

The RBM deposited in the middle river course should be removed in order to give a safe passage for river flow and prevent the bank erosion and associated flood hazards.

River Mot

River Mot is also an ephemeral stream that originates at an altitude of 2160 m from Bhadrak range. Mot river flows between Trauli and Misraspatti and while passing through Chandpur and lower Charba, it meets river Kot near village Rudrapur, further downstream from the confluence point the river is known as Kotmot. Kotmot river drains to Asan river which is a tributary of Yamuna river. In the plain reaches of valley Kot and Mot rivers are separated by about ½ km wide patch of forest land and agricultural fields in the village.

Mot river bring down heavy amount of sediment from their sloping catchment areas which are deposited in the downstream valley areas in the form of river bed material (RBM) consisting of sand, gravel and boulders. The upper catchment of river has very steep slopes. Though the catchment has good forest cover, it is fragile and vulnerable to problem of landslides and moderate to high erosion. Agricultural area is more in Mot river catchment as compared to Kot river.

River reach studied is covered between 77° 55' 04.03"E to 77° 49' 47.14"E longitude and 30° 25' 53.88" N to 30° 25' 40.19" N latitude. Based on the ground observations, a total of 4.36 km length was found suitable with extractable RBM depositions. At places in the river course stabilized islands with regenerating vegetation were found. These islands were excluded from the assessment as they must not be disturbed.

The RBM deposited in the middle river course should be removed in order to give a safe passage for river flow and prevent the bank erosion and associated flood hazards.

Swarna River

Swarna Rao originates from Shivalik hills between village Koti and village Sartalli. It joins Assan river at Rampur Kalan at $30^{\circ}21'18.55''$ N and $77^{\circ}50'00.05''$ E. It is a seasonal river (torrent). The total length of the torrent under excavation of RBM is approx. 4.1 km along with the tributary.

River reach studied is covered between $77^{\circ} 51' 36.07''$ E to $77^{\circ} 53' 34.40''$ E longitude and $30^{\circ} 22' 49.79''$ N to $30^{\circ} 23' 55.33''$ N latitude. Cross-section of river at uniform length was measured and pit samples of deposited material from the river bed at different locations were also taken. Based on the ground observations, a total of 3.7 km length was found suitable with extractable RBM depositions. At places in the river course stabilized, islands with regenerating vegetation were found. These islands were excluded from the assessment as they must not be disturbed.

The RBM deposited in the middle river course should be removed in order to give a safe passage for river flow and prevent the bank erosion and associated flood hazards. Views of River Song, Ramgarh Rao and Swarna for assessment of RBM are shown in Plate. 2.

Assessment of Extractable RBM for Different Rivers

The extraction of RBM is to be done from middle 50% of the river width while leaving 25% width along both the banks. Maximum depth of excavation is at the centre which gradually reduces and becomes nil at the end (Fig.2a & b). This is aimed to give a parabolic section to the river after the excavation as shown in the figure. RCC pillars are to be erected at the bank of river and start of extraction zone (Fig.2b). In different rivers surveyed, width of extractable zone varied from 9 m to 105 m and maximum depth of extraction varied from 0.75 m to 2.5 m. Observations were recorded at different intervals and volume of quantity of extractable RBM was computed for different rivers surveyed (Table 1.1 to 7.2). Sample cross-section of different rivers showing the extraction zone are shown in Fig. 3a to 3g. Where there is a bridge, no extraction is done upto 500 m both on upstream and downstream side of the bridge as in the case of Song River (Table 5.2). The extractable quantity of RBM from different rivers has been assessed as follows (Table 1):

Table 1: The extractable quantity of RBM from different rivers/torrents

Sr. No.	River/torrent	Cumulative Volume, V_c (m^3)
1.	Koti	231995
2.	Mot	217057
3.	Nare Khala	178934
4.	Yamuna Dholā	466402
5.	Song	221760
6.	Ramgarh Rao	214798
7.	Swarna Rao	594614
G. Total		2125560

Recommendations

1. As the method and depth of extraction of RBM to be made will depend upon the pattern and quantity of RBM deposited during the monsoon, hence the quantity of RBM extraction will be estimated by surveying the river before the monsoon (after previous extraction of RBM is over i.e. in the month of June) and after the monsoon is over (before the next extraction of RBM starts i.e. in the month of November/December).
2. The extraction duration of RBM in the seasonal rivers may be kept from January to May.
3. The very big boulders in the river should not be removed from the junction of the hilly area and plain area as these big boulders serve for dissipating the energy of the flowing water.
4. The extraction may be carried out as per the methodology explained in the report and the concerned authorities responsible for extraction may be communicated accordingly.
5. As explained to the staff present during survey and communicated in the earlier reports as well, permanent pillars on both sides of the river at every one kilometer of length may be erected as permanent bench post. Further the RCC pillars constructed to demarcate width of extraction leaving 25 % of river width from the each banks may be erected with a depth of 1.5 m below the ground and 1.2 m above the ground. Probably this may not be carried over by river during monsoon and hence avoid the periodical construction of pillar every year. However this year, only 5-6 such pillars may be erected to observe its stability. While erecting the pillar, the corner of the pillar may face upstream.
6. The four pillars constructed to help in confining the extraction of RBM may be marked from the right hand side of the river to the left hand side of the river as 1/1, 1/2, 1/3, and 1/4 starting from zero length of the river and then at the interval of about 1 km distance in the river length till the last of the river reach up to which the extraction of RBM is to be made. These will serve as the permanent bench marks for the survey of the cross section.
7. In future, the report on possible extraction of quantity of RBM shall be based on the two surveys (1st survey during the month of April/May i.e. after the extraction of the RBM is completed followed by the 2nd survey during the month of October/November i.e. after the fresh deposition of the RBM in the river). The report on possible extraction of RBM should be made available to the executing department during the month of Nov. / Dec. i.e. before the initiation of the extraction of RBM.

Acknowledgements

The project team is grateful to Dr. P.K. Mishra, Director, CSWCRTI, Dehradun for approving this project and providing necessary support and facilities. The team is thankful to Regional Manager (Tehri Region), Uttarakhand Forest Development Corporation, Dehradun, (Uttarakhand) for sponsoring this project and providing all help and facilities for timely completion of this study. Thanks are due to Shri Subhash Chandra, DFDM, Shri Ram Kumar, DLO, Shri Suresh Singh, DLO, Shri L.P. Singh, DLO, Shri Ramphool, Scale and Shri Suresh Kumar, Driver. The logistics and field assistance provided by the officers and staff of Forest Corporation are thankfully acknowledged.

Our thanks are due to Chairman and Members, CPC for their quick processing of this consultancy project. The help rendered by the Officers and staff of Division of Hydrology & Engineering in preparation of the project report, specially Shri Manjeet Rawat, P.A is duly acknowledged.


[Dr. G.P. Juyal]
HD (H&E) & Project Leader
CSWCRTI, Dehradun
(Uttarakhand)

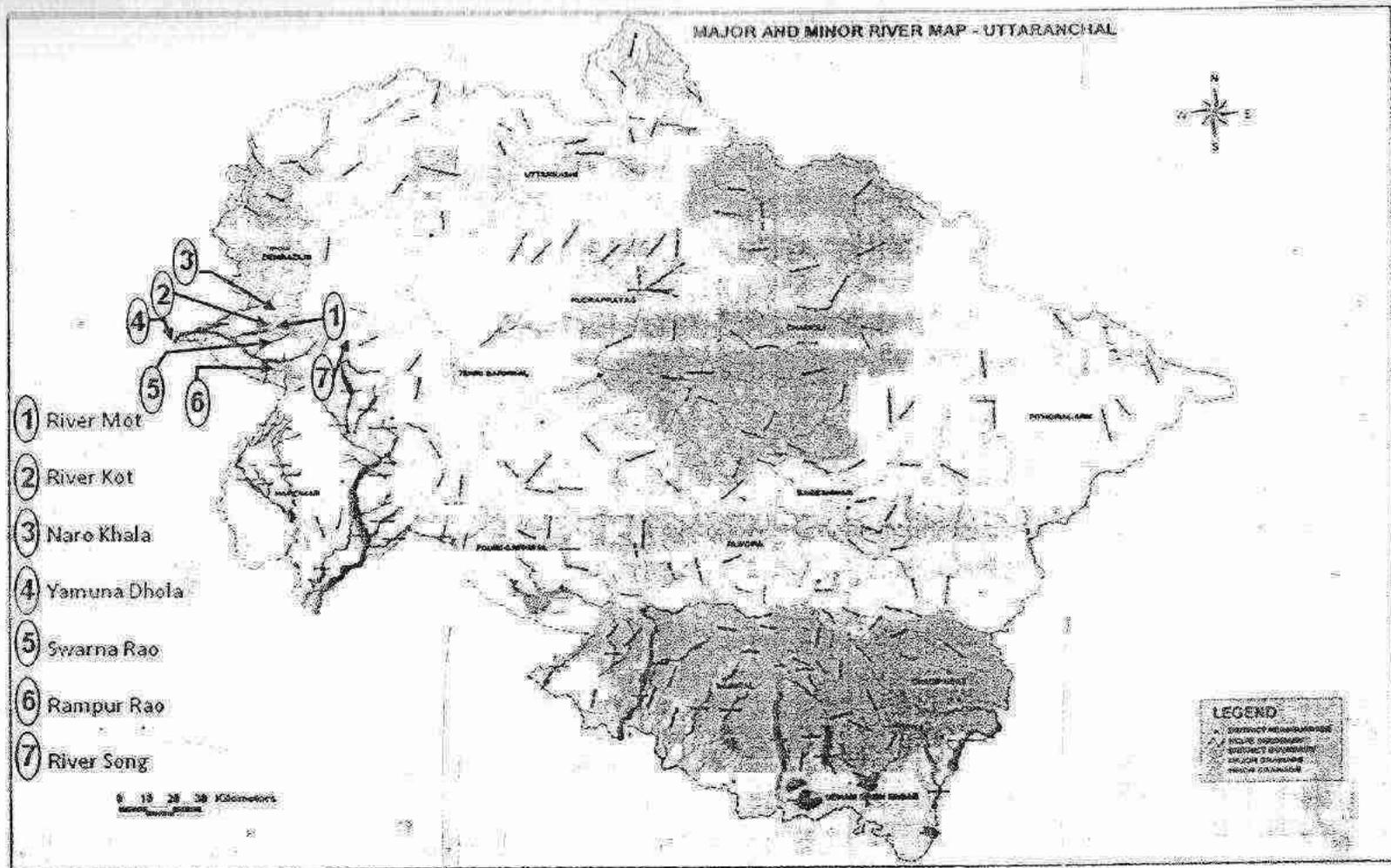


Fig. 1: Map showing the rivers under study for RBM extraction

Table 1.1: Details of extraction width and depth at different locations in River Kot

Km	Width of the river (m)	Width of the extraction zone (m)	Depth (m)	Cross-sectional area (m ²)
0.00	54.00	27.00	0.75	20.25
1.83	99.00	49.50	0.83	41.09
4.21	99.00	49.50	0.92	45.54
5.47	125.00	62.50	1.12	70.00

Table 1.2: Computation of volume of extraction from River Kot

Km	Length Segment, L (m)	Width of the river (m)	Width of the extraction zone (m)	Cross-sectional area (m ²)	Average Cross-sectional area (m ²)	Volume, V (m ³)	Cumulative Volume, V _c (m ³)
0.00	0	54.00	27.00	20.25	0	0	0
1.83	1830	99.00	49.50	41.09	30.67	56121.53	56121.53
4.21	2380	99.00	49.50	45.54	43.31	103083.75	159205.28
5.47	1260	125.00	62.50	70.00	57.77	72790.20	231995

Table 2.1: Details of extraction width and depth at different locations in River Mot

Km	Width of the river (m)	Width of the extraction zone (m)	Depth (m)	Cross-sectional area (m ²)
0.00	92.00	46.00	0.90	41.40
1.10	90.00	45.00	1.25	56.25
1.60	60.00	30.00	1.30	39.00
1.66	120.00	60.00	1.10	66.00

Table 2.2: Computation of volume of extraction from River Mot

Km	Length Segment, L (m)	Width of the river (m)	Width of the extraction zone (m)	Cross-sectional area (m ²)	Average Cross-sectional area (m ²)	Volume, V (m ³)	Cumulative Volume, V _c (m ³)
0.00	0	92.00	46.00	41.40	0	0	0
1.10	1100	90.00	45.00	56.25	48.83	53707.50	53707.50
1.60	600	60.00	30.00	39.00	44.53	76200.00	129907.50
1.66	660	120.00	60.00	66.00	52.50	87150.00	217057

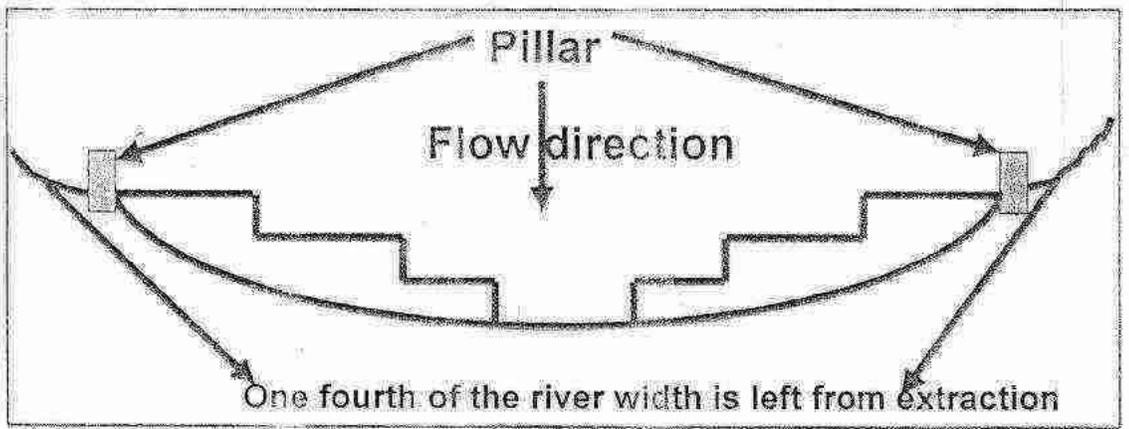


Fig. 2a: Procedure of extraction of river bed material

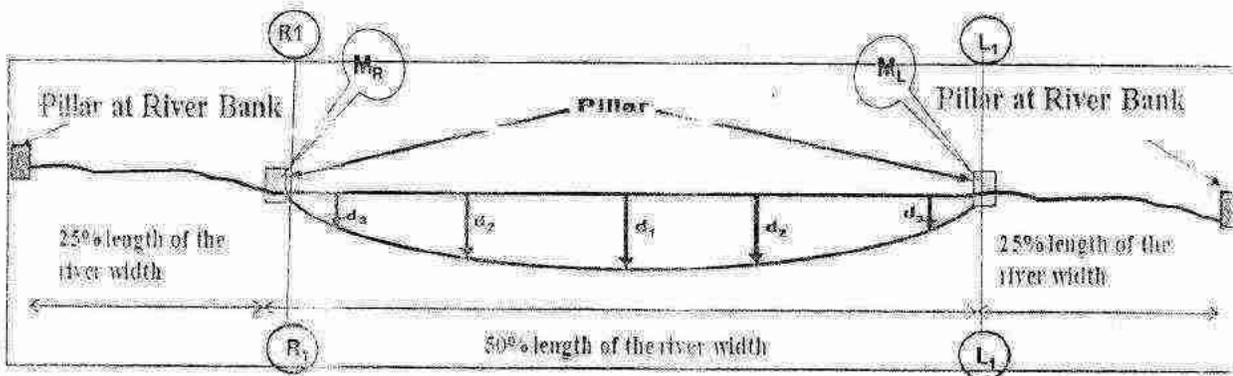


Fig. 2b: Anticipated shape of the river after proper extraction of river bed material

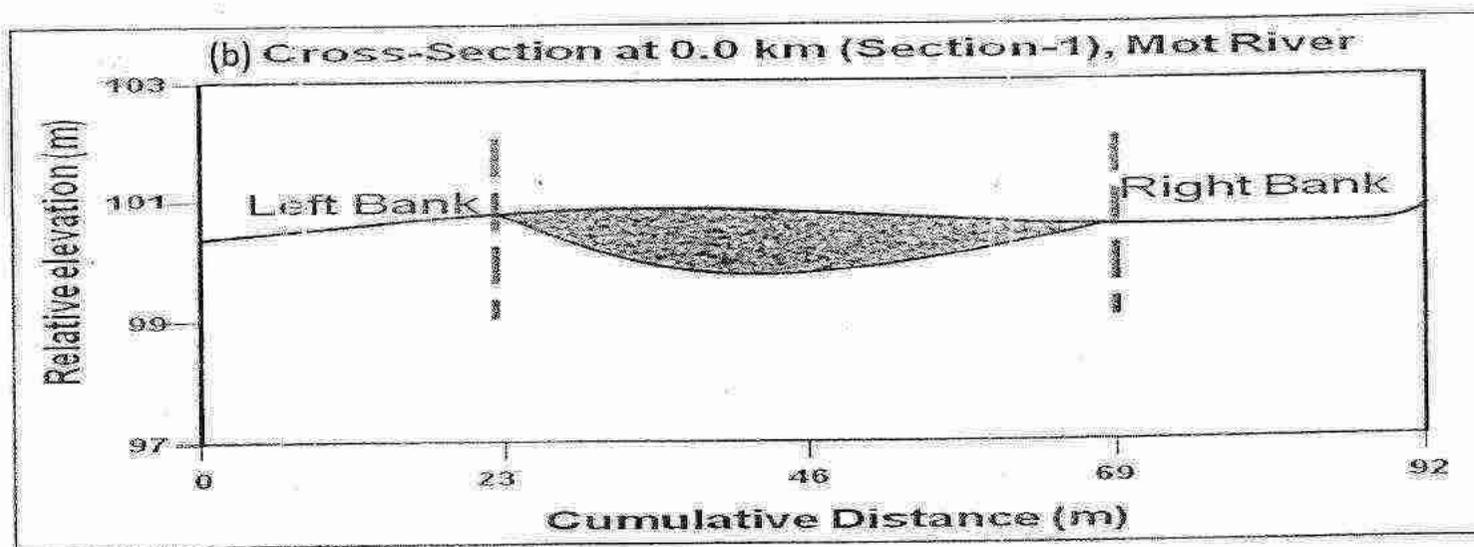
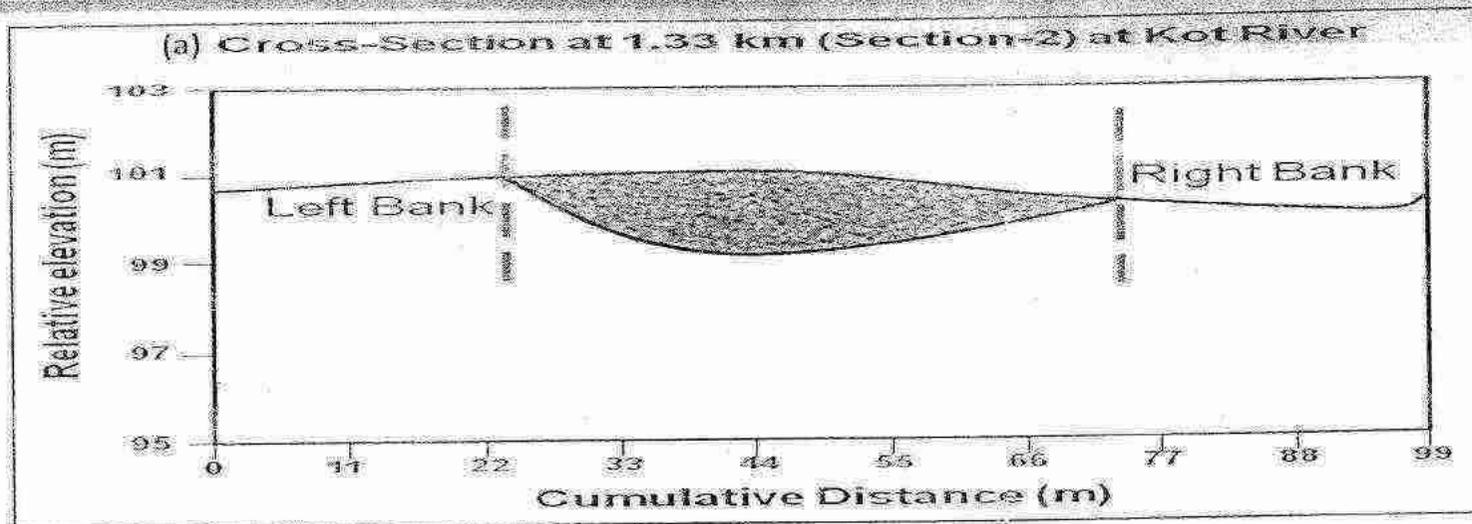


Fig. 3: Sample cross-section of river showing the extraction zone



Uttarakhand Forest Development Corporation (Camp office Managing Director)

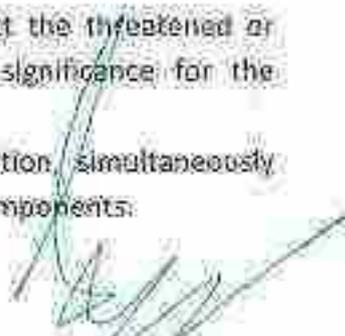
Aranya Vikas bhawan 73-Nehru road Dehradun. Tel. 0135-2657610 Fax : 0135-2655488

Safety, Health and Environment Policy

As the National Environment Policy, 2006 covers the entire nation and functions as the basic framework for different states and their departments to focus on their respective environment concerns, Uttarakhand Forest Development Corporation has no Environment Policy of its own. The Corporation has adopted the National Environmental Policy, with the principal objective of maintaining a clean and healthy environment and to facilitate sustainable development of the state for the benefit of the community in general and the stake holders:

To fulfill this commitment, the corporation has decided to maintain continuing efforts to:

1. Focus on the sustainable development of the state to provide bright and healthy future to the forthcoming generations.
2. Optimum utilization of natural resources and steps for conservation of natural resources.
3. Integration of Environmental Concerns into policies, plans, programmes and projects for Economic and Social Development.
4. Restoration of the Environmental damage at the first instance without waiting for the damage to expand gradually.
5. Formulation of policies and development of strategies to protect the threatened or endangered species and natural systems which are of great significance for the livelihoods and general well being.
6. Plantation of trees that nourishes and enriches soil for cultivation, simultaneously encouraging the local people for conservation of biotic & abiotic components.


(Dr. S. Chandola)
Managing Director
Uttarakhand Forest
Development Corporation



SOIL TESTING REPORT

Project Name: Extraction of Sand, Bajri and Boulder from Kot Mot River Bed

Location: Village-Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

Project Proponent: M/s Uttarakhand Forest Development Corporation (UKDFC)

Monitoring Location: Mine Site, Khusalpur, Vikasnagar and Rampur

Duration of data collection: March-May, 2015

Sl. No.	Parameter	Units of Measurements	Mine site	Khusalpur	Vikasnagar	Rampur
1	pH	-	7.32	7.45	7.59	7.18
2	Bulk Density	gm/cm ³	1.45	1.48	1.40	1.38
3	Conductivity	micro mhos/cm	468	512	480	381
4	Moisture	%	12.5	11.3	12.8	10.3
5	WHC	-	40.2	37.8	30.4	32
6	Texture	-	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
7	Sand	%	72	76	70	74
8	Clay	%	12	6	12	10
9	Silt	%	16	18	18	16
10	Sodium	mg/100gm	38	32	36	34
11	Potassium	mg/100gm	3.4	2.8	2.4	2.6
12	CEC	meq/100gm	8.52	5.16	8.92	7.04
13	Nitrogen	mg/100gm	13.6	15.2	14.4	12.8
14	Organic Matter	%	0.68	0.76	0.72	0.64
15	Phosphorous	mg/100gm	0.64	0.75	0.70	0.58
16	Calcium	meq /100gm	10.4	8.1	7.8	9.2
17	SAR	-	2.62	2.47	2.65	2.41
18	Magnesium	meq /100gm	3.3	2.8	3.7	3.5

Naveen Kr. Jha

Naveen Jha
 Analyzed by:

Notes:

- The results relate only to the sample tested.
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Gaja Nandi Mallick
 Gaja Nandi Mallick
 Authorized Signatory



Surface water Quality Analysis Report

Project Name: Extraction of Sand, Bajri and Boulder from Kot Mot River Bed

Location: Village-Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

Project Proponent: M/s Uttarakhand Forest Development Corporation (UKDFC)

Monitoring Location: Mine Site and Khusalpur

Duration of data collection: March-May, 2015

S.No.	Parameters	Units	Surface water Quality	
			Mine Site	Khusalpur
1.	Colour	Hazen Units	<5	<5
2.	Odour	-	Agreeable	Agreeable
3.	Taste	-	Not Done*	Not Done*
4.	Turbidity	NTU	<5	<5
5.	pH	-	7.65	7.47
6.	Temperature	°C	26.5	26.5
7.	Conductivity	µmhos/cm	405	400
8.	Alkalinity as CaCO ₃	mg/l	75	66
9.	Total Dissolved Solids	mg/l	262	258
10.	Total Hardness as CaCO ₃	mg/l	160	157
11.	Calcium as Ca	mg/l	118	110
12.	Magnesium as Mg	mg/l	42	47
13.	Chloride as Cl	mg/l	28	34
14.	Phosphate as PO ₄	mg/l	0.4	0.23
15.	Nitrate as NO ₃	mg/l	3.8	4.6
16.	Sulphate as SO ₄	mg/l	42	58
17.	Fluoride as F	mg/l	0.75	0.79
18.	Phenolic Compound	mg/l	<0.001	<0.001
19.	Copper as Cu	mg/l	<0.01	<0.01
20.	Mercury as Hg	mg/l	<0.001	<0.001
21.	Selenium as Se	mg/l	<0.01	<0.01
22.	Total Arsenic as As	mg/l	<0.01	<0.01
23.	Lead as Pb	mg/l	<0.01	<0.01
24.	Zinc as Zn	mg/l	0.086	0.16
25.	Chromium as Cr ⁶⁺	mg/l	<0.05	<0.05
26.	Manganese as Mn	mg/l	<0.02	<0.02
27.	Boron as B	mg/l	0.28	0.27
28.	Iron as Fe	mg/l	0.12	0.12
29.	Sodium as Na	mg/l	13	13
30.	Potassium as K	mg/l	2	2
31.	Dissolved oxygen	mg/l	6.2	6.4

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32	COD	mg/l	10	8
33	BOD	mg/l	<2.0	<2.0
34	Total Coliform	MPN/100ml	42	48
35	Faecal Coliform	MPN/100ml	8.6	9.4

Priyanka Gupta
Analyzed by:



Gaja Nand Mallick
Authorized Signatory

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GROUNDWATER TESTING REPORT

Project Name: Extraction of Sand, Bajri and Boulder from Kot Mot River Bed
Location: Village-Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand
Project Proponent: M/s Uttarakhand Forest Development Corporation (UKDFC)
Monitoring Location: Vikasnagar and Rampur
Duration of data collection: March-May, 2015

S.No.	Parameters	Units	Ground water Quality	
			Vikasnagar	Rampur
1.	Colour	Hazen Units	<5	<5
2.	Odour	-	Agreeable	Agreeable
3.	Taste	-	Agreeable	Agreeable
4.	Turbidity	NTU	<5	<5
5.	pH	-	7.42	7.56
6.	Temperature	°C	26.5	26.5
7.	Conductivity	µmhos/cm	448	436
8.	Alkalinity as CaCO ₃	mg/l	182	177
9.	Total Dissolved Solids	mg/l	292	288
10.	Total Hardness as CaCO ₃	mg/l	180	179
11.	Calcium as Ca	mg/l	50	56
12.	Magnesium as Mg	mg/l	13.4	9.5
13.	Chloride as Cl	mg/l	14	15
14.	Phosphate as PO ₄	mg/l	0.25	0.17
15.	Nitrate as NO ₃	mg/l	3.8	3.6
16.	Sulphate as SO ₄	mg/l	26	30
17.	Fluoride as F	mg/l	<0.001	<0.001
18.	Phenolic Compound	mg/l	<0.01	<0.01
19.	Copper as Cu	mg/l	0.71	0.78
20.	Mercury as Hg	mg/l	<0.001	<0.001
21.	Selenium as Se	mg/l	<0.01	<0.01
22.	Total Arsenic as As	mg/l	<0.01	<0.01
23.	Lead as Pb	mg/l	<0.01	<0.01
24.	Zinc as Zn	mg/l	0.098	0.074
25.	Chromium as Cr ⁺⁶	mg/l	<0.05	<0.05
26.	Manganese as Mn	mg/l	<0.02	<0.02
27.	Boron as B	mg/l	0.21	0.23

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28.	Iron as Fe	mg/l	0.11	0.08
29.	Sodium as Na	mg/l	8	10
30.	Potassium as K	mg/l	1	2
31.	Dissolved oxygen	mg/l	NA	NA
32.	COD	mg/l	NA	NA
33.	BOD	mg/l	NA	NA
34.	Total Coliform	MPN/100ml	Absent	Absent
35.	Faecal Coliform	MPN/100ml	Absent	Absent


Priyanka Gupta
Analyzed by:




Gaja Nand Mallick
Authorized Signatory

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Ambient air quality testing reports

Project Name: Extraction of Sand, Bajri and Boulder from Kot Mot River Bed

Location: Village-Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

Project Proponent: M/s Uttarakhand Forest Development Corporation (UKDFC)

Monitoring Location: Mine Site Rudrapur, Rampur, Sahaspur, Herbertpur and Vikasnagar

Duration of data collection: March-May, 2015

Ambient Air Quality at Mine Site, Rudrapur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	02.03.2015	62	33	6	16
	03.03.2015	64	38	8	13
	09.03.2015	68	35	7	14
	10.03.2015	72	40	5	19
	15.03.2015	78	45	6	21
	16.03.2015	75	41	9	25
	22.03.2015	70	46	7	16
	23.03.2015	76	37	5	14
April	01.04.2015	62	34	8	26
	02.04.2015	59	40	7	18
	08.04.2015	78	46	6	20
	09.04.2015	65	38	8	16
	14.04.2015	72	46	5	20
	15.04.2015	76	39	9	24
	24.04.2015	66	44	6	19
	25.04.2015	69	48	8	17
May	01.05.2015	64	40	5	14
	02.05.2015	70	46	7	21
	08.05.2015	72	50	5	18
	09.05.2015	74	45	7	20
	14.05.2015	70	38	5	17
	15.05.2015	76	44	8	19
	24.05.2015	64	49	7	22
	25.05.2015	78	46	6	18
	Max	78	50	9	26
	Min	59	33	5	13
	Avg	70.00	42.00	6.67	18.63
	98 percentile	78	49.54	9	25.54



Ambient Air Quality at Rampur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	02.03.2015	66	34	7	16
	03.03.2015	78	40	9	18
	09.03.2015	60	36	8	12
	10.03.2015	70	45	6	16
	15.03.2015	68	41	8	20
	16.03.2015	64	38	7	17
	22.03.2015	58	36	9	22
	23.03.2015	72	44	8	15
April	01.04.2015	77	35	7	20
	02.04.2015	66	40	8	16
	08.04.2015	71	44	6	24
	09.04.2015	58	36	10	18
	14.04.2015	68	39	8	14
	15.04.2015	72	42	6	19
	24.04.2015	63	37	7	24
	25.04.2015	74	43	9	18
May	01.05.2015	70	37	8	15
	02.05.2015	74	40	7	20
	08.05.2015	67	45	8	16
	09.05.2015	65	38	6	22
	14.05.2015	68	43	9	19
	15.05.2015	72	46	7	16
	24.05.2015	69	44	8	23
	25.05.2015	67	42	9	18
	Max	78	46	10	24
	Min	58	34	6	12
	Avg	68.21	40.21	7.71	18.25
	98 percentile	77.54	45.54	9.54	24



Ambient Air Quality at Sahaspur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	04.03.2015	69	36	8	20
	05.03.2015	54	44	7	26
	11.03.2015	69	40	10	18
	12.03.2015	60	38	11	21
	17.03.2015	69	41	7	23
	18.03.2015	63	39	9	16
	24.03.2015	67	37	11	22
	25.03.2015	72	42	7	26
April	03.04.2015	70	40	9	28
	04.04.2015	69	34	11	21
	10.04.2015	72	45	8	26
	11.04.2015	68	41	10	21
	16.04.2015	73	36	7	25
	17.04.2015	68	43	9	18
	27.04.2015	74	42	8	24
	28.04.2015	71	37	7	21
May	03.05.2015	68	44	10	23
	04.05.2015	71	38	8	25
	10.05.2015	68	35	11	19
	11.05.2015	60	40	7	23
	16.05.2015	72	43	9	18
	17.05.2015	67	39	7	22
	26.05.2015	65	41	10	26
	27.05.2015	69	37	8	17
	Max	74	45	11	28
	Min	54	34	7	16
	Avg	67.83	39.67	8.69	22.04
	98 percentile	73.54	44.54	11	27.08



Ambient Air Quality at Herbertpur

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	04.03.2015	72	39	6	20
	05.03.2015	64	35	9	26
	11.03.2015	78	40	7	21
	12.03.2015	60	32	8	23
	17.03.2015	62	36	10	26
	18.03.2015	68	40	6	19
	24.03.2015	74	35	9	24
	25.03.2015	69	39	10	27
April	03.04.2015	57	32	7	20
	04.04.2015	63	38	6	24
	10.04.2015	69	42	8	22
	11.04.2015	72	37	10	18
	16.04.2015	67	35	7	24
	17.04.2015	68	39	6	18
	27.04.2015	70	41	9	12
	28.04.2015	66	36	7	16
May	03.05.2015	69	40	8	24
	04.05.2015	70	43	6	20
	10.05.2015	63	36	9	23
	11.05.2015	68	39	11	25
	16.05.2015	59	46	6	20
	17.05.2015	62	43	7	14
	26.05.2015	72	38	6	16
	27.05.2015	77	41	9	18
	Max	78	46	11	27
	Min	57	32	6	12
	Avrg	67.46	38.42	7.79	20.83
	98 percentile	77.54	44.62	10.54	26.54



Ambient Air Quality at Vikasnagar

MONTH	DATE	PM10	PM2.5	SO2	NO2
March	07.03.2015	62	32	10	18
	08.03.2015	71	40	9	20
	13.03.2015	75	41	11	16
	14.03.2015	78	43	9	24
	19.03.2015	80	45	8	20
	20.03.2015	75	38	10	19
	27.03.2015	68	37	8	15
	28.03.2015	72	39	11	23
April	06.04.2015	65	34	9	14
	07.04.2015	73	40	10	20
	12.04.2015	69	34	8	21
	13.04.2015	78	41	12	25
	18.04.2015	72	38	9	17
	19.04.2015	67	34	11	26
	29.04.2015	76	37	9	17
	30.04.2015	63	33	10	15
May	06.05.2015	69	37	8	21
	07.05.2015	65	34	11	16
	12.05.2015	74	36	9	24
	13.05.2015	63	35	8	28
	18.05.2015	70	39	11	22
	19.05.2015	72	42	9	18
	29.05.2015	78	40	8	26
	30.05.2015	69	38	10	21
	Max	80	45	12	28
	Min	62	32	8	14
	Avrg	71.00	37.79	9.50	20.25
	98 percentile	79.08	44.08	11.54	27.08

M.K.

Manoranjan Kumar

Analyzed by:

Notes:

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G.N.M.
 Gaja Nand Mallick
 Authorized Signatory

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Noise test reports

Project Name: Extraction of Sand, Bajri and Boulder from Kot Mot River Bed

Location: Village-Rudrapur, Tehsil- Vikasnagar, District- Dehradun, Uttarakhand

Project Proponent: M/s Uttarakhand Forest Development Corporation (UKDFC)

Monitoring Location: Mine Site, Rampur, Sahaspur, Herbertpur and Vikasnagar

Duration of data collection: March-May, 2015

Location Name	Date of Sampling	Category	Noise Level dB(A)		Reference Level dB(A)	
			Daytime (Ld)	Night-time (Ln)	Daytime (Ld)	Night-time(Ln)
Mine Site	02.03.2015	Residential Area	55	45	51.8	41.9
Rampur	09.03.2015	Residential Area	55	45	50.6	42.6
Sahaspur	12.03.2015	Residential Area	55	45	52.4	43.4
Herbertpur	18.03.2015	Residential Area	55	45	49.7	41.7
Vikas Nagar	27.03.2015	Residential Area	55	45	52.5	40.6

Aman Singh
Analyzed by:

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प्रेषक,

संयुक्त निदेशक,
भूतत्व एवं खनिकर्म इकाई,
उद्योग निदेशालय उत्तराखण्ड देहरादून।

Annexure- VII

सेवा में,

प्रबन्ध निदेशक,
वन विकास निगम उत्तराखण्ड,
देहरादून।

संख्या: /मा0प्लान/उ0खनि0/देहरादून/2013-14

दिनांक 13 मई, 2015

विषय:- पर्यावरणीय अनुमति प्राप्ति हेतु प्रबन्ध निदेशक, उत्तराखण्ड वन विकास निगम लि0, देहरादून के पक्ष में जनपद देहरादून की तहसील विकासनगर के ग्राम रुद्रपुर क्षेत्रान्तर्गत स्थित कोटमोट नदी कुल रकवा 60.00 है0 वन भूमि में बालू, बजरी, बौल्डर के खनन हेतु 05 वर्ष की अवधि हेतु आशय पत्र पर स्वीकृत क्षेत्र से सम्बन्धित खनन योजना के अनुमोदन के सम्बन्ध में।

महोदय,

प्रभागीय लैगिंग प्रबन्धक (खनन), वन विकास निगम उत्तराखण्ड देहरादून के पत्रांक 15 दिनांक 07.04.2015 के द्वारा जनपद देहरादून की तहसील विकासनगर के ग्राम रुद्रपुर क्षेत्रान्तर्गत स्थित कोटमोट नदी कुल रकवा 60.00 है0 वन भूमि जो कि भूतत्व एवं खनिकर्म विभाग के संशोधित कार्यालय जाप संख्या 584/मू0खनि0ई0/2012-13 दिनांक 23 जनवरी, 2013 द्वारा आपके पक्ष में पर्यावरणीय अनुमति प्राप्त किये जाने हेतु अशय पत्र पर स्वीकृत किया गया है, से सम्बन्धित प्रस्तुत खनन योजना जो भारतीय खान ब्यूरो द्वारा तदर्थ मान्यता प्राप्त आर0क्यू0पी0 श्री हरीश कौथीला आर0क्यू0पी0/DDN/141/2002-A के द्वारा तैयार की गयी है को वैज्ञानिक, तकनीकी एवं पर्यावरण सुरक्षा के दृष्टिकोण से खनन सक्रियाओं के सुनियोजित संचालन हेतु उपयुक्त पाये जाने के दृष्टिगत उत्तराखण्ड उपखनिज परिहार नियमावली-2001 के नियम-34 के अन्तर्गत प्रदत्त अधिकार का प्रयोग करते हुए, प्रस्तुत खनन योजना का अनुमोदन निम्नलिखित शर्तों के अधीन किया जाता है:-

शर्त:-

1. खनन योजना का अनुमोदन खनन पट्टा विलेख के निष्पादन की तिथि से आगामी पांच वर्षों की अवधि के लिए किया जा रहा है।
2. पट्टाधारक द्वारा प्रश्नगत क्षेत्र के सम्बन्ध में पर्यावरण एवं वन मंत्रालय भारत सरकार से पर्यावरणीय अनुमति प्राप्त की जायेगी तथा पर्यावरणीय अनुमति की समस्त शर्तों का अनुपालन किया जायेगा।
3. स्वीकृत क्षेत्र का सीमाबन्धन/पिलरबन्दी उपखनिज परिहार नियामवली-2001 के नियम-17 के अनुसार भूतत्व एवं खनिकर्म विभाग के द्वारा राजस्व विभाग के साथ संयुक्त रूप से किया जायेगा तथा नियम-14 के अनुसार पट्टाधारक द्वारा पट्टा विलेख के निष्पादन एवं पट्टा विलेख का पंजीकरण कराने के उपरान्त खनन क्षेत्र से उपखनिज का खनन/चुगान प्रारम्भ किया जायेगा।
4. प्रस्तावित खनन योजना के अनुसार, मैनुवल माइनिंग से, बिना ब्लास्टिंग के प्रथम वर्ष में आर0एल0 529.0मी0 से आर0एल0 593.5मी0 तक 360000.00 टन, द्वितीय वर्ष में आर0एल0 529.0मी0 से आर0एल0 593.5मी0 तक 360000.00 टन, तृतीय वर्ष में आर0एल0 529.0मी0 से आर0एल0 593.5मी0 तक 360000.00

4

- टन, चतुर्थ वर्ष में आर०एल० 529.0मी० से आर०एल० 593.5मी० तक 360000.00 टन एवं पंचम वर्ष में आर०एल० 529.0मी० से आर०एल० 593.5मी० तक 360000.00 टन उपखनिज का खनन किया जायेगा।
5. यह खनन योजना अन्य किसी अधिनियम जो कि इस खान या क्षेत्र पर लागू होते हैं या समय-समय पर राज्य सरकार या केंद्र सरकार या अन्य किसी सक्षम द्वारा प्रख्यापित किये जाते हैं, को छोड़ कर अनुमोदित की जाती है।
 6. यह खनन योजना वन (संरक्षण) अधिनियम-1980, वन संरक्षण नियमावली 1981 और अन्य सम्बन्धित अधिनियम और नियमावली, आदेश और दिशा निर्देश जो कि इस खनन पट्टे पर समय-समय पर दिये जाये लामू होंगे।
 7. अनुमोदित खनन योजना किसी भी प्रभावी क्षेत्रान्तर्गत माननीय न्यायालय के आदेश एवं दिशा निर्देश के लागू होने को बाधित नहीं करती है।
 8. अनुमोदित अवधि में किये गये खनन कार्य के निरीक्षण के उपरान्त यदि खनन योजना में संशोधन हेतु आदेश दिये जाते हैं तब संशोधित खनन योजना प्रस्तुत करने का पूर्ण उत्तरदायित्व पट्टाधारक का होगा।
 9. आबद्ध/नियोजित श्रमिकों को सुरक्षात्मक उपकरण प्रदान करने तथा सुरक्षित खनन कार्य करने हेतु सभी आवश्यक सावधानियाँ बरतने का दायित्व पट्टाधारक का होगा।
 10. अनुमोदित खनन योजना की एक-एक प्रमाणित प्रति सम्बन्धित जिलाधिकारी कार्यालय एवं निदेशालय के क्षेत्रीय कार्यालय में अभिलेखार्थ यथाशीघ्र प्रस्तुत करने का दायित्व भी पट्टाधारक का होगा।
 11. अनुमोदित खनन योजना के अनुसार, पट्टाधारक द्वारा खनन कार्य न किये जाने पर, पट्टाधारक के विरुद्ध पट्टे की शर्त का उल्लंघन माना जायेगा और तदनुसार कार्यवाही की जायेगी।
 12. खनन योजना इस शर्त के साथ अनुमोदित की जा रही है कि पट्टाधारक द्वारा श्रमिकों की सुरक्षा एवं स्वास्थ्य की उचित व्यवस्था की जायेगी।

संलग्नक:- खनन योजना की अनुमोदित प्रति।

भवदीय

(एस० एल० पैट्रिक)
संयुक्त निदेशक

संख्या: 46 / मा०प्लान/उ०खनि०/देहरादून/2013-14 तददिनांकित।

प्रतिलिपि:- जिलाधिकारी देहरादून को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

13/5/15
(एस० एल० पैट्रिक)
संयुक्त निदेशक

MINING PLAN

FOR SAND, BAJRI AND BOULDER
IN
KOTH MOTH RIVER
DEHRADUN FOREST DIVISION
AREA: 60 ha.

At

CHOHARPUR FOREST RANGE
NEAR VILLAGE - RUDRAPUR
TEHSIL - VIKASNAGAR
DISTRICT - DEHRADUN (UTTARAKHAND)

APPLICANT

M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION
ARANYA VIKAS BHAWAN, 73 NEHRU ROAD,
DEHRADUN - 248001 (UTTARAKHAND)

PREPARED BY



Harish Kainthola
RQP/DDN/141/2002-A
(Valid upto 16 Jan. 2017)

भूतल एवं खनिकर्मा इकाई,
उद्योग निदेशालय, जलशंखण्ड
देहरादून
शर्तों के अधीन अनुमोदित
पर्यांक: 46/सा. स्त/र. वि. दे. 2015
दिनांक: 13 फेब्रु 2015
[Signature]
राज्य - निदेशक

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CHAPTER - 1

GENERAL INFORMATION

M/s Uttarakhand Forest Development Corporation (UKFDC) Uttarakhand has got Letter of Intent in Choharpur Forest Range, Dehradun Forest Division near village-Rudrapur, Tehsil- Vikas Nagar, Distt.- Dehradun (Uttarakhand) for preparation of mining plan for Mining License (ML) from Government of Uttaranchal over an area of 60 ha for RBM (sand bajri & boulder) in single block in Koth Moth River for the period of 05 year (Annexure No.-1). Demarcated Topo Map (Annexure No.-2) is provided by the UKFDC. The applied area is jointly inspected by different state Govt. authorities (Annexure No. 3).

The mining plan of the area is prepared by M/s *KainGeotech*, Prop Harish Kainthola, Lane No.- 8, Indraprashtha, Upper Nathanpur, Ring road, Dehradun, RQP Regd. No.: RQP/DDN/141/2002-A, (Annexure No.4) for estimating the reserve of mineral RBM (sand bajri & boulder).

M/s Uttarakhand Forest Development Corporation has authorised M/s *KainGeotech* to prepare the Mining Plan in respect of Rudrapur, area over an area of 60 ha for minor mineral falls under Forest (*Be Nap*) land under Choharpur Forest Range near village-Rudrapur, Tehsil- Vikasnagar, Distt.- Dehradun Uttarakhand (Annexure No. 5).

Mining of minerals is site specific in nature and the location of the proposed project is restricted to the geology and mineral deposition of the area. Safety, economical and technical constraints determine the mining methods to be employed.



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CHAPTER - 2

DETAIL INFORMATION OF QUARRY LEASE

Name & Address of the Applicant:

M/s Uttarakhand Forest Development Corporation (UKFDC), Aranya Vikas Bhawan, 73 Nehru Road, Dehradun - 248001.

Status of the Applicant:

Govt. Body. Applicant has 10 year experience in mining activities.

Minerals which are occurring in the area and which the applicant intends to mine:

RBM (sand, bajri & boulder).

Status of the area:

M/s Uttarakhand Forest Development Corporation (UKFDC) has applied for an area of 60 ha falls under Forest (*Be Nap*) land in Choharpur Forest Range near village Rudrapur, Tehsil- Vikasnagar, Distt.-Dehradun Uttarakhand.

Period for which the mining lease is granted / renewed / proposed to be applied:

5 years

Name, Address & Registration No. of the recognized person, who prepared the Mining Plan:

Harish Kainthola

KainGeotech

Lane No. 8, Indraprastha,

Mussoorie by pass road, Upper Nathanpur,

Dehra Dun- 248008 (Uttarakhand)

Telephone (Cell): 09412028745, 09412058990 (Office), 0135-2734986 (Resi.)

E-mail - hkainthola@gmail.com, kain_geotech2147@rediffmail.com

Registration No. - RQP/DDN/141/2002-A

Valid up to - 16 Jan 2017 (Annexure No - 4)

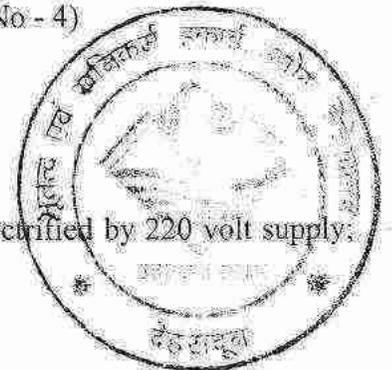
Infrastructure facilities -

Power & Electricity:

The lease area falls near village- Rudrapur which is electrified by 220 volt supply. nearly 80% area fall 5 km periphery of the area is electrified.

Water Supply:

Water table of this area is about 12-120 ft below the ground. Water supply from tank will be arranged for drinking purpose. Dug wells and spring water can also be used for



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drinking water purposes. For irrigation, small canal are made on the perennial *nalas* and water supply for drinking purpose through pipelines by Uttarakhand Jal Sasthan.

Post office & Telegraph:

Post Office is situated at Sahaspur which is about 5km away from lease hold area.

Education institute:

Primary school is situated in Charba which is about 2 km away from lease hold area.

Senior Sec. School is situated in Charba which is about 2 km away from lease hold area.

Intermediate collage is available in the Charba which is about 2 km away from lease hold area.

For getting higher studies, people are going to dehradun which is about 25 km from the lease area.

Health facility:

In Sahaspur Primary Health Center is available, which is about 5 km from lease area. District hospital is situated at Dehradun, which is 25 km away from the lease area.

Police station:

The nearest police station is at Sahaspur which is about 5 km from applied area.

Bank:

There are number of banks available at Sahaspur which is about 5km from the applied area.

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CHAPTER-3

GEOLOGY AND RESERVES

Physiography:

Physiographically the area is simple except a few dip slopes composed of Pleistocene and Recent deposits facing the syncline Doon valley and ridges & cliffs of the Upper Siwalik Conglomerates. The Middle Siwalik Formation develops low rounded hills with distinct marked lowering throughout northern margin of the unit as compared to southern margin. The important rivers of the area are Tons, Suarna, Nimmi, Seetla (Koth & Moth) and Chorkhala running approximately south to south-west directions and Asan running approximately south-east direction. The climate of the area is inter-continental (monsoon type). Maximum temperature reaches 36.2°C and the minimum even to freezing points in winters. Average rainfall is about 2073.3mm and most of it flows as runoff and some percolates in sandstones and conglomerates.

Regional geology:

Situated in the annals of Garhwal Himalaya, the district of Dehradun occupies the long tectonic 'Doon Valley' of the outer Himalaya. It lies within the Pre-Tertiary ranges of Lesser Himalaya to the north, and the Siwalik ranges of Outer Himalaya to the south. The Siwalik rocks have been folded into an overturned syncline, flanked by two anticlines. The syncline shape of Siwaliks has controlled the geomorphological development of Doon Valley (Auden, 1937).

The terrain around Dehradun is full of minor ridges and valleys. A prominent ridge runs north-south. Western part is washed by the river Tons, Noon Nadi and Asan, tributaries of Yamuna, flowing towards southwest and the eastern segment is drained by the WNW-ESE flowing river Suswa, a tributary of Ganga.

Lithostratigraphy of the Upper Siwalik and Post-Siwalik sediment in Tons Valley is given below:

Age	Formations	Divisions	Lithology	Average Thickness
Recent (Quaternary)	Doon Gravels	Tons/Asan Alluvium	Alluvium	
Sub-Recent	Post-Siwaliks	New Terrace sediments	Gravel and pebble beds with brown clay bands	70m
Upper-Pleistocene-Mid Pleistocene		Old Terrace sediments	Boulder beds, sand, yellow, and maroon clay bands	44m
Unconformity				
Lower Pleistocene	Upper Siwaliks	Boulder conglomerates ?	Alternating conglomerates, Sand and clay bands	147m

The Upper Siwalik partly ranges into Pleistocene which is probably represented by the Boulder Conglomerate Stage here. These are overlain by Post-Siwalik sediments with a pronounced unconformity. The Siwalik rocks constitute low ranges in this area, whereas the Post-Siwalik constitutes the older and newer terraces of the river Tons/Asan. The Quaternary part of the Upper Siwalik consists mainly of conglomerates with alternating sand and clay beds. The conglomerates contain pebbles mainly of quartzite, slate, limestone, sandstone etc. embedded in a sandy matrix. The Old Terrace sediments contain boulder and gravel beds with smooth, but often cracked boulders mainly of quartzite, phyllite, schist, sandstone etc. embedded in coarse sandy matrix. There are some bands of yellow and maroon clay along with some sandy and sandy clay horizon. These sediments generally lie horizontally, but occasionally show gentle southerly dips. The New Terrace sediments contain pebble and gravel horizons with unconsolidated material composed mainly of limestone, quartzite etc. There are some brown coloured clay beds, which appear to be older Alluvium. These are usually placed horizontally, unconformably overlying the Old Terrace sediments. Sometimes, these even overlap the Old Terrace, and directly overlie the Siwalik and other Formation. These Post-Siwalik sediments exhibit variable thicknesses. Tube well data shows a gradual increase in their thickness from west to east. In the western part of the area the Old Terrace is 12m and New Terrace is 36 m thick.

In Lesser Himalayan Zone steeply sloping northern flank of the valley comprising rocks of the Lesser Himalayan Formations, such as quartzite, schist, slates, phyllites, hard sandstone, limestone and dolomite of the Chandpur, Nagthat, Blaini, Krol and Tal Formations and having secondary porosity and permeability and are characterised by springs and seepages. Though sedimentary in nature the rocks have very low intergranular porosity and are characterized by fissures, fracture and joints. The zones of lineament, faults and the Main Boundary Thrust show pockets of high secondary porosity. The groundwater/sub-surface water in this zone occurs largely as disconnected local bodies in favourably perched aquifers under both confined and unconfined conditions and also in zones of jointing, fracturing and faulting. Relatively flat areas and gently sloping grounds characterized by deep weathering, such as hill-tops, ridges, saddles, spurs and bulges of old landslide-debris, river terraces and fluvial fans from the recharge area while steeper hillslopes, 1st or 2nd order stream at slope breaks and scraps of fans are sites of discharges. The upper portions of the catchment areas are saucer-shaped. The springs in the rocks of the secondary porosity show great variability in yield even within short distances. The limestone and dolomite of the Krol Formation is characterized by cavities and solution channels oriented along WNW-ESE and NW-SE trending joints. The sand-gravel deposits of fluvial and colluvial origin in the Lesser Himalayan Zone lying in the lower reaches of the stream or near the confluence of two streams in the form of fans and terraces are highly porous and permeable and therefore, hold sufficient quantities of water. The soil cover of the study area was found to be mostly yellowish grey with some soils having brownish colour. The texture of the soil in the study area was found predominantly sandy clay loam in nature.

In Synclinal central zone classified under piedmont zone occupied by the Doon gravels, having primary porosity and permeability, is forming the main aquifer in the area. The groundwater is present in aquifers under unconfined and confined conditions. The

course and gravels underlain by clay beds is the main water bearing strata. The zone is characterized by high infiltration rate. The Siwalik Zone the water is present under confined conditions and the water table is relatively deep.

Geology of the Area:

The synclinal trough shaped Doon Valley bounded by the rocks of the Lesser Himalayan formations in north and Siwalik in south, forms a part of the sub-mountain region of the Garhwal Himalaya. Geologically the valley is divided into:

The Lesser Himalaya: Mussoorie mountain range in northwest and northeastern parts. It comprises rocks of the Jaunsar (Chandpur phyllites and Nagthat quartzites) and Mussoorie Group (shales, sandstone, greywacks, calcareous slates, dolomite and limestone of Blaini-Krol Tal sequence) of Proterozoic-Cambrian age.

A synclinal structural depression: filled with coarse clastic/ River Borne Material (RBM) consisting fan deposits of late Pleistocene and Holocene age known as the Doon Gravels. The Doon Gravels have been further subdivided into Oldest, Younger and Youngest Doon Gravels (Nossion, 1971; Meijerink; 1974). The Oldest Doon Gravels resting over the Upper and Middle Siwalik beds and at places directly over Chandpur phyllites are consist of poorly sorted pebbles and gravels set in sandy matrix and red clays. The Oldest Doon Gravels consist partly of crushed Upper Siwaliks cobbles, angular pebbles of quartzites, slates and shales from the Nagthat, Chandpur and Tal Formations and limestone pebbles from the Krol Limestone alternating with clay beds. The Younger Doon Gravels, resting unconformably over the Oldest Doon Gravels in northern part, are characterized by very large boulders present in debris flow and braided river deposits. The unit consist of poorly sorted mixture of clay, sands, gravels and large bounders. The major part of the valley is occupied by Younger Doon Gravels occurring in the form of large fans, formed by reworking of Oldest Doon Gravels, and are called as Principal Doon fans. The Youngest Doon Gravels are braided river deposits and sub-recent terrace deposit along Asan and Song River. A number of coalesced fan have also descend down from the Siwalik range forming "Piedmont zone", are also part of youngest Doon Gravels.

The Siwalik range in the south comprises the middle and Upper Siwalik. The rocks of the middle Siwalik have the characteristic facies of continental deposits of large low land rivers and consist of friable medium grained grey coloured sandstone rich in micaceous minerals with mudstone. The rocks of the Upper Siwalik indicate a change in the region of the large braided rivers and are characterized by alternate polymictic conglomerate and subordinate grey micaceous sandstone (Tandon *et al.*, 1988). The conglomerate consists of well rounded to subrounded clasts of white, pink and grey quartzite, granite, phyllites and rare limestone.



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Exploration:

No, exploration was carried out as the minerals are abundant in the proposed lease area.

Estimation and Categories of reserve:

As much of the lease area is covered with water catchment area only the middle area is considered for reserve estimation. The sand/gravel which is exposed in all the three dimensions (3.0m on an average) is considered as proved. From the field trials conducted in the sector and information gathered from the project proponent, the bulk density is found to be 1.8.

The method of cross section has been adopted for computing the geological reserve. The mining lease boundary & mining limits are marked on the plans. The intersectional volume between two section lines has been determined by the following manner:

$$V = (S1+S2)/2 \times L, \text{ where}$$

V= volume

S1 & S2= Sectional area of the mineral body

L=Strike influence

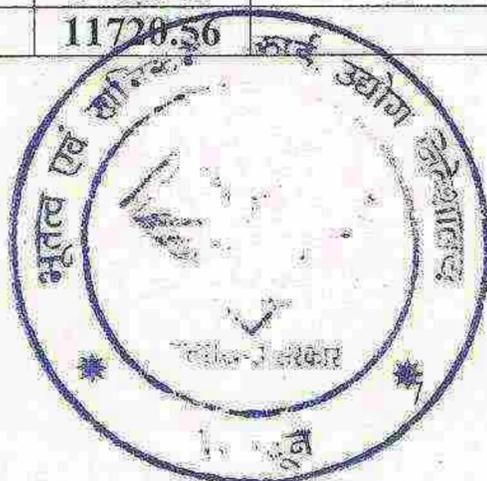
The mining lease has been applied only in river bed area. Geological reserves have been estimated through geological cross sections. The strike influence of sections is 39m to 84m. The area of each section line is calculated and sectional area is multiplied by the strike influence in between two section line to give the volume of each section line. . The incidence of RBM has been taken as 90% of the total volume considering rest 10% as waste and would be used as backfilled material for reclaiming the excavated benches. From 25% area of each side from both banks would not be used for exploitation of mineral. While computing the geological mineral reserves the depth of mineralization is taken upto 6m in all the applied area.

There are three categories of reserve; namely measured/proved, indicated/probable, inferred/possible. The proved categories include mineral upto 3 m depth. The probable category includes 2 m after the proved depth and possible category includes 1 m from the possible depth as far as this lease is concerned.

The proved reserve, probable reserves & possible reserves are 6371110.76 tonnes, 4247407.48 tonnes & 2123703.28 tonnes respectively. Following table shows the calculation of different categories of reserve:

Measured/Proved Reserve:

Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 1-1'	5860.28	39	205695.83	370252.49
1-1' to END	5860.28	41	216244.33	389239.80
	11720.56		421940.16	759492.29



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Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 2-2'	12019.90	55	594985.05	1070973.09
2-2' to 3-3'	22822.29	84	1725365.12	3105657.22
3-3' to END	10802.38	82	797215.64	1434988.16
	45644.57		3117565.82	5611618.47

Indicated/Probable reserve:

Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 1-1'	3906.85	39	137130.44	246834.78
1-1' to END	3906.85	41	144162.77	259492.98
	7813.70		281293.20	506327.76

Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 2-2'	8013.27	55	396656.87	713982.36
2-2' to 3-3'	15214.86	84	1150243.42	2070438.15
3-3' to END	7201.59	82	531477.34	956659.22
	30429.72		2078377.62	3741079.72

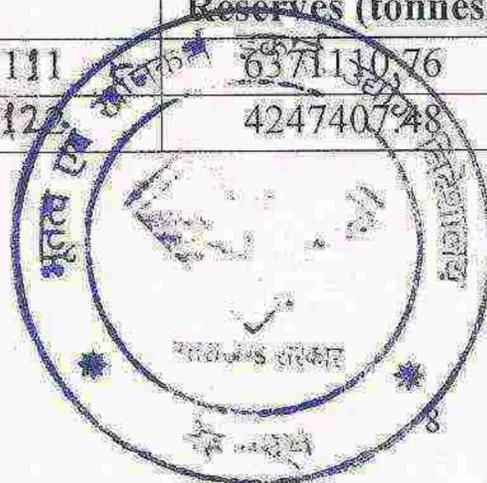
Inferred /Possible reserved:

Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 1-1'	1953.43	39	68565.39	123417.71
1-1' to END	1953.43	41	72081.57	129746.82
	3906.86		140646.96	253164.53

Section Line	Sectional area (m ²)	Strike influence (m)	Volume (m) ³	Recoverable reserves (tonnes)
LB to 2-2'	4006.63	55	198328.19	356990.73
2-2' to 3-3'	7607.43	84	575121.71	1035219.07
3-3' to END	3600.79	82	265738.30	478328.94
	15214.85		1039188.20	1870538.75

Category according to UNFC classification:

Reserves	UNFC code	Geological Reserves (tonnes)	Grade
Proved	111	6371130.76	Road, Bridges and building construction
Probable	122	4247407.48	Road, Bridges and building construction



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CHAPTER - 4

MINING

Mining (Past):

Applied area for mining is 60 ha and proposed in river Moth Nadi & its tributary Koth Nadi has been considered for exploitation of the mineral (RBM). The present topography shows some depositional and erosional or mining activity during past years. Infected mining pits if any, are replenished every year during the rainy season. The lease area has gentle slope towards south west. Highest point is at RL 595 m in the northeast corner of the area where as lowest point RL 529 m is in the southwest corner of the area.

Proposed Method of Mining:

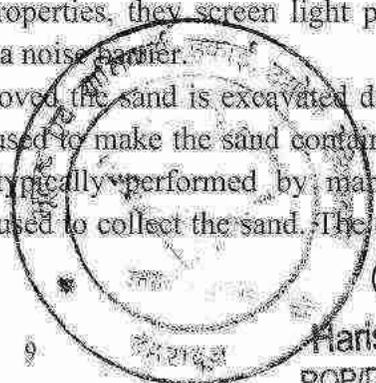
The project does not involve any processes such as drilling, blasting and beneficiation. The mining process involves collection of material by simple hand tool such as shovel, pans and sieves. This is followed by sorting and manual picking, stacking and loading into trucks/tractor-trolley for transporting. The pits from where the material is picked are not deeper than 1.5m as allowed in mining area and shall follow the normal channel direction of the river. These get replenished during monsoon. The only waste is silt/clay which is recycled back to the pits.

Mining will be carried out only during the day time. The factors such as topography, bed gradient, soils, rainfall etc will be taken into consideration for the same. The material is transported through the high velocity flow and is deposited in downstream portion where the bed slope is mild.

Applied area is a part of a river bed and mining will be done manually in open cast method in quite a systematic manner by forming benches of 1.5m high. However, there may be variation in the width which the lessee will keep on mending. About 360,000 Tonnes mineral will be exploited per year. From first year to fifth year total 1800,000 Tonnes mineral will be produced. The proposed area is within river bed and mined out area will be replenished gradually during succeeding rainy season. The sandy soil to be scrapped manually with the help of pickaxe, spade & crowbar and will be stacked separately in dump yard located near the working pit. About 10% of the total production is considered as a waste material and will be used for reclaiming the bank slope. Backfilling will be done simultaneously in each year.

Prior to any actual mining being done at the site, it is necessary to remove overburden from the top of the RBM. Overburden is sandy soil or subsoil that is mainly composed of silty sand. Sandy soil will be kept separate and used on top of the berms once they have reached their final elevation. The berms have multiple purposes; they provide storage for overburden until the mine is reclaimed, they provide a visual barrier between the active mine and roads or adjoining properties, they screen light position should the mine be operated after dark and they act as a noise barrier.

Once the overburden has been removed the sand is excavated depending upon the lithological variation, no blasting may be used to make the sand containing material more amenable to excavation. Excavation is typically performed by manual means. Hand operated tools like spade; tasla etc will be used to collect the sand. The excavated material



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may be directly loaded into trucks, dumpers, tippers and tractors trolleys and send to the destination wherever it is required for construction and other purposes.

Transportation of sand from the mine is a process to deliver mined out material to the location where it is going to be collected. Mined out sand will manually be loaded into truck and transported to its destination where it will ultimately be used. Sufficient space will be left for loading of trucks. Excavation of river bed minerals will commence from the top surface of the area and commence towards down removing the minerals manually in 1.5m slices. Ultimate depth of a bench will be 1.5m. Mining will be restricted upto a maximum depth of 1.5m only. The entire area does not require excavating at once. Per year about 360,000 tonnes production of river RBM (sand bajri & boulder) have been proposed to meet the market requirement.

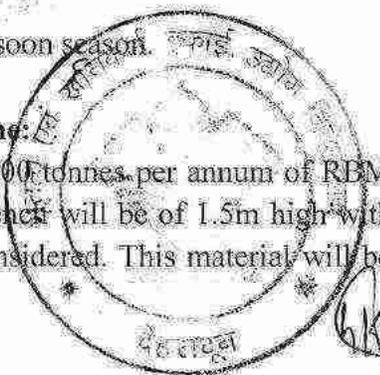
The mineral extraction will be done for a period of 270 days in a year. During this period the areas of mining quarry will be free from submergence. During mining operation the river flow will be away to enable dry pit mining. In the lease area the river flow being reduced and sediment load get deposited. During flood season, the area gets replenished with sediments and source of erosion at this location is comparatively less.

The guidelines of the Ministry of Environment & Forests and Directorate of Geology and Mining will be followed; the most important is as under:

- Dry pit mining will be followed which means mining an all times will be above the flowing river water level. Mining activity will be immediately stopped when water comes in the mining pits.
- RBM (sand bajri & boulder) will be collected in slices upto a depth of 1.5 m or river water level whichever less than prescribed.
- Stream will not be diverted to form inactive channel.
- Mining at the concave side of the river channel will be avoided to prevent bank erosion.
- Mining will be restricted minimum 25% (UPL) from both banks to minimize effect of river bank erosion and to avoid consequent channel migration. Plantation will be done on such area to isolate mining operation form the rest of the area.
- Area of mining lease will be demarcated prior to mining and pillars will be erected on ground.
- No mining operations shall be carried out in proximity of any bridge and or embankment. Working will be during day-time only; i.e. sunrise to sunset only;
- No constructions will be done at site except for construction of initial temporary shelter house;
- No water intake from river will be done. Water will be supplied by tankers from outside sources;
- No machineries will be used;
- Mining will be completely stopped during monsoon season.

Proposed Rate of Production and Life of Mine:

Depending upon the market about 360,000 tonnes per annum of RBM is proposed to be swiped out from the mining area. Each bench will be of 1.5m high with 0.75m high sub benches. Tonnage factor of 1.8 has been considered. This material will be expected to be replenished during the next rainy season.



Year Wise Mining & Development:

Area does not show any outcrop of in-situ deposit. The production is generally in the form of bajri and boulder. The general recovery of the RBM is about 90% has been considered as per our past experience. Thus, total saleable quantity in tonnes will be around 360,000. From I year to V year about 453m retaining wall will be constructed along the plantation & dump area and about 161m retaining wall will be constructed along the edge of bench.

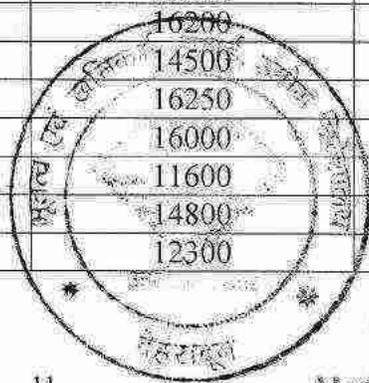
I Year:

The mining face will be started from SW to NE direction from the lower level and advance towards higher levels. During this year mining is proposed RL 529m to RL 593.5m to open the mining faces and transportation of mineral. The mining face will be advance towards NE. Backfilling will be done upto RL 592m. Tonnage factor of 1.8 has been considered. Thus, total saleable quantity in Tonnes will be 360,000.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high with 0.75m high sub benches. In I year about 58m long retaining wall will be constructed along the plantation & dump area.

The net recovery of RBM has been considered 90% of total excavation. The bench wise proposed quantity, production and closing recoverable reserves are given below:

Bench Level (m)	Quantity of the mineral (Tonnes)	Production (Tonnes)	Balance (Tonnes)
529	2947.91	2850	97.91
530.5	3987.63	3900	87.63
532	2960.20	2850	110.20
533.5	7435.36	7400	35.36
535	7058.59	6900	158.59
536.5	8661.44	8600	61.44
538	9161.17	9000	161.17
539.5	8476.62	8300	176.62
541	10007.52	10000	7.52
542.5	10101.63	10000	101.63
544	24685.08	24000	685.08
545.5	28214.66	28100	114.66
547	18647.89	18500	147.89
548.5	21356.78	21200	156.78
550	17006.31	16900	106.31
551.5	23728.97	23600	128.97
553	16297.40	16200	97.40
554.5	14652.20	14500	152.20
556	16352.13	16250	102.13
557.5	16097.15	16000	97.15
559	11878.35	11600	278.35
560.5	14908.12	14800	108.12
562	12467.82	12300	167.82



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563.5	2494.69	2400	94.69
565	864.81	850	14.81
566.5	2161.14	2100	61.14
568	3055.36	3000	55.36
569.5	1474.84	1400	74.84
571	1733.98	1600	133.98
572.5	458.30	400	58.30
574	427.15	350	77.15
575.5	686.50	600	86.50
577	3545.61	3450	95.61
578.5	4616.78	4550	66.78
580	1854.84	1750	104.84
581.5	2736.47	2700	56.47
583	4714.05	4500	214.05
584.5	3986.66	3900	86.66
586	1631.79	1500	131.79
587.5	2680.31	2500	180.31
589	6133.44	6000	133.44
590.5	3666.65	3600	66.65
592	4792.20	4600	192.20
593.5	4574.30	4500	74.30
Total	365400.83	360000	5400.83

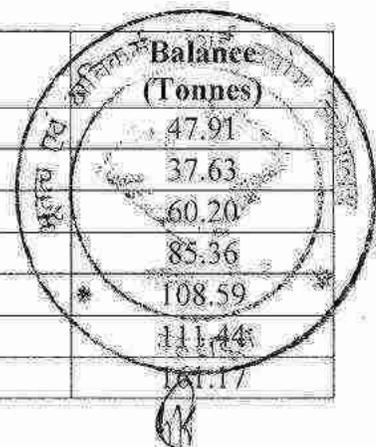
The position of benches in I year is shown in Plate No.4.

II Year:

As mentioned that the mined out area will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. During this year mining is proposed from RL. 529m to RL. 593.5m to open the mining faces and transportation of mineral. The mining face will be advance towards NE. Backfilling will be done upto RL. 592m. Tonnage factor of 1.8 has been considered. Thus, total saleable quantity in Tonnes will be 360,000. In this year about 60m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90% of total excavation. The bench wise proposed quantity, production and closing recoverable reserves are given below:

Bench Level (m)	Quantity of the mineral (Tonnes)	Production (Tonnes)	Balance (Tonnes)
529	2947.91	2900	47.91
530.5	3987.63	3950	37.63
532	2960.20	2900	60.20
533.5	7435.36	7350	85.36
535	7058.59	6950	108.59
536.5	8661.44	8550	111.44
538	9161.17	9000	161.17



539.5	8476.62	8300	176.62
541	10007.52	10000	7.52
542.5	10101.63	10000	101.63
544	24685.08	24000	685.08
545.5	28214.66	28100	114.66
547	18647.89	18500	147.89
548.5	21356.78	21200	156.78
550	17006.31	16900	106.31
551.5	23728.97	23600	128.97
553	16297.40	16200	97.40
554.5	14652.20	14500	152.20
556	16352.13	16250	102.13
557.5	16097.15	16000	97.15
559	11878.35	11600	278.35
560.5	14908.12	14800	108.12
562	12467.82	12300	167.82
563.5	2494.69	2400	94.69
565	864.81	800	64.81
566.5	2161.14	2100	61.14
568	3055.36	3000	55.36
569.5	1474.84	1400	74.84
571	1733.98	1600	133.98
572.5	458.30	350	108.30
574	427.15	300	127.15
575.5	686.50	600	86.50
577	3545.61	3450	95.61
578.5	4616.78	4600	16.78
580	1854.84	1750	104.84
581.5	2756.47	2700	56.47
583	4714.05	4500	214.05
584.5	3986.66	3900	86.66
586	1631.79	1500	131.79
587.5	2680.31	2500	180.31
589	6133.44	6000	133.44
590.5	3666.65	3600	66.65
592	4792.20	4600	192.20
593.5	4574.30	4500	74.30
Total	365400.83	360000	5400.83

The position of benches in II year is shown in Plate No.5.



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III Year:

As mentioned that the mined out area will be replenished during the monsoon season and the mineral will be filled back over the mined out pit.

The mining face will be advance towards northeast. During this year mining is proposed RL 529m to to RL 593.5m to open the mining faces and transportation of mineral. Backfilling will be done upto RL 592m. In this year about 57m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90% of total excavation. The net saleable production of RBM will be 360,000 Tonnes. The bench wise proposed quantity, production and balance reserves are given below:

Bench Level (m)	Quantity of the mineral (Tonnes)	Production (Tonnes)	Balance (Tonnes)
529	2947.91	2850	97.91
530.5	3987.63	3900	87.63
532	2960.20	2850	110.20
533.5	7435.36	7400	35.36
535	7058.59	6900	158.59
536.5	8661.44	8600	61.44
538	9161.17	9000	161.17
539.5	8476.62	8300	176.62
541	10007.52	10000	7.52
542.5	10101.63	10000	101.63
544	24685.08	24000	685.08
545.5	28214.66	28100	114.66
547	18647.89	18500	147.89
548.5	21356.78	21200	156.78
550	17006.31	16900	106.31
551.5	23728.97	23600	128.97
553	16297.40	16200	97.40
554.5	14652.20	14500	152.20
556	16352.13	16250	102.13
557.5	16097.15	16000	97.15
559	11878.35	11600	278.35
560.5	14908.12	14800	108.12
562	12467.82	12300	167.82
563.5	2494.69	2400	94.69
565	864.81	850	14.81
566.5	2161.14	2100	61.14
568	3055.36	3000	55.36
569.5	1474.84	1400	74.84
571	1733.98	1600	133.98
572.5	458.30	400	58.30
574	427.15	350	77.15

575.5	686.50	600	86.50
577	3545.61	3450	95.61
578.5	4616.78	4550	66.78
580	1854.84	1750	104.84
581.5	2756.47	2700	56.47
583	4714.05	4500	214.05
584.5	3986.66	3900	86.66
586	1631.79	1500	131.79
587.5	2680.31	2500	180.31
589	6133.44	6000	133.44
590.5	3666.65	3600	66.65
592	4792.20	4600	192.20
593.5	4574.30	4500	74.30
Total	365400.83	360000	5400.83

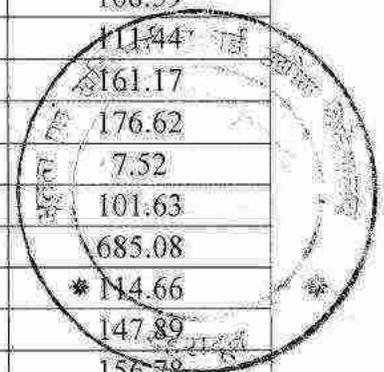
The position of benches in III year is shown in Plate No.6.

IV Year:

As mentioned that the mined out area of III year will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. The mining face will be advance towards NE. During this year mining is proposed from RL 529m to RL 593.5m to open the mining faces and transportation of mineral. Backfilling will be done upto RL 592m. In IV year about 58m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90% of total excavation. The net saleable production of RBM will be 360,000 Tonnes. The bench wise proposed quantity, production and closing recoverable reserves are given below:

Bench Level (m)	Quantity of the mineral (Tonnes)	Production (Tonnes)	Balance (Tonnes)
529	2947.91	2900	47.91
530.5	3987.63	3950	37.63
532	2960.20	2900	60.20
533.5	7435.36	7350	85.36
535	7058.59	6950	108.59
536.5	8661.44	8550	111.44
538	9161.17	9000	161.17
539.5	8476.62	8300	176.62
541	10007.52	10000	7.52
542.5	10101.63	10000	101.63
544	24685.08	24000	685.08
545.5	28214.66	28100	* 114.66
547	18647.89	18500	147.89
548.5	21356.78	21200	156.78
550	17006.31	16900	106.31



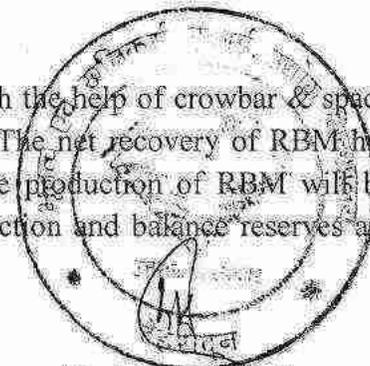
551.5	23728.97	23600	128.97
553	16297.40	16200	97.40
554.5	14652.20	14500	152.20
556	16352.13	16250	102.13
557.5	16097.15	16000	97.15
559	11878.35	11600	278.35
560.5	14908.12	14800	108.12
562	12467.82	12300	167.82
563.5	2494.69	2400	94.69
565	864.81	800	64.81
566.5	2161.14	2100	61.14
568	3055.36	3000	55.36
569.5	1474.84	1400	74.84
571	1733.98	1600	133.98
572.5	458.30	350	108.30
574	427.15	300	127.15
575.5	686.50	600	86.50
577	3545.61	3450	95.61
578.5	4616.78	4600	16.78
580	1854.84	1750	104.84
581.5	2756.47	2700	56.47
583	4714.05	4500	214.05
584.5	3986.66	3900	86.66
586	1631.79	1500	131.79
587.5	2680.31	2500	180.31
589	6133.44	6000	133.44
590.5	3666.65	3600	66.65
592	4792.20	4600	192.20
593.5	4574.30	4500	74.30
Total	365400.83	360000	5400.83

The position of benches in IV year is shown in Plate No.7.

V Year:

As mentioned that the mined out area of IV year will be replenished during the monsoon season and the mineral will be filled back over the mined out pit. The mining face will be advance towards NE. During this year mining is proposed RL 529m to open the mining faces and transportation of mineral. In this year about 59m long retaining wall will be constructed along the plantation & dump area.

The sandy soil will be removed from river bank with the help of crowbar & spade and stacked separately. Each bench will be of 1.5m high. The net recovery of RBM has been considered 90% of total excavation. The net saleable production of RBM will be 360,000 Tonnes. The bench wise proposed quantity, production and balance reserves are given below:



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Bench Level (m)	Quantity of the mineral (Tonnes)	Production (Tonnes)	Balance (Tonnes)
529	2947.91	2850	97.91
530.5	3987.63	3900	87.63
532	2960.20	2850	110.20
533.5	7435.36	7400	35.36
535	7058.59	6900	158.59
536.5	8661.44	8600	61.44
538	9161.17	9000	161.17
539.5	8476.62	8300	176.62
541	10007.52	10000	7.52
542.5	10101.63	10000	101.63
544	24685.08	24000	685.08
545.5	28214.66	28100	114.66
547	18647.89	18500	147.89
548.5	21356.78	21200	156.78
550	17006.31	16900	106.31
551.5	23728.97	23600	128.97
553	16297.40	16200	97.40
554.5	14652.20	14500	152.20
556	16352.13	16250	102.13
557.5	16097.15	16000	97.15
559	11878.35	11600	278.35
560.5	14908.12	14800	108.12
562	12467.82	12300	167.82
563.5	2494.69	2400	94.69
565	864.81	850	14.81
566.5	2161.14	2100	61.14
568	3055.36	3000	55.36
569.5	1474.84	1400	74.84
571	1733.98	1600	133.98
572.5	458.30	400	58.30
574	427.15	350	77.15
575.5	686.50	600	86.50
577	3545.61	3450	95.61
578.5	4616.78	4550	66.78
580	1854.84	1750	104.84
581.5	2756.47	2700	56.47
583	4714.05	4500	214.05
584.5	3986.66	3900	86.66
586	1631.79	1500	131.79
587.5	2680.31	2500	180.31
589	6133.44	6000	133.44
590.5	3666.65	3600	66.65
592	4792.20	4600	192.20
593.5	4574.30	4500	74.30
Total	365400.83	360000	5400.83

The position of benches in V year is shown in Plate No.8.

Ultimate pit limit and life of the mine:

About 60 ha area will be available for the production of RBM up to the life of the mine. The proposed area is within river bed and mined out area will be replenished gradually during succeeding rainy season. Hence there will be no change in land use, land cover or topography of the area. Mining will be undertaken through manually. The height and width of the mining faces will be kept 1.5m each and ultimate pit slope will be 45°. The existing track will be used for the opening of the faces and transportation of mineral. The waste material will stack separately and will be kept in the earmarked stack site. Mineable reserves of the area are calculated with the help of slices (Plate-11) and are tabulated below:

Mineable reserve:

Bench Level (m)	Area of Bench (m) ²	Depth (m)	Volume (m) ³	Recoverable Reserves (m) ³	Recoverable Reserves (Tonnes)
1	2	3	4	5	6
529	1213.13	1.5	1819.70	1637.73	2947.91
530.5	1641.00	1.5	2461.50	2215.35	3987.63
532	1218.19	1.5	1827.29	1644.56	2960.20
533.5	3059.82	1.5	4589.73	4130.76	7435.36
535	2904.77	1.5	4357.16	3921.44	7058.59
536.5	3564.38	1.5	5346.57	4811.91	8661.44
538	3770.03	1.5	5655.05	5089.54	9161.17
539.5	3488.32	1.5	5232.48	4709.23	8476.62
541	4118.32	1.5	6177.48	5559.73	10007.52
542.5	4157.05	1.5	6235.58	5612.02	10101.63
544	10158.47	1.5	15237.71	13713.93	24685.08
545.5	11610.97	1.5	17416.46	15674.81	28214.66
547	7674.03	1.5	11511.05	10359.94	18647.89
548.5	8788.80	1.5	13183.20	11864.88	21356.78
550	6998.48	1.5	10497.72	9447.95	17006.31
551.5	9765.01	1.5	14647.52	13182.76	23728.97
553	6706.75	1.5	10060.13	9054.11	16297.40
554.5	6029.71	1.5	9044.57	8140.11	14652.20
556	6729.27	1.5	10093.91	9084.51	16352.13
557.5	6624.34	1.5	9936.51	8942.86	16092.15
559	4888.21	1.5	7332.32	6599.08	11878.35
560.5	6135.03	1.5	9202.55	8382.29	14908.12
562	5130.79	1.5	7696.19	6926.57	12467.82
563.5	1026.62	1.5	1539.93	1385.94	2494.69
565	355.89	1.5	533.84	480.45	864.81
566.5	889.36	1.5	1334.04	1200.64	2161.14

568	1257.35	1.5	1886.03	1697.42	3055.36
569.5	606.93	1.5	910.40	819.36	1474.84
571	713.57	1.5	1070.36	963.32	1733.98
572.5	188.6	1.5	282.90	254.61	458.30
574	175.78	1.5	263.67	237.30	427.15
575.5	282.51	1.5	423.77	381.39	686.50
577	1459.10	1.5	2188.65	1969.79	3545.61
578.5	1899.91	1.5	2849.87	2564.88	4616.78
580	763.31	1.5	1144.97	1030.47	1854.84
581.5	1134.35	1.5	1701.53	1531.37	2756.47
583	1939.94	1.5	2909.91	2618.92	4714.05
584.5	1640.60	1.5	2460.90	2214.81	3986.66
586	671.52	1.5	1007.28	906.55	1631.79
587.5	1103.01	1.5	1654.52	1489.06	2680.31
589	2524.05	1.5	3786.08	3407.47	6133.44
590.5	1508.91	1.5	2263.37	2037.03	3666.65
592	1972.10	1.5	2958.15	2662.34	4792.20
593.5	1882.43	1.5	2823.65	2541.28	4574.30
Total	150370.71		225556.07	203000.46	365400.83

Conceptual Mine Plan and Life of Mine:

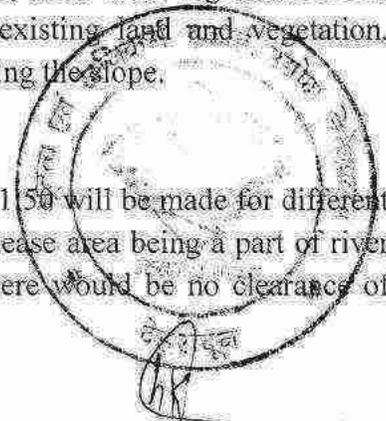
The lease is moderate in size. A wide strip has been left all along the lease boundary as leaving a margin of 25% on both sides which will help in proper channelization of the river as a statutory condition. No RBM will be collected from the proximity of any bridge/embankment. Collection of sand is restricted up to a maximum depth of 1.5m. River/stream will not be diverted in any case. No mining is proposed during rainy season. A quantity of material about 1333m tonnes per day ROM has been proposed to collect during the course of mining. This will be replenished during the next rainy season. Area has sufficient material for the next coming 5 years. The ultimate plan is shown in Plate No. 10.

Afforestation:

The entire mining lease area being a part of river bed, there is no vegetation in the leased out area. Hence there would be no clearance of existing land and vegetation. Plantation will be done on both side of river bank for stabilising the slope.

Infrastructure:

Track having width 3.0m and gradient varies 1:20 to 1:50 will be made for different working pits and up to sandy soil stack. The entire mining lease area being a part of river bed, there is no buildings in the leased out area. Hence there would be no clearance of existing land.



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Backfilling:

The mining will be undertaken on the river bed. The mined out pit will be restored by backfilling of waste material (sandy soil). The final backfilling can be started once the ultimate benches are formed and mineral is completely excavated. However the mined out area will be replenished during the monsoon season and the mineral will be filled back over the mined out pit itself. During extraction of RBM (sand bajri & boulder) from Koth & Moth rivers bed near Rudrapur village; sandy clay will also be removed in form of waste materials. The excavated sandy clay will be used for backfilling of the pits. Therefore there is no risk associated with failure of waste dump.



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CHAPTER – 5

USE OF MINERAL

The RBM containing sand bajri & boulder is an important material for construction. The RBM will be used in road, bridge and building constructions.

CHAPTER – 6

MINE DRAINAGE

The deposit is situated in the river bed and area has a moderate to heavy rainfall. The maximum highest RL is about 595 m on the NE part of the area, while the lowest RL recorded on the SW part of the area is about 529m and general slope is towards south-western direction. Provision of garland drainage is given along the lease boundary with proper gradient towards SW direction.

CHAPTER – 7

STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE

The top RBM containing sandy soil will be removed with the help of pickaxe, spade & crowbar and stacked separately. Part of these rejects will be utilized in construction and maintenance of retaining walls.



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CHAPTER - 8

OTHER

Site Services:

The following site services will be provided:

- (i) Office
- (ii) Store
- (iii) First Aid Centre
- (iv) Drinking water shed
- (v) Rest shelter

The site services like rest room shelter, first aid box and drinking water facilities will be provided to workers at the mine site.

Employment Potential:

The mine manager should be a graduate engineer holding at least second class manager's certificate.

The category-wise employments are given as below:

Manager/Foreman	:	10
Skilled:		
Supervisor	:	32
Time Keeper	:	18
Office Assistant/Dispatch Supervisor	:	10
Un-skilled:		
Daily wages/mining workers	:	530
Total	:	600

The services of following persons/agencies may be retained on part time basis.

- (i) Environment consultancy agency
- (ii) Consultant Mining Engineer (Part-time) degree in Mining
- (iii) Mining Geologist
- (iv) Mines Surveyor

CHAPTER - 9

BENEFICIATION

No beneficiation of mineral processing will required for sand. There for no such investigations have been conducted.



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ENVIRONMENT

Land use:

Land degradation and ecological disturbances generally occurs in open cast mining. In preparation of mining plan of River Kot Mot, for sand bajri & boulder mining to M/s Uttarakhand Forest Development Corporation (UKFDC), emphasis on environmental protection has been given to minimize the adverse impact on the present environmental status. Opencast method of mining causes some land degradation and disturbs the ecology of the area. While preparing the Environment Management Plan (EMP) emphasis has been laid on restoring the ecology of the area as much as is possible. Applied area is almost barren but at places covered with thin grasses. This has been made possible by planning the mine workings in the most systematic, safe and scientific manner with due regard to conservation of mineral.

Water regime:

The ground water table in this region is at shallow depth below ground surface and hence ground water may interfere in opencast mining below 1.5m depth. The ground water conditions in alluvial parts of Dehradun district are considerably influenced by the varying lithology of the subsurface formations. The main source of water, which sustains groundwater in the district, is rainfall. Alluvium is the main water bearing formation in the area, which consists of coarse sand, fine sand and silt. Ground water in Dehradun district occurs under unconfined, confined and semi-confined conditions. The aquifers are separated with thick clay with considerable thickness, which act as confining layers. The water level data suggests the presence of multilayer aquifer system.

Flora and fauna:

Area supports moderately healthy vegetation, the main forest species are along the Shiwalik foothills. These Terai plains support the species of Sisam, Arjuna, Kanji, Khair, Sagaun, Neem, Eucalyptus, Babul etc. Ground vegetation mainly consists of grasses and small shrubs. Useful fodder grasses, *Cynodon dactylon*, *Eleusine indica*, *Trifolium alexandrinum* etc. can be seen growing in the area. The large weeds which infest uncultivated tracts are Aak (*Calotropis procera*), Castor (*Ricinus communis*), Dhatura (*Datura metel*) and thorn (*Opuntia stricta*). Other noxious weeds and those which appear in crops are Pohli or Thistle (*Carthamus oxyacantha*), Shial Kanta (*Argemone Mexicana*), Kandyari (*Solanum xanthocarpum*), Parthenium hysterophorus and Bhag (*Cannabis sativa*).

The core Zone of Kot Mot River where mining operation is proposed consists of riparian vegetation in which aquatic and marshland plants are the main component. Most among them are weeds. No ecologically sensitive plant species has been reported from this area. Riparian vegetation is found along the river side. In stagnant water growth of hydrophytes like *Hydrolea zeylanica*, *Ipomoea carnea*, *Ludwigia ascendens*, *Sagittaria sagittifolia*, *Spilanthes paniculata*, *Typha latifolia*, etc can be commonly observed. Buffer zone of the applied area is Doon Velly and foothills of Siwalik and tree species observed in

the area are, Aam, Jamun, Bail, Bakain, Bargad, Neem, Peepal, Popular, Safeda and Sisam etc.

Shrubs: *Calotropis procera*, with a few *Datura innoxia* and *Ipomoea carnea* etc. occurs in the depressions.

Herbs: *Ageratum conyzoides*, *Amaranthus spinosus*, *Cannabis savita* and *Hydrolea zeylanica*.

Quality of air, ambient noise level and water:

Mining activities includes excavation and lifting of minerals. The proposed mining activity is manual in nature. No drilling and blasting is envisaged for the mining activity. Hence the only impact anticipated is due to movement of vehicles deployment for transportation of minerals. The location of the monitoring stations will be selected based on predominant wind direction and sensitive locations within the study area.

Water quality:

The surface drainage system in the area is almost seasonal. The flow in the natural drain is observed only immediately after the rainfall and then these nala become entirely dry. Drinking water quality will not deteriorate by mining and allied activities.

Climatic condition:

Rainfall: Doon valley is characterized by humid climate with moderate temperature, rainfall and luxuriant vegetation. The average annual rainfall in the area reaches 2073.3mm. Maximum rainfall seems during July and August. On an average there are about 48 rainy days in a year.

Temperature: Mean Maximum temperature is 36.2⁰C and the mean minimum temperature is 6.1⁰C. In association with the cold waves arising in the wake of the western disturbance which travels East wards, the minimum temperature goes down to about 3⁰ and at times leads to frosts.

Socio-Economics:

Social and demographic profile:

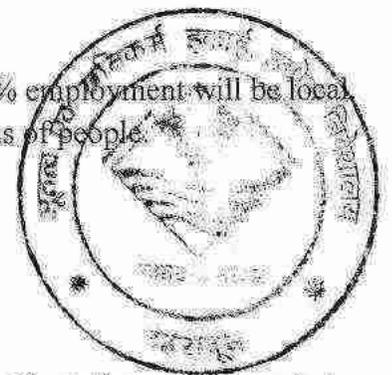
The scale of operation is medium. It is expected that 90% employment will be local. Therefore there will be positive impact on socio-economic status of people.

Historical monuments etc:

There is no historical building in and around the lease area.

Programme of afforestation:

Plantation is proposed along the slope on both bank of the river. Plantation will be carried out on approach roads and nearby vicinity of river bank.



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Rehabilitation of extracted land has to be designed skilfully in order to restore it to its formal use, or to an alternative use that is compatible with the surroundings. Plantation with grasses, herbs, shrubs and trees is an important means for restoring such areas. Stabilizing and re-vegetate the de-vegetated areas viz. debris, dumps and slopes which get degraded due to vehicle movement, rolling stones, etc are important for conservation of soil, regulation of surface and underground water and for rehabilitation of wild life habitat. These generally are extracting operations and need planting in various phases by select species. Protective engineering measures, in conjunction, become necessary.

Top layer of RBM having some sandy soil is considered as an overburden and will be stacked separately and nature of this dump will be temporary. Mining pits will be backfilled from first year onwards in the proposed pit. Soil will be spread over the benches.



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CLOSURE PLAN

Mined Out land:

Plantation is proposed along the slope on both bank of the river. The mining will commence from the lower levels and will advance towards higher levels. Intermittent backfilling will commence from the lower levels and subsequently advance, towards the higher elevations. The year wise proposal for reclamation is shown in Plate No. - 4 to 8.

Water Quality Management:

The mineral as well as soil are non-toxic and mining is also proposed at medium to small scale. Hence no proposal has been provided for the surface and ground water bodies. The expected depth of water table in applied area likely to be more than the exploitation depth.

Air Quality Management:

The lease area is situated in the river bed. The manual mining without drilling and blasting has been proposed. Therefore the impact on air environment will be negligible. Mining and allied activities are going on a comparatively small scale; the existing air is absolutely clean.

Waste Management:

The RBM containing sandy soil will be stacked separately and these dumps are temporary in nature. The dumping will be undertaken manually. The toe wall having width 1.5m and height 1.0m will be made along the side and slope of the soil and width & height 1.5m each retaining wall for protecting RBM dump to avoid the wash off material during intermittent rains.

Infrastructure:

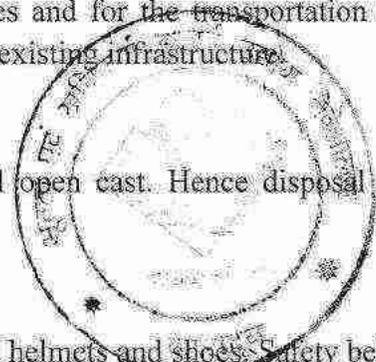
In river bed RBM (sand, bajri & boulder) is excavated by manual open cast mining method. No mechanization is required. The tracks having width of 3.0m and gradient 1:20 to 1:50 will be made for the advancement of mining faces and for the transportation of RBM and waste material. There will not be any changed in existing infrastructure.

Disposal of Mining Machinery:

The RBM (sand bajri & boulder) mine is manual open cast. Hence disposal of mining machineries are not required.

Safety and Security:

Each worker employed in the mine will be provided helmets and shoes. Safety belts will be used for working in the top of the benches. Protective works like parapet walls, garland drains shall be provided before the mine/pit is abandoned.



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A worker in a mine should be able to work under adequately safe and healthy condition. Safety of the mine and the employees is taken care of by the Mining Rules & Regulations. The minerals will be mined out in a uniform wash so that the river flow/course shall not get disturbed. Mining is to be done leaving safety barrier on both sides and maximum barrier should be on concave side of the river, preferably the flow channel (excavation void) created should be kept straight so as to help avoid erosion. River banks will not be excavated to form access ramps. Only excavated river gravel should be used to deposit against the river bank to form access ramps.

Disaster management and risk assessment:

The possible risks in the case of river bed mining project are bank erosion, floods, accidents due to transportation etc. At present the mining is proposed in a mild sloping forest (*Be nap*) land in river bed. Pits will be created of limited depth of 1.5 m only, thus the chance of failure of pit slope does not exist.

When the mining will reach up to the optimum economical depth then backfilling will commence to restore the topography of the area. The mining faces shall be dressed properly because any hanging boulders/loose material may create fatal accidents to the labourers while working in the pit. The mine shall be critically examined for its proneness to any natural hazard and assessment regarding danger of hazard and precautions to be taken and should be reviewed so that chances of slope failures will be minimized.

CHAPTER - 12

CONCLUSION

This applied area is suitable for producing material for making road, bridge, buildings and other constructional work. This is a part of Govt. of India's policy to develop maximum infrastructure facility in India. This making of road or bridge will generate direct & indirect employment to the local people. Uttarakhand Forest Development Corporation (UKFDC) will undertake mining activity as per the plan indicated in the above chapters with proper taking care of environmental aspects i.e. without disturbing the ambient condition. Pits will be created of limited depth of 1.5 m only, thus the chance of failure of pit slope seems to be least. The proposed river bed mining is unlikely to change any characteristic of the river bed as the permitted mining volume is based upon annual replenishment.


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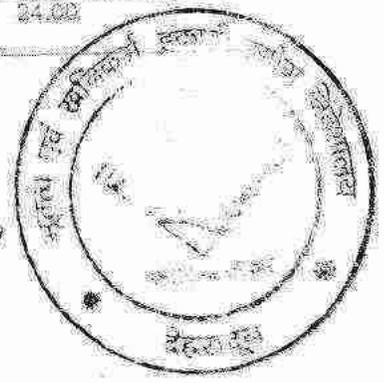
मृदात्म एवं खनिकर्म इकाई
उद्योग निदेशालय उत्तराखण्ड भोपालबानी, देहरादून
 संख्या: 60/खनि01/2012-13, दिनांक: 23 जनवरी, 2013
कार्यालय भाषा
आशय पत्र (Letter of Intent)

उत्तराखण्ड खनिज नीति, 2011 के बिन्दु-2 के प्रसार-1 के अनुसार राज्य के वन नदी सम्बन्धित क्षेत्रों में उपखनिज को सुगम को खनन परटे वन क्षेत्र में उत्तराखण्ड वन विकास निगम को उत्तराखण्ड ब्यवसायिक पत्रिका नियमावली 2001 के नियमानुसार निर्धारित प्रपत्र एण0एम-1 में आवेदन करने को उपखनन हेतु बंध हेतु प्रीक्यूरे किंगी ऑफ प्रावधान के मुताबिक वन क्षेत्र के वन नदी सम्बन्धित क्षेत्रों में उपखनिजों को सुगम को खनन परटे वन क्षेत्र हेतु आवेदनक प्रपत्र निदेशक, उत्तराखण्ड वन विकास विकास निगम, देहरादून द्वारा प्रस्तुत आवेदन पत्रों को उत्तराखण्ड व इस आशय पत्र (Letter of Intent) के माध्यम को राज्य सरकार आवेदनक प्रपत्र निदेशक, उत्तराखण्ड वन विकास निगम को पत्र में उत्तरा द्वारा आवेदित क्षेत्रों यथा जनपद देहरादून के 18 उपखनिज ब्लॉकों तथा उत्तराखण्ड विधान सभा क्षेत्रों में 02 उपखनिज ब्लॉकों में उत्तराखण्ड वन विकास निगम को 01 जनपद नैनीताल के 02 उपखनन उपखनिज नगर को 02 जनपद प्रतापगढ़ के 01 तथा जनपद रामपुर के 02 उपखनन ब्लॉकों जिनका विवरण तालिका-1 में प्रिलिखित है, को 05 (पांच) वर्ष की अवधि हेतु उपखनिज सुगम हेतु खनन परटे प्रीक्यूरे करने को मंजूर किया है-

तालिका-1

क्र.सं.	नदी का नाम	जनपद का नाम	क्षेत्रफल (है.)
1.	गढ़वाल		42.00
2.	काली नदी		60.00
3.	रामुना बाय किनार लाव		70.00
4.	रामुना बाय किनारा कुल्हाल		32.00
5.	आमलावा		30.00
6.	रामुना रामपुर नदी		20.11
7.	दोष हरिपुर		51.73
8.	सौरना नदी		23.75
9.	बागना री		20.00
10.	आरी री		30.00
11.	खजनावर री		30.00
12.	हामाड री		8.00
13.	कालुशाला री		18.00
14.	बाली जी + मुरली री		8.00
15.	बडासरा		30.00
16.	भोली री		30.00
17.	सुखरी री		16.00
18.	कुसुमधरा री		24.00

JPBW (10)
6/1/13
23-01-2013



19	बालगंगा नदी	दिहरी गढ़वाल	7.908
20	पुष्पागाढ़		10.00
21	खी नदी		7.98
22	मालन नदी		45.00
23	सुखरी नदी	पीड़ी गढ़वाल	73.00
24	कोल्हू नदी / कोल्हू		24.50
25	लौंगर झरना		570.00
26	चाबका नदी-2		245.55
27	घोसला नदी	नैनीताल	88.00
28	जाखन नदी		15.88
29	खेर नदी		235.00
30	भाकड़ा		170.00
31	दाबका नदी-3	उधमसिंह नगर	65.00
32	शारदा नदी-2		186.00
33	भगार-सखी नदी	अल्मोड़ा	8.7
34	लक्ष्मिया नाला	चम्पावत	10.00
35	लक्ष्मिया नाला किता साहिव		15.48
	योग		2313.37

2. आवेदन प्रकाश निदेशक, उत्तराखण्ड वन विकास निगम यदि उक्त तालिकाओं में उल्लिखित सभी उपखनिज सुतान का खनन पट्टा लेने हेतु सहमत हो तो शम्भुनादेश संख्या 922/VII-1/11-सि/2012 दिनांक 26 फरवरी, 2012 में दिये गये निर्देशानुसार EIA Notification, 2006 के अन्तर्गत पर्यावरणीय स्वीकृति प्राप्त कर पर्यावरणीय स्वीकृति की प्रति इस कार्यालय को प्रस्तुत करना सुनिश्चित करें, ताकि नियमानुसार खनन पट्टा स्वीकृति हेतु उपरोक्त कार्यवाही की जा सके।

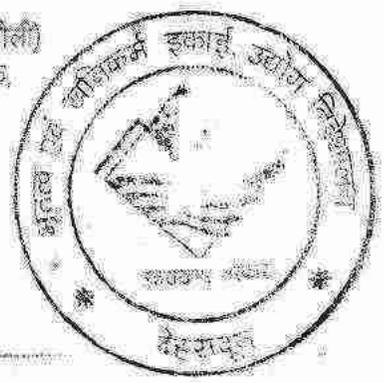
सहायक
(सिनेस वर्गोली)
निदेशक

प्रकाशन संख्या (1)/सूचिनांकित।

प्रतिलिपि: निम्नलिखित को सूचना एवं आवश्यक कार्यवाही हेतु प्रेषित।

1. प्रमुख सचिव, औद्योगिक विकास विभाग, उत्तराखण्ड शासन।
2. सिलाधिकारी, देहरादून/दिहरी गढ़वाल/पीड़ी गढ़वाल/चम्पावत/नैनीताल/उधमसिंह नगर।
3. प्रमुख निदेशक, उत्तराखण्ड वन विकास निगम देहरादून को इस आशय से प्रेषित कि EIA Notification, 2006 के अन्तर्गत पर्यावरणीय स्वीकृति प्राप्त कर इस कार्यालय को उक्त कार्यवाही सुनिश्चित करें।
4. गार्ड फाईल।

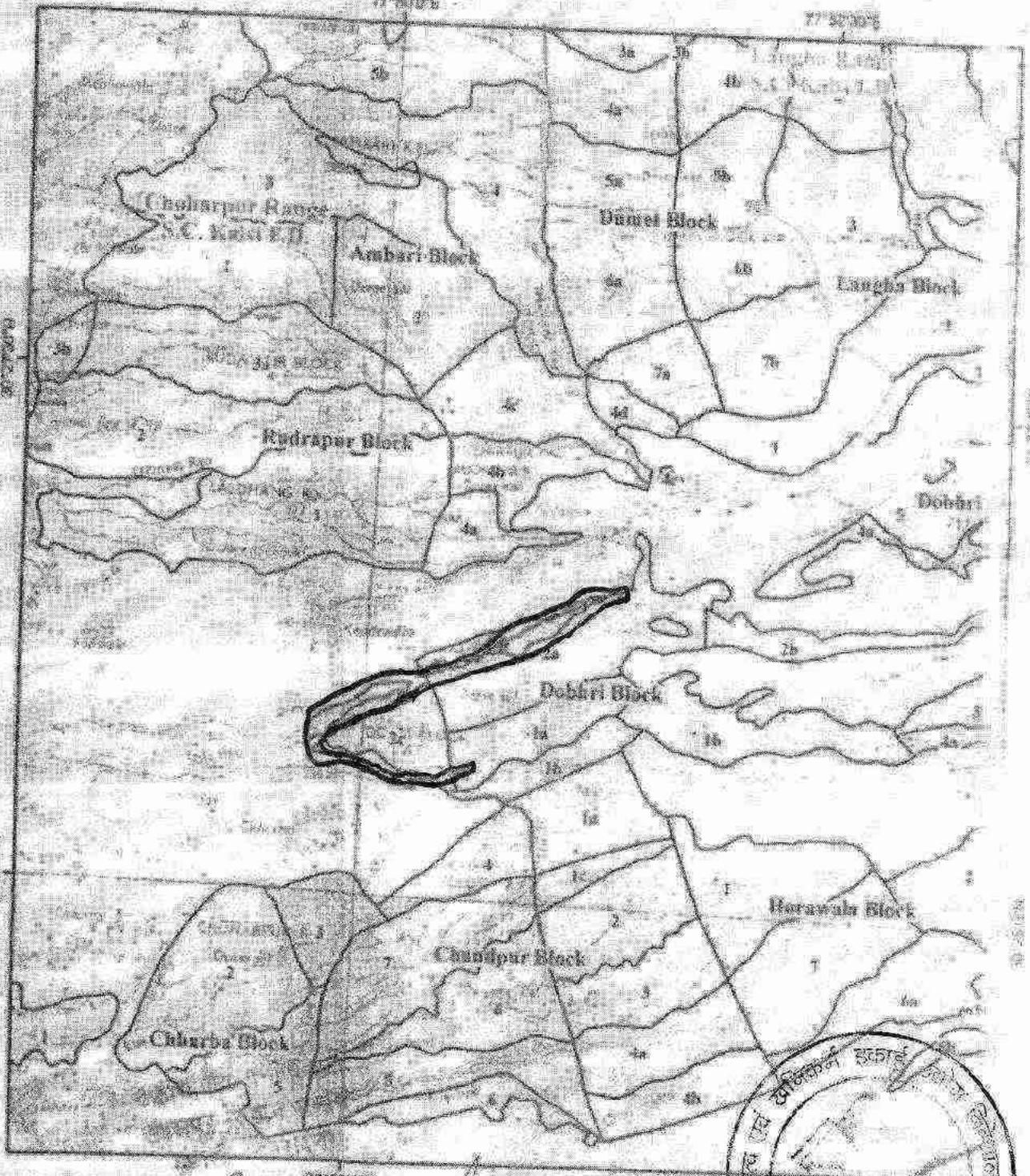
(सिनेस वर्गोली)
निदेशक



405

डिजिटल मैप - जिला देहरादून के अन्तर्गत चौहलपुर रेंज, वन प्रभाग
 नू-सं० कालसी में प्रस्तावित खनन क्षेत्र - कोड - मोठ नदी से० ६० ६०

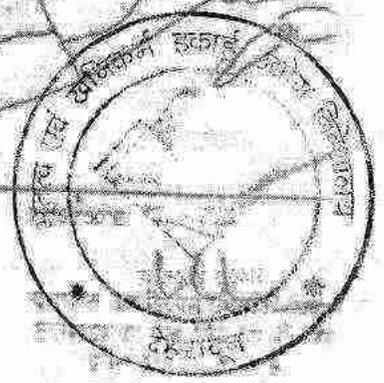
0 0.5 1 2 Km



Legend

- प्रस्तावित खनन क्षेत्र
- वन प्रभाग सीमा
- रेंज सीमा
- ब्लॉक सीमा

Agarwal
 वन विभागाध्यक्ष
 देहरादून जिला प्रशासन



संयुक्त निरीक्षण आख्या

भारत सरकार से अनुमति प्राप्त करने के लिये भूमी संरक्षण वन प्रभाग कोटमोट नदी, (आरक्षित वन क्षेत्र) से उपखनिज चुगान हेतु संयुक्त निरीक्षण आख्या।

प्रभागीय वनाधिकारी, भूमी संरक्षण वन प्रभाग की पत्र संख्या 111/2011/वन/प्रभागीय के क्रम में निर्धारित तिथि दिनांक से तक भूमी संरक्षण प्रभाग की चौहड़पुर रेंज की कोटमोट नदी, चौहड़पुर का संयुक्त निरीक्षण वन प्रभाग वनाधिकारी, कालसी, प्रभागीय वन विकास प्रबन्धक, खन्नु देहरादून, विकासनगर व उप जिलाधिकारी, विकासनगर द्वारा किया गया।

निरीक्षण के दौरान उक्त क्षेत्र में उपखनिज (रिता, बजरी, पत्थर) मिलीजुली अवस्था में विद्यमान है। जिसका वर्तमान में चुगान/खनन कार्य प्रारम्भ किया जा रहा है। वर्षाकाल में कोटमोट नदी में उपखनिज (रिता, बजरी, पत्थर) एकत्र होने से पानी का बहाव मुख्य धारा में नदी के दोनों तटों पर कटाव कर रहा है। जिससे कोटमोट नदी, चौहड़पुर के तटों पर आबादी प्रभावित हो रही है व कोटमोट नदी, चौहड़पुर का क्षेत्र जो कोटमोट नदी से उपखनिज चुगान कार्य में बड़ी संख्या में श्रमिक कार्य कर रहे हैं, रोजगार का सृजन होगा, यदि खनन चुगान नहीं किया जाता है तो इन क्षेत्रों में रोजगार का स्रोत कम हो जायेगा। साथ ही स्थानीय आपूर्ति सहज/नियमानुसार इससे नदियों में आये नलबे को चुगान से नदियों की अविरलता प्रभावित नहीं होगी।

उपरोक्त नदी से उपखनिज चुगान कार्य उत्तराखण्ड राज्य के क्षेत्र में राज्य को भारी राजस्व की प्राप्ति होगी।

अतः संयुक्त निरीक्षण के दौरान संयुक्त रूप से यह निर्णय लिया गया कि कोटमोट नदी, चौहड़पुर क्षेत्र से 80 हे० क्षेत्र में उपखनिज चुगान कार्य प्रारम्भ करने में सरकार को प्रस्ताव प्रस्तुत किया जा सकता है।

उपरोक्त 80 हे० में उपखनिज चुगान की अनुमति भारत सरकार द्वारा प्रस्तावित दशा में नियमानुसार चुगान कार्य किये जाने पर पर्यावरण की हृष्टिकरण से बचाव प्रभाव पड़ने की सम्भावना प्रतीत नहीं होती है।

चुगान कार्य हेतु वन संरक्षण अधिनियम 1980 की धारा-2 एवं EIA का प्राविधानों के अनुरूप भारत सरकार से अनुमति प्राप्त किये जाने की संज्ञित है।


प्रभागीय वन विकास प्रबन्धक
उत्तराखण्ड का विकास विभाग
देहरादून


तहसीलदार
विकासनगर




कालसी



जनपद देहरादून कोटमोट नदी, चौहड़पुर में उपलब्ध उपखनिज के चुगान के सम्बन्ध में
भूगर्भीय/तकनीकी आख्या

कार्यालय प्रभागीय वन विकास प्रबन्धक (खनन), देहरादून के पत्रांक 375/दि० 10.07.2013 के क्रम में जनपद देहरादून के कोटमोट नदी, चौहड़पुर उपखनिज युक्त क्षेत्र का निरीक्षण दि० 09-08-13 को श्री आर०एस०कहेड़ा, प्रभागीय वन विकास प्रबन्धक एवं श्री आई०पी० सिंह, उप लौगिंग अधिकारी, खनन प्रभाग, देहरादून की उपस्थिति में उपलब्ध कराये गये मानचित्रानुसार विभागीय सर्वेक्षण के सहयोग से किया गया। क्षेत्र की भूगर्भीय/तकनीकी आख्या निम्नवत् है:-

उक्त प्रस्तावित क्षेत्र, देहरादून से 28 कि०मी० दूरी पर सहसपुर लाघाँ रोड के उत्तर दिशा में 2 कि०मी० दूरी पर है, प्रस्तावित क्षेत्र कोटमोट नदी, चौहड़पुर के पूर्व दिशा एवं पश्चिम दिशा में आरक्षित वन क्षेत्र है, इस क्षेत्र में उपखनिज रेत, बजरी, पत्थर, मिला-जुली अवस्था में है जिसका चुगान किया जा सकता है। इस क्षेत्र में उपखनिज का अनुमानित अनुपात लगभग 20:40:40 है। यह उपखनिज विभिन्न निर्माण कार्यों में प्रयोग किया जा सकता है। इस क्षेत्र के मध्य भाग से चुगान करते हुए प्रतिवर्ष लगभग 2:00 लाख 0मी० उपखनिज निकाला जा सकता है। उपखनिज निकाले जाने से नरौखाला नदी द्वारा किनारों पर किये जा रहे कटाव को कम किया जा सकता है।

सुव्यवस्थित चुगान कार्य किये जाने से भूगर्भीय/तकनीकी दृष्टिकोण के प्रभाव पड़ने की सम्भावना प्रतीत नहीं होती है। विगत वर्षों में इस क्षेत्र में खनन अनुमति प्राप्त नहीं हुई है। खनन अनुमति प्राप्त होने पर राजस्व प्राप्ति की जा सकती है। क्षेत्र में उपखनिज की उपलब्धता को दृष्टि गोचर रखते हुए नियमानुसार प्रस्ताव तैयार किये जाने से सम्बन्धी आवश्यक कार्यवाही करना चाहें।



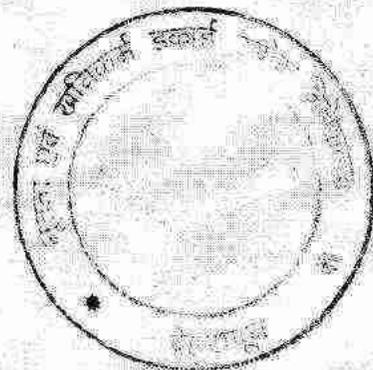
(आई०पी० सिंह)
उप लौगिंग अधिकारी
उ०वनविकासनिगम, देहरादून



(आर०एस०कहेड़ा)
प्रभागीय वन विकास प्रबन्धक (खनन)
उ०वन विकास निगम, देहरादून



(राजेन्द्र प्रसाद शुक्ला)
मू वैज्ञानिक
भूतत्व एवं खनिकर्म इकाई,
जिला टास्क फोर्स, देहरादून





[Signature] 10/05/12
Regional Controller of Mines (North)
Bureau of Mines

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON TO PREPARE MINING PLANS

(Under Rule 22 (c) of Mineral Concession Rules - 1960)

Shri HARISH KAINTHOLA resident
of 54, ANARWALA, DEHRADUN, UA son
of SHRI MADAN MOHAN SHARMA having given satisfactory
evidence of his qualifications and experience is hereby granted recognition
under Rule 22 (c) of the Mineral Concession Rules, 1960 as a Qualified
Person to prepare Mining Plans.

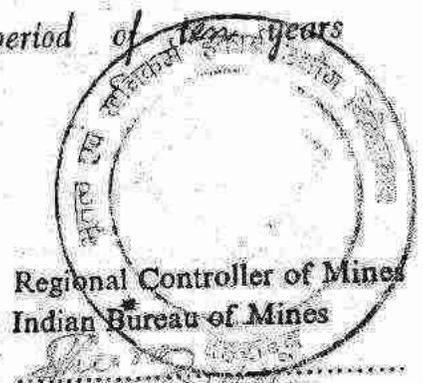
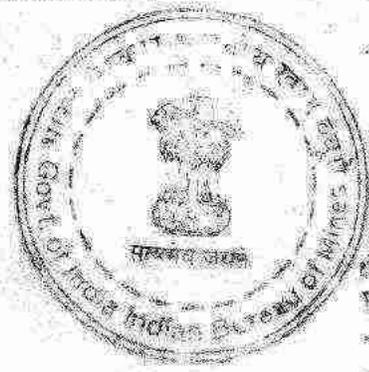
His registration number is

ROP	DDN	141	2502 - A
-----	-----	-----	----------

This recognition is valid for a period of ten years
ending 16.1.2012

Place: Dehradun
Date: 17.1.2012

Signature of ROP. *[Signature]*
14/10/2011



Regional Controller of Mines
Indian Bureau of Mines
[Signature]
Regional Controller of Mines
Bureau of Mines

श्री हरीश केंचौला
खेड नं. 8, इन्डियन गवर्नमेंट ऑफिस
अमर तलमपुर, मीरत जिल्हा, उत्तर प्रदेश-243008
देहरादून (उत्तर प्रदेश)।


बाल विवेक (शर्मा)
Controller of Mines (North)
भारतीय खान ब्यूरो
Indian Bureau of Mines

16 जनवरी 2017 तक के लिए मनीनीकृत
Renewed up to 16th January 2017


बाल विवेक (शर्मा)
Controller of Mines (North)
भारतीय खान ब्यूरो
Indian Bureau of Mines

AUTHORISATION LETTER

M/s Uttarakhand Forest Development Corporation (UKFDC) has made an agreement regarding the preparation of mining plan of 21 lots at different districts in Uttarakhand with M/s *KainGeotech* and here by authorize M/s *KainGeotech*- Prop. Shri Harish Kainthola, (RQP/DDN/141/2002-A) to prepare the Mining Plans in respect of Kot Mot river in Choharpur Forest Range, over an area of 60 ha for minor mineral, falls under forest land near village - Rudrapur etc., Tehsil- Vikasnagar, Distt. - Dehradun (Uttarakhand).

UKFDC request the Director, Geology and Mining Unit, Directorate of Industry, Govt. of Uttarakhand, Dehradun to make further correspondence regarding modification and collection of the aforesaid Mining Plan with the said recognized person on his following address:

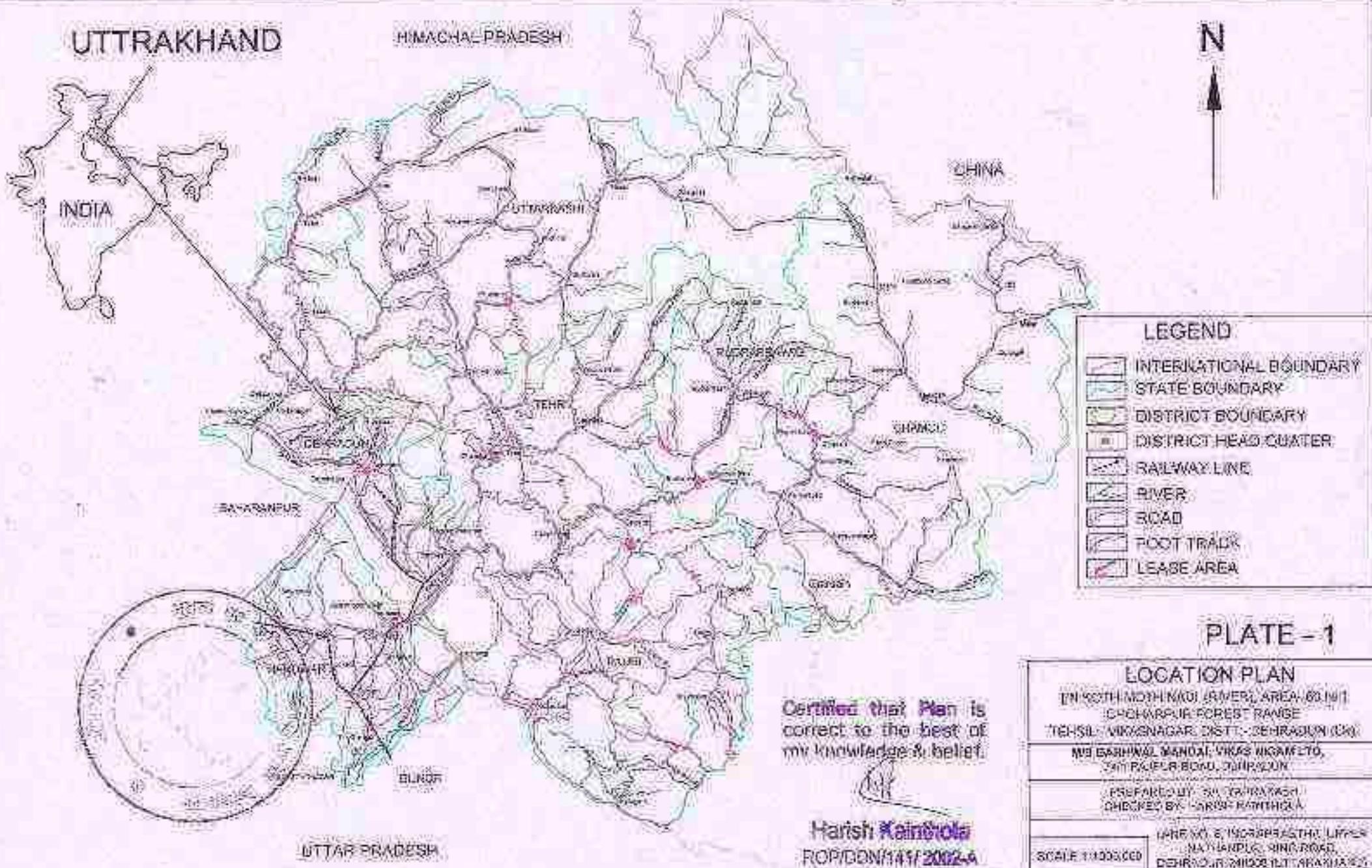
Name of RQP : Shri Harish Kainthola C/o M/s *KainGeotech*
Registration No. : RQP/DDN/141/2002-A
Validity : (Valid upto 16th Jan, 2017)

Address of RQP

Lane No. 8,
 Indraprastha, Mussoorie Bye pass road,
 Upper Nathanpur, P.O. Nehrugram- 248008,
 Dehra Dun (Uttarakhand)
 Telephone: 09412028745(Office),
 8410411206 (Cell)
 E- mail: hkainthola@gmail.com


 प्रभागीय वन विकास प्रबंधक (खनन)
 उत्तराखण्ड वन विकास निगम
 15/15 ए डोगवाला, देहरादून





UTTRAKHAND

HIMACHAL PRADESH

N

INDIA

CHINA

LEGEND

-  INTERNATIONAL BOUNDARY
-  STATE BOUNDARY
-  DISTRICT BOUNDARY
-  DISTRICT HEAD QUARTER
-  RAILWAY LINE
-  RIVER
-  ROAD
-  FOOT TRACK
-  LEASE AREA

PLATE - 1

LOCATION PLAN

TIRTHKOTLI (RIVER) AREA 60 SQ. KM
 CHOHPUR FOREST RANGE
 TEHSIL: VIKASNAGAR, DISTT.: DEHRADUN (UK)
 NE BARHVAL MANDAL, VIKAS NIGAM LTD,
 340 B.P. ROAD, DEHRADUN

PREPARED BY: SA. CHAVANWASHI
 CHECKED BY: HARISH KAINTHOLA

SCALE 1:100000

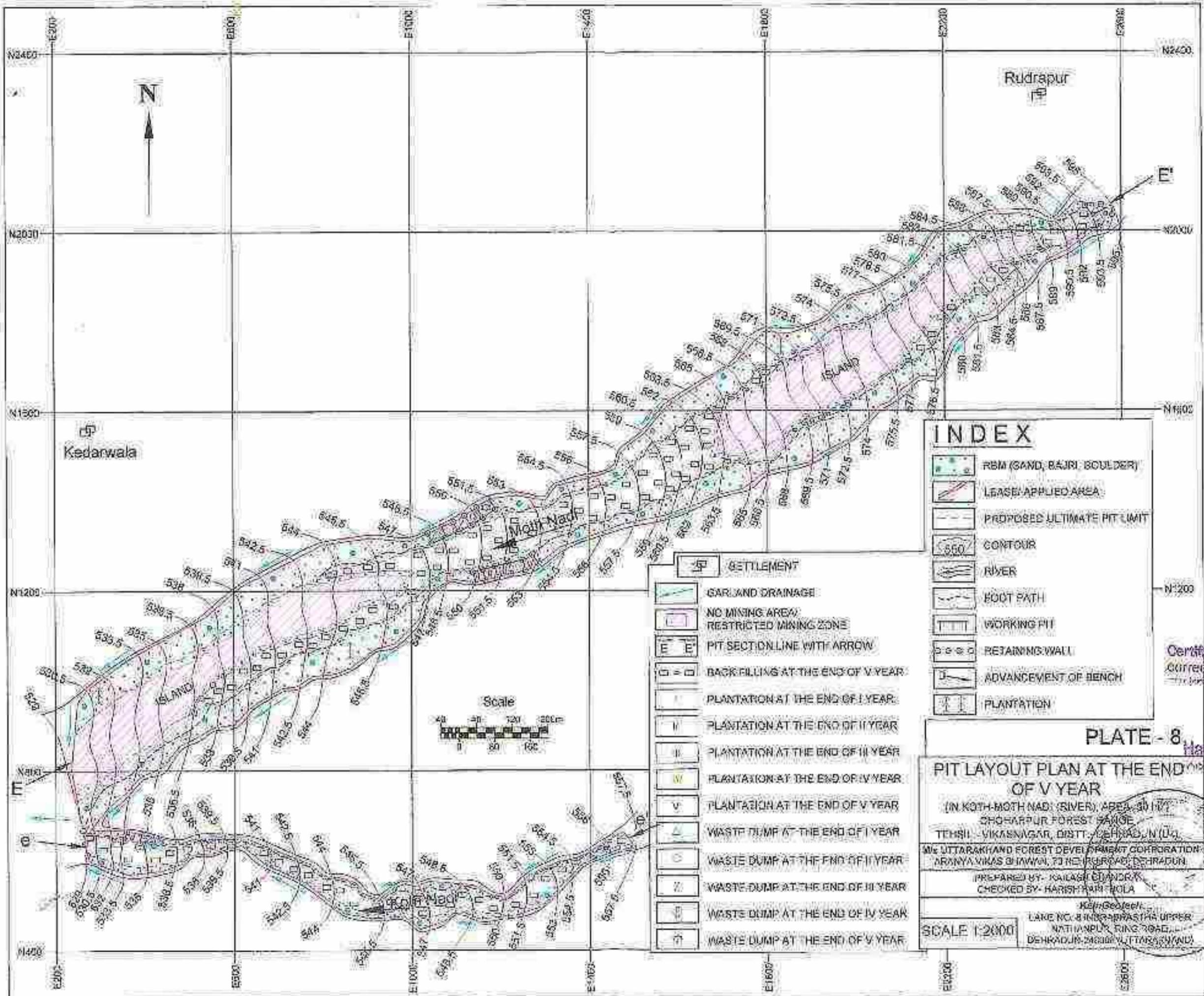
MAP NO. 8, INDIA PRAKASH, LITNER
 MAYAPUR, RING ROAD,
 DEHRADUN, UTTARAKHAND

Certified that Plan is correct to the best of my knowledge & belief.



Harish Kainthola
 ROP/DON/141/2002-A

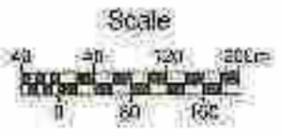
UTTAR PRADESH



INDEX

- RBM (SAND, RAJRI, BOULDER)
- LEASE/APPLIED AREA
- PROPOSED ULTIMATE PIT LIMIT
- CONTOUR
- RIVER
- FOOT PATH
- WORKING PIT
- RETAINING WALL
- ADVANCEMENT OF BENCH
- PLANTATION

- SETTLEMENT
- GARDEN DRAINAGE
- NO MINING AREA/ RESTRICTED MINING ZONE
- PIT SECTION LINE WITH ARROW
- BACK FILLING AT THE END OF V YEAR
- PLANTATION AT THE END OF I YEAR
- PLANTATION AT THE END OF II YEAR
- PLANTATION AT THE END OF III YEAR
- PLANTATION AT THE END OF IV YEAR
- PLANTATION AT THE END OF V YEAR
- WASTE DUMP AT THE END OF I YEAR
- WASTE DUMP AT THE END OF II YEAR
- WASTE DUMP AT THE END OF III YEAR
- WASTE DUMP AT THE END OF IV YEAR
- WASTE DUMP AT THE END OF V YEAR



Certified that Plan is correct to the best of my knowledge & belief.

Harish Kainthola

PLATE - 8

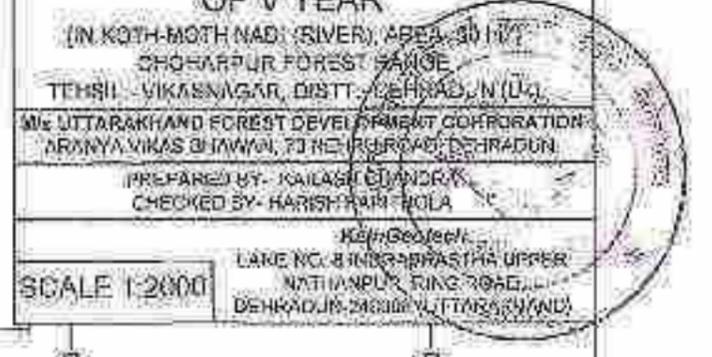
PIT LAYOUT PLAN AT THE END OF V YEAR

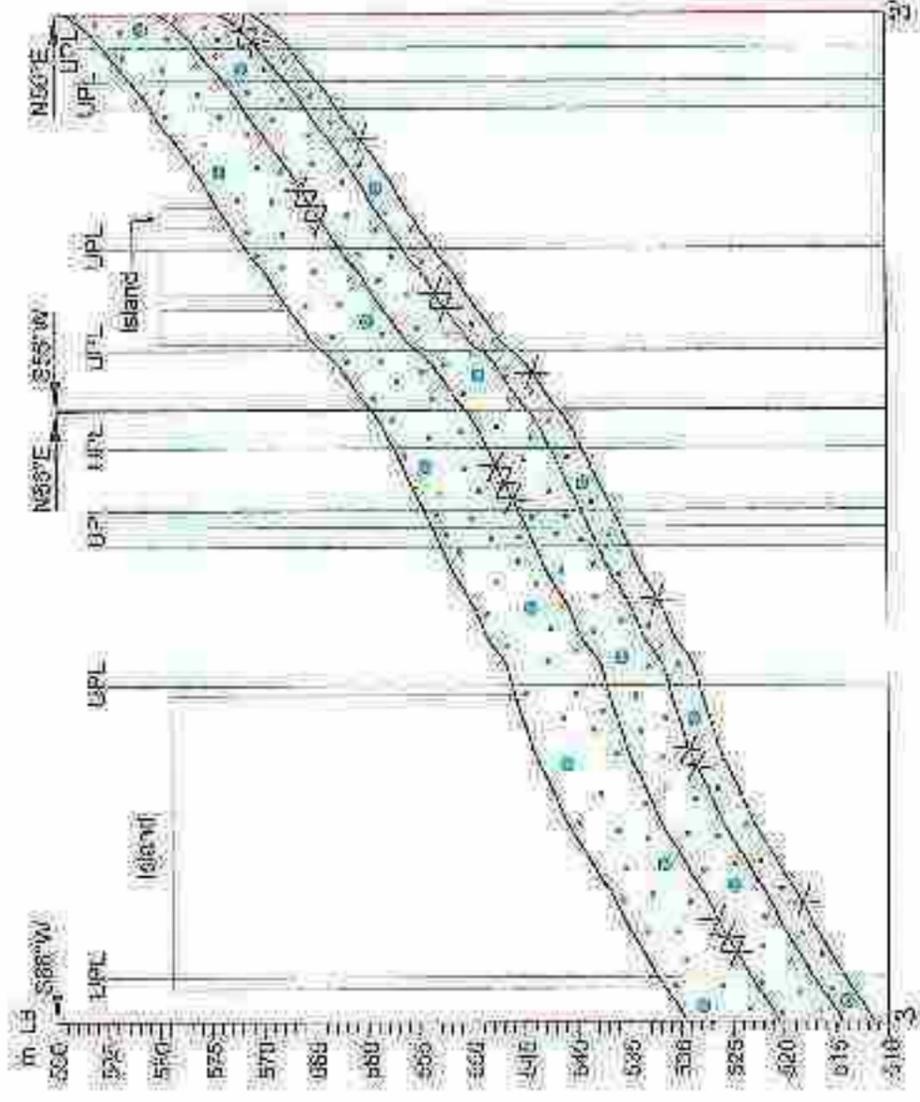
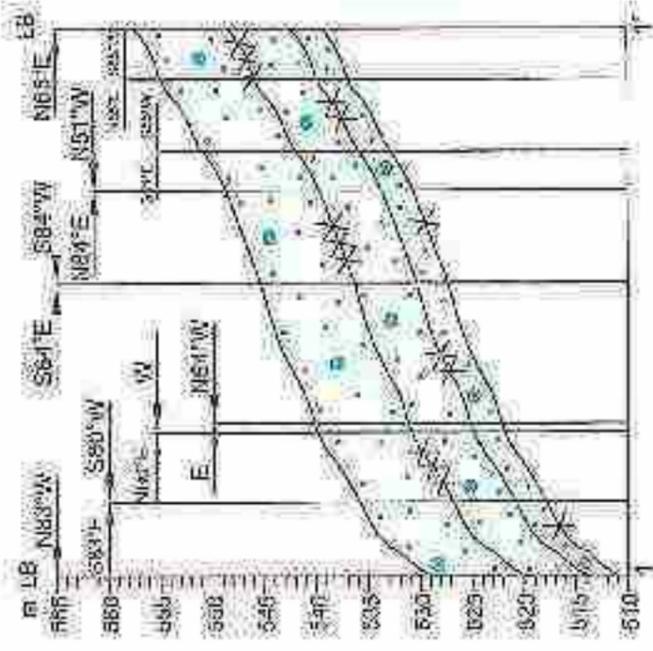
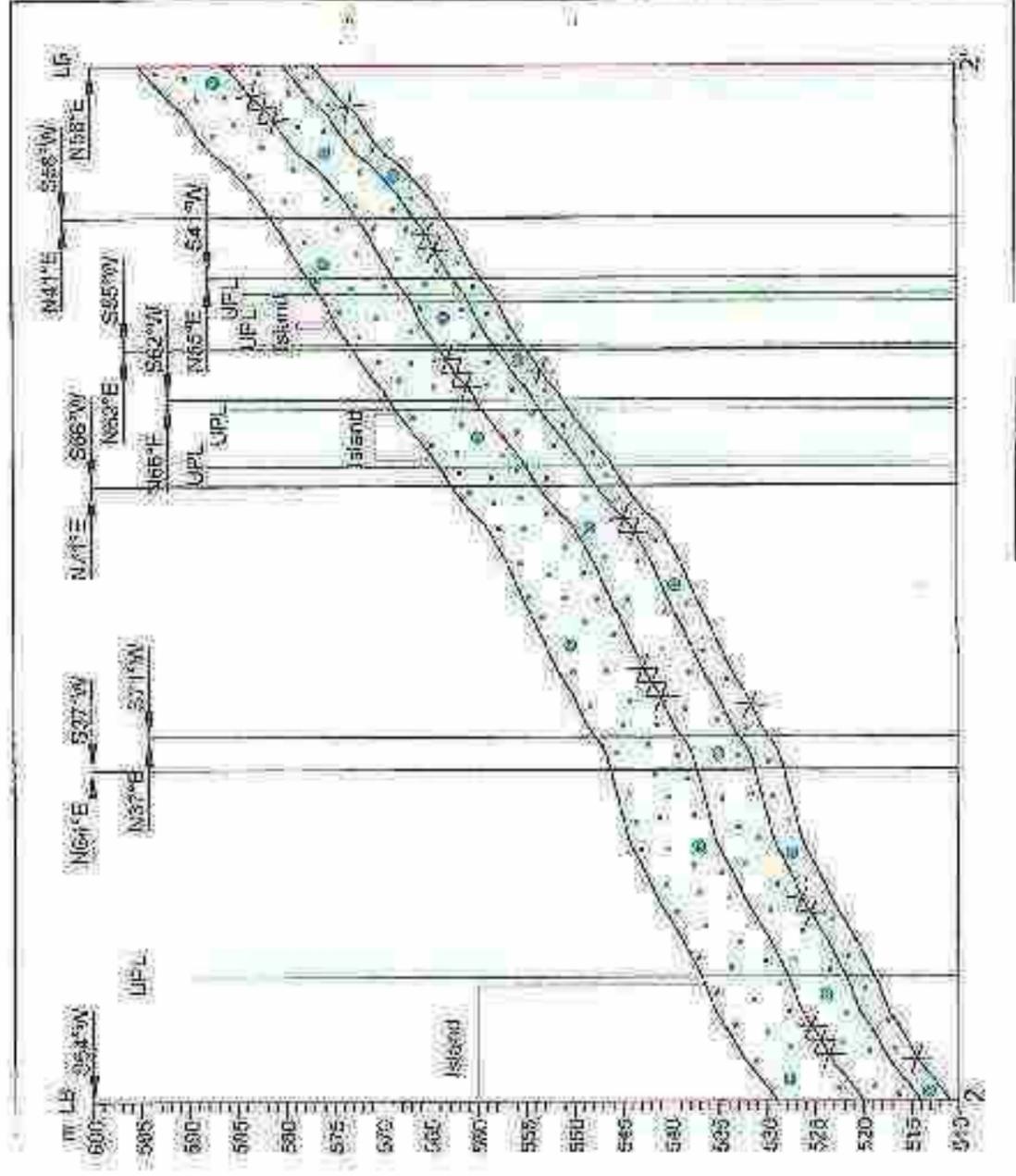
(IN KOTH-MOTH NADI (SIVER), AREA 30 HVT)
 CHHARPUR FOREST RANGE,
 TEHSIL - VIKASNAGAR, DISTT. DEHRADUN (U.P.)

U.P. UTTARAKHAND FOREST DEVELOPMENT CORPORATION,
 NRANYA VIKAS BHAWAN, 73 NEHRU ROAD, DEHRADUN

PREPARED BY - KAILASH CHANDRICK
 CHECKED BY - HARISH KAINTHOLA

SCALE 1:2000
 Kainthola Geotech
 LAKE NO. 8 INDRA PRASHTHA UPPER
 NATHANPUR RING ROAD,
 DEHRADUN-248001, UTTARAKHAND



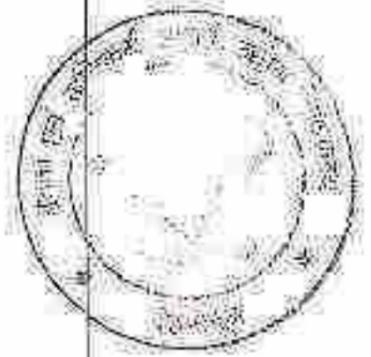


INDEX

	RBM (SAND, BAIRI, BOULDER) QUATERNARY
	LEASE BOUNDARY
	ULTIMATE PIT LIMIT
	MEASURED MINERAL CONTACT
	INDICATED MINERAL CONTACT
	INFERRED MINERAL CONTACT

PLATE - 3

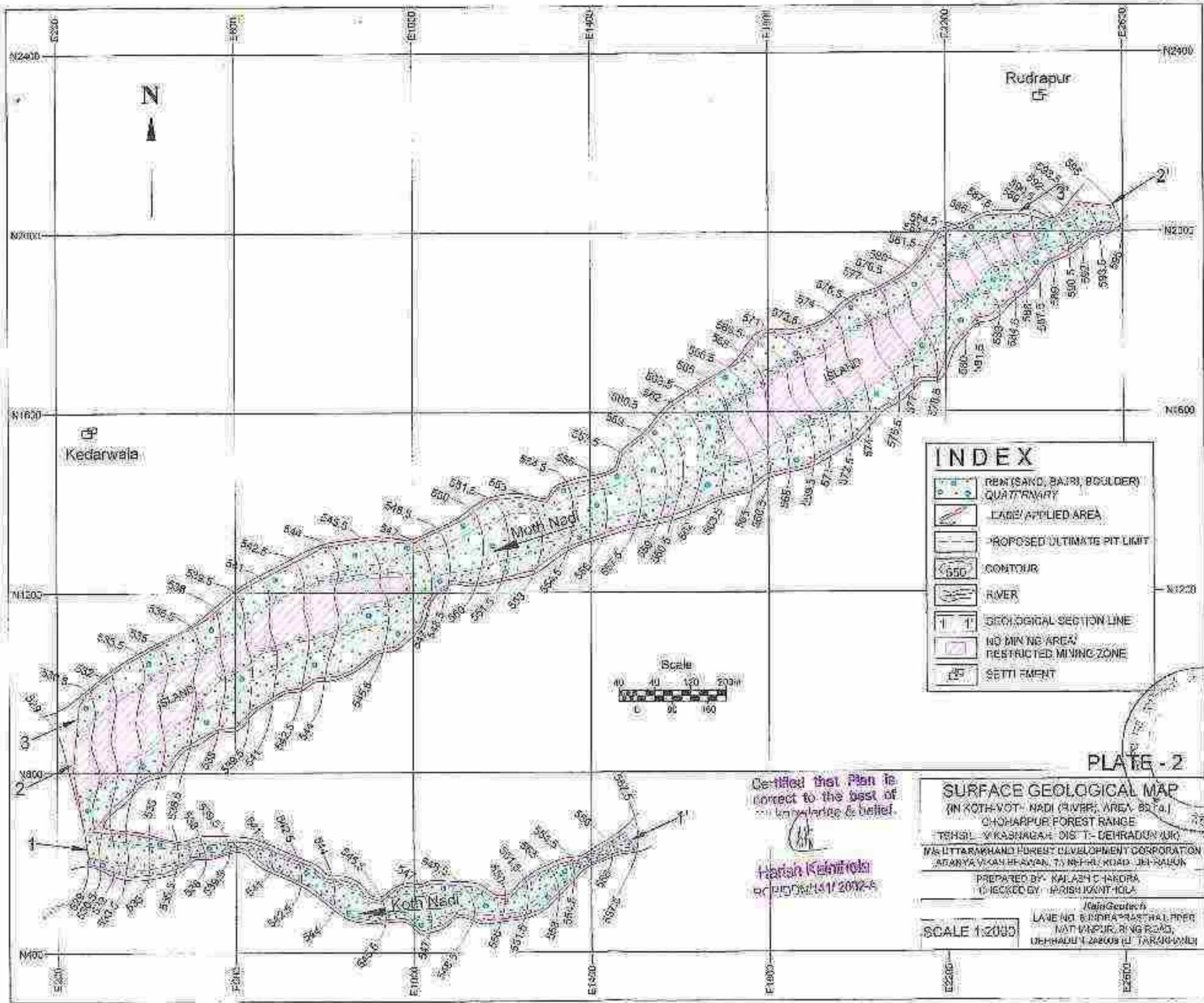
GEOLOGICAL SECTIONS
 IN KOTHIMATH NADI (RIVER) AREA-08 (a)
 CHONAREUK FOREST RANGE
 TEHSIL VIKASNAGAR, DISTT. DEHRADUN (UK)
 M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION
 A-3A/5A VIKAS BHAWAN, 73 NEHRU ROAD, DEHRADUN
 PREPARED BY: KALASH CHANDRA
 CHECKED BY: ANKISH KANTHOLA
 KairiGeotech
 LANE NO 2 INDRAPRASTHA UPPER
 NA, HANUUK, RING ROAD
 DEHRADUN-248008 (UTTARAKHAND)
 HORIZONTAL SCALE
 1:2000



Certified that Plan is correct to the best of my knowledge & belief.

(Signature)

Hanish Kantola
 PROPRIETOR



INDEX	
	RBN (SAND, BARI, BOULDER) QUATERNARY
	LABE/ APPLIED AREA
	PROPOSED ULTIMATE PIT LIMIT
	CONTOUR
	RIVER
	GEOLOGICAL SECTION LINE
	NO MINING AREA/ RESTRICTED MINING ZONE
	SETTLEMENT



PLATE - 2

Certified that Plan is correct to the best of my knowledge & belief.

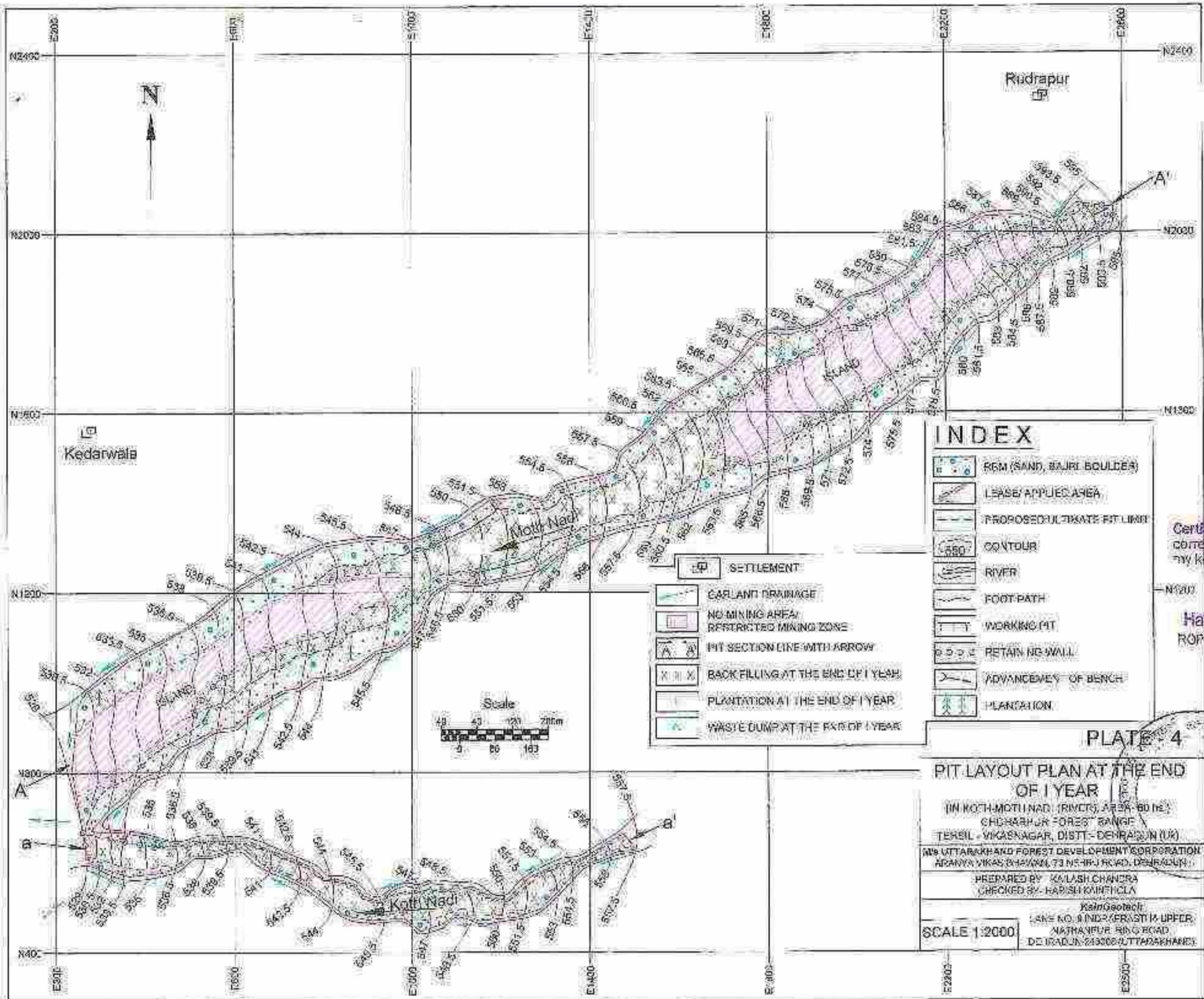
(Signature)

Harish Kishoreti
 01/06/2012-6

SURFACE GEOLOGICAL MAP
 (IN KOTH-NADI RIVER AREA, 857a.)
 CHOHARPUR FOREST RANGE
 TSHSL VIKASHGARH DISTT-DEHRADUN UK
 MAHARAJGARH FOREST DEVELOPMENT CORPORATION
 AGARVA VIKASH ROAD, TSHSL ROAD, JBI-RABUN
 PREPARED BY: KALASH CHANDRA
 CHECKED BY: PARISHKANT JOLA

(Institution Stamp)

SCALE 1:2000
 LAJE NO. 60NDRA-PRASHAL PPR
 NATI WAPUR, BING ROAD,
 DEHRADUN 242009 (U. TARA-ONLINE)



INDEX

	REM (SAND, BAURI BOULDER)
	LEASE/APPLIED AREA
	PROPOSED ULTIMATE PIT LIMIT
	CONTOUR
	RIVER
	FOOT-PATH
	WORKING PIT
	RETAINING WALL
	ADVANCEMENT OF BENCH
	PLANTATION

-
-
-
-
-
-
-



Certified that Plan is correct to the best of my knowledge & belief.

(Signature)

Harish Kainthola
ROPIEDM/14/1/2002-A

PLATE - 4

PIT LAYOUT PLAN AT THE END OF 1 YEAR

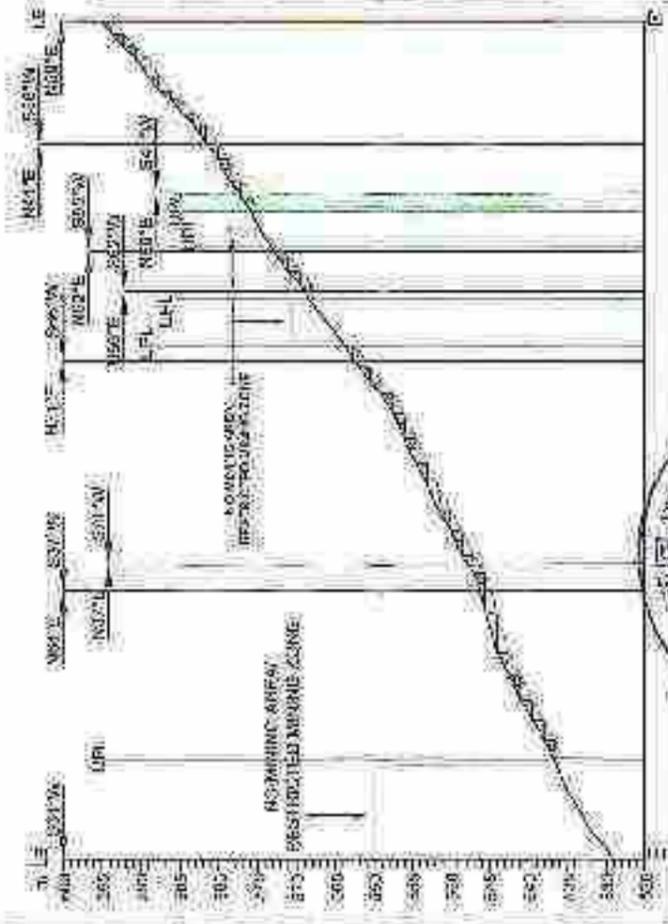
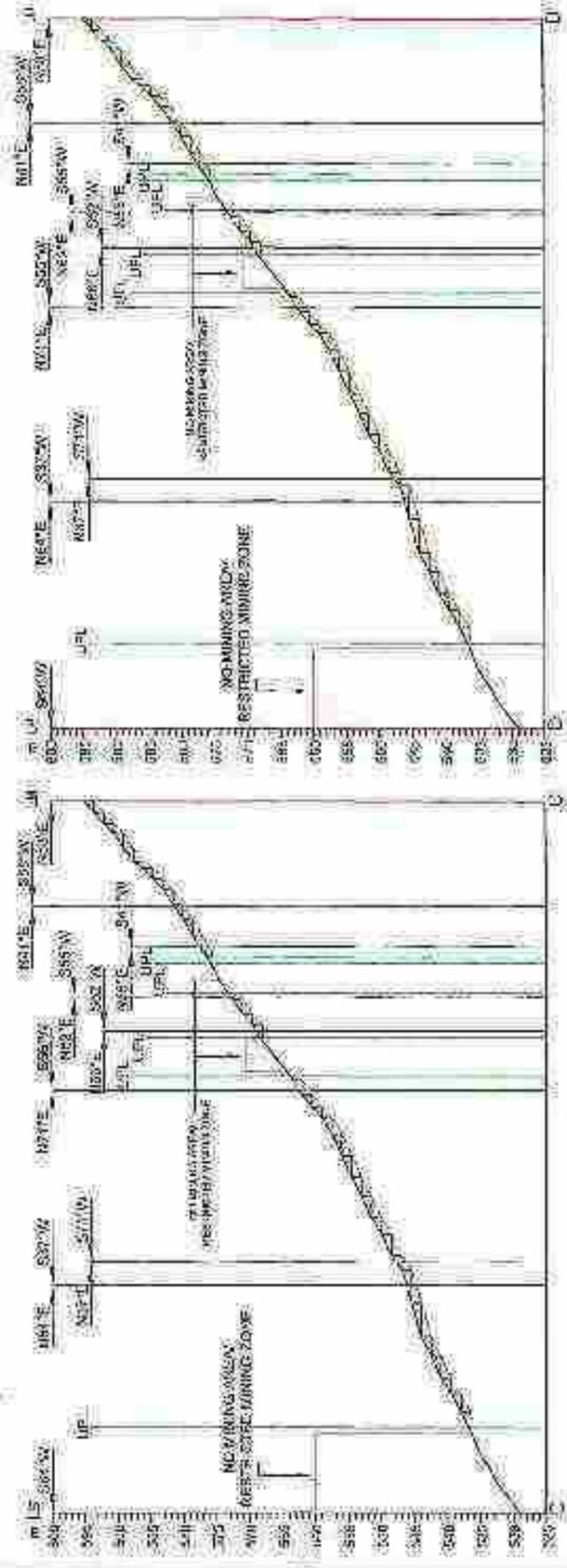
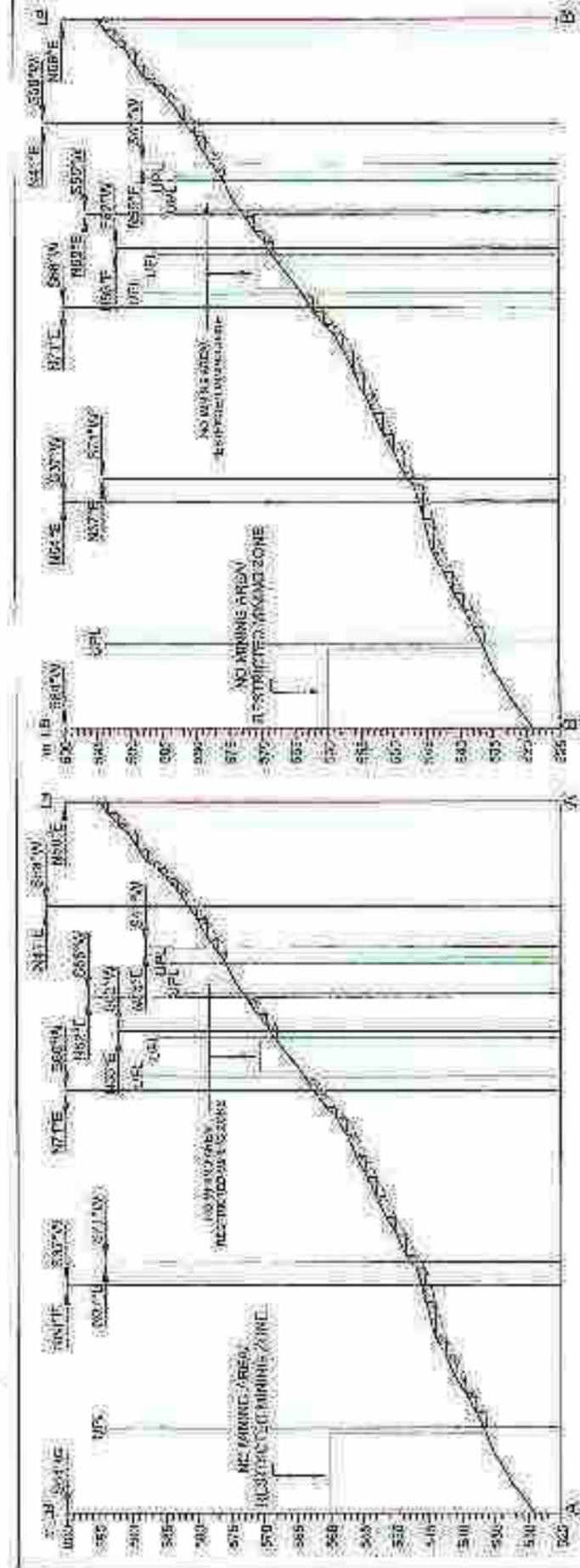
(IN KOTHI-MOTI NADI (RIVER) AREA - 60 HE.)
CHENABHUK FOREST RANGE
TERAIL - VIKASNAGAR, DISTT - DEHRADUN (UK)

M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION
ARANYA VIKAS BHAVAN, 73 NEHRU ROAD, DEHRADUN

PREPARED BY: KVLASH CHANDRA
CHECKED BY: HARISH KAINTHOLA

Kain Gotech
PLOT NO. 8 (INDIA) PASTI II UPPER,
NATHANPUR, RING ROAD,
DEHRADUN-243002-UTTARAKHAND

SCALE 1:2000



INDEX

- NEW SAND BANK AREA (NSA)
- IF-FAST BOUNDARY
- UPL
- LPL
- BENCH ADVANCEMENT
- ULTIMATE PIT DEPTH (7.5m)
- BACK FILLING AT THE END OF 1 YEAR
- BACK FILLING AT THE END OF 2 YEAR
- BACK FILLING AT THE END OF 3 YEAR
- BACK FILLING AT THE END OF 4 YEAR
- BACK FILLING AT THE END OF 5 YEAR

Confirmed that plan is correct to the best of my knowledge & belief.

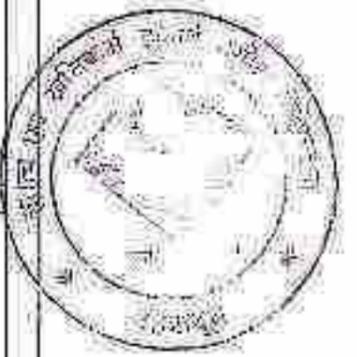
(Signature)

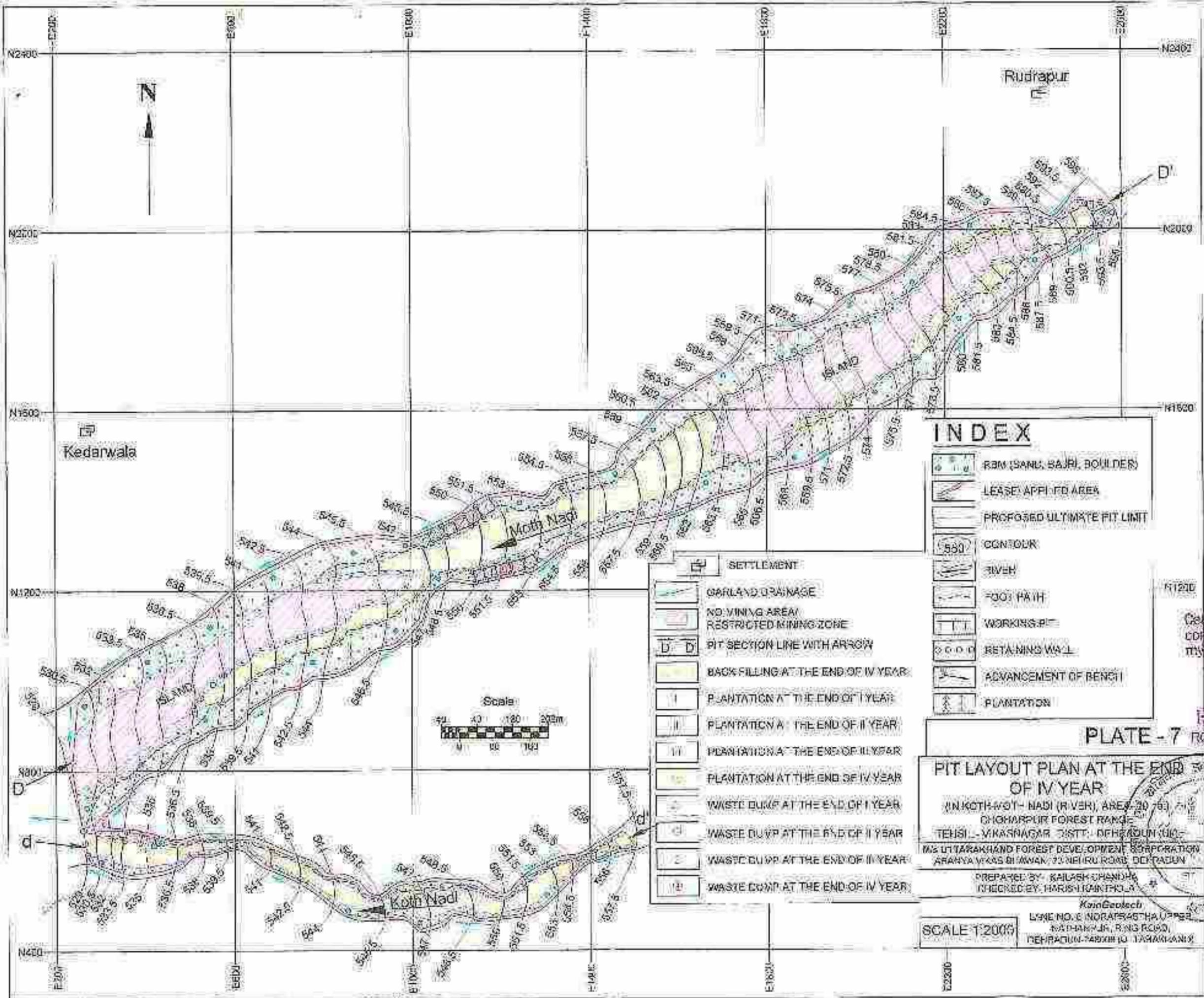
Harish Kishore
 PROJECTING/2411/2002-A

PLATE - 9A

PIT SECTIONS

IN KOTHMATH NADI RIVER AREA, AREA-001a)
 CHOKHAI-04 FOREST RANGE
 TENSU: VIKRANGAR, DISTT- DE. (RANIKHET)
 IN UTARAKHAND FOREST DEVELOPMENT CORPORATION
 ABARVA, WAKAS BHAWAN, TENDULPOHAL, DEHRADUN
 DRAWN BY: HRSB/KNT/CLL
 CHECKED BY: HRSB/KNT/CLL
 KOTMATH
 LANE NO. 3, KOTMATH, UPPER
 HATHI, DEHRADUN
 HORIZONTAL SCALE
 1:200





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	PLANTATION

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	WASTE DUMP AT THE END OF II YEAR
	WASTE DUMP AT THE END OF III YEAR
	WASTE DUMP AT THE END OF IV YEAR

Certified that Plan is correct to the best of my knowledge & belief.

(Signature)

Harsh Kainthola
RCF/DDN/141/2002-A

PLATE - 7

PIT LAYOUT PLAN AT THE END OF IV YEAR
 IN KOTH-NOT-NADI (RIVER), AREA-2076
 GHOGHARPUR FOREST RANGE
 TEHSIL - VIKASNAGAR DISTT. DEHRADUN (U.P.)
 M/S UTTARAKHAND FOREST DEVELOPMENT CORPORATION
 ARANYA VAS BIHWAN, 73 NEHRU ROAD, DEHRADUN

PREPARED BY: KAILASH CHANDHA
 CHECKED BY: HARSH KAINTHOLA

KainGeotech
 LINE NO. 6, NORAIPASTHA UPSE
 BATHANPUR, RING ROAD,
 DEHRADUN-248001, UTTARAKHAND

SCALE 1:2000



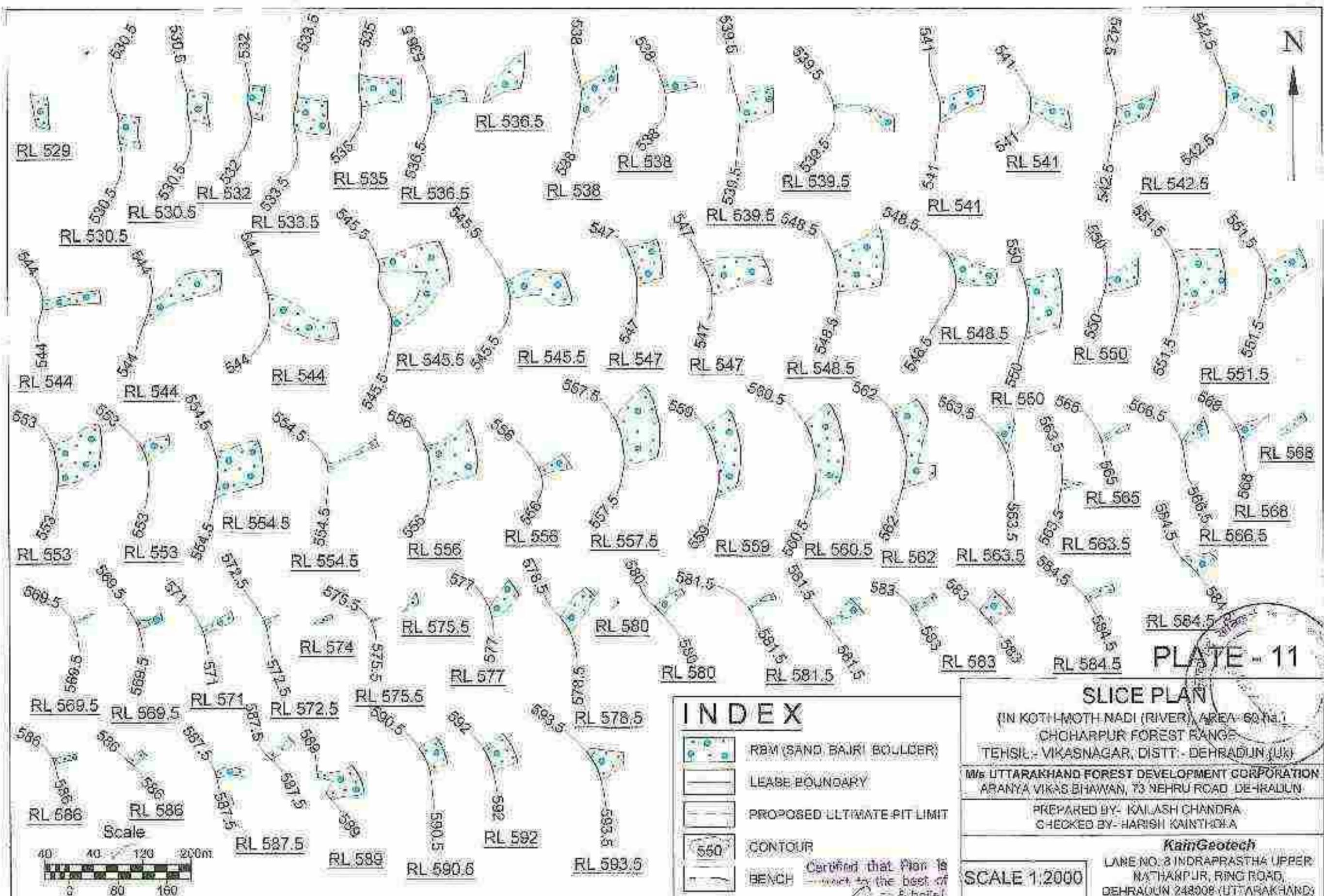
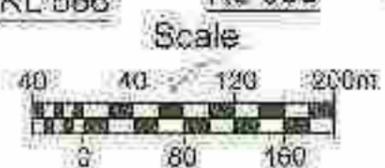


PLATE - 11

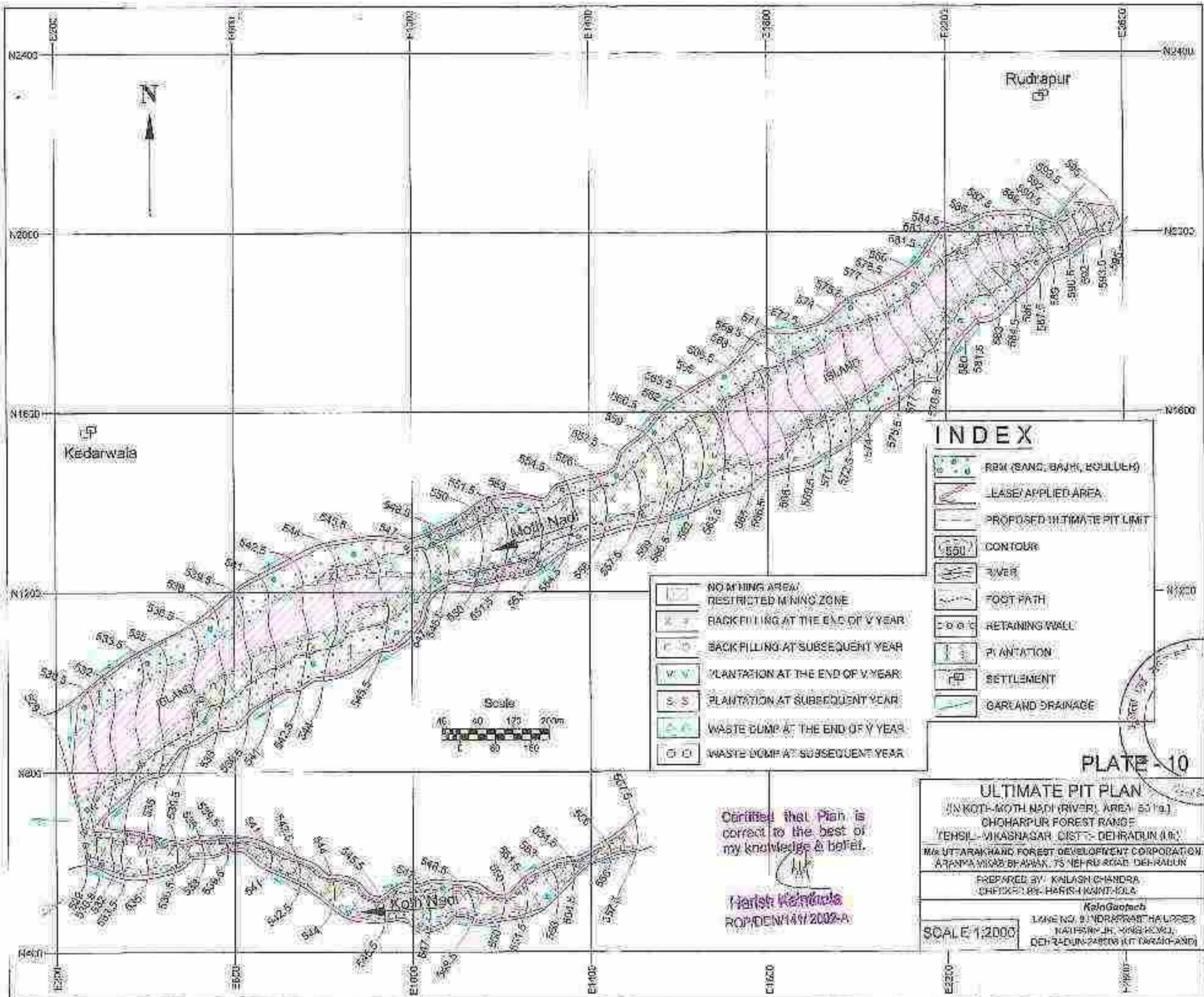
INDEX

	RBM (SAND, BAIRI, BOULDER)
	LEASE BOUNDARY
	PROPOSED ULTIMATE PIT LIMIT
	CONTOUR
	BENCH

SLICE PLAN
 (IN KOTI-MOTH NADI (RIVER) AREA - 60 Ha.)
 CHCHARPUR FOREST RANGE
 TEHSIL - VIKASNAGAR, DISTT - DEHRADUN (UK)
 M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION
 ARANYA VIKAS BHAWAN, 73 NEHRU ROAD DEHRADUN
 PREPARED BY - KALASH CHANDRA
 CHECKED BY - HARISH KAINTHOLA
KamGeotech
 LANE NO. 3 INDRAPRASTHA UPPER,
 NATHANPUR, RING ROAD,
 DEHRADUN 248008 (UTTARAKHAND)



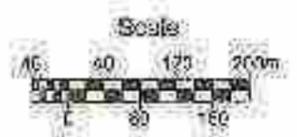
Harish Kainthola
 ROPID/NH/V/2022-4



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	PLANTATION AT THE END OF V YEAR
	PLANTATION AT SUBSEQUENT YEAR
	WASTE DUMP AT THE END OF V YEAR
	WASTE DUMP AT SUBSEQUENT YEAR



Certified that Plan is correct to the best of my knowledge & belief.

Harish Kishore
RO/DEW/14/2002-A

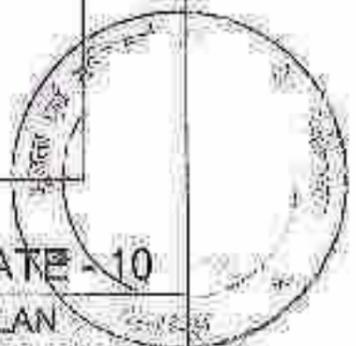
PLATE - 10

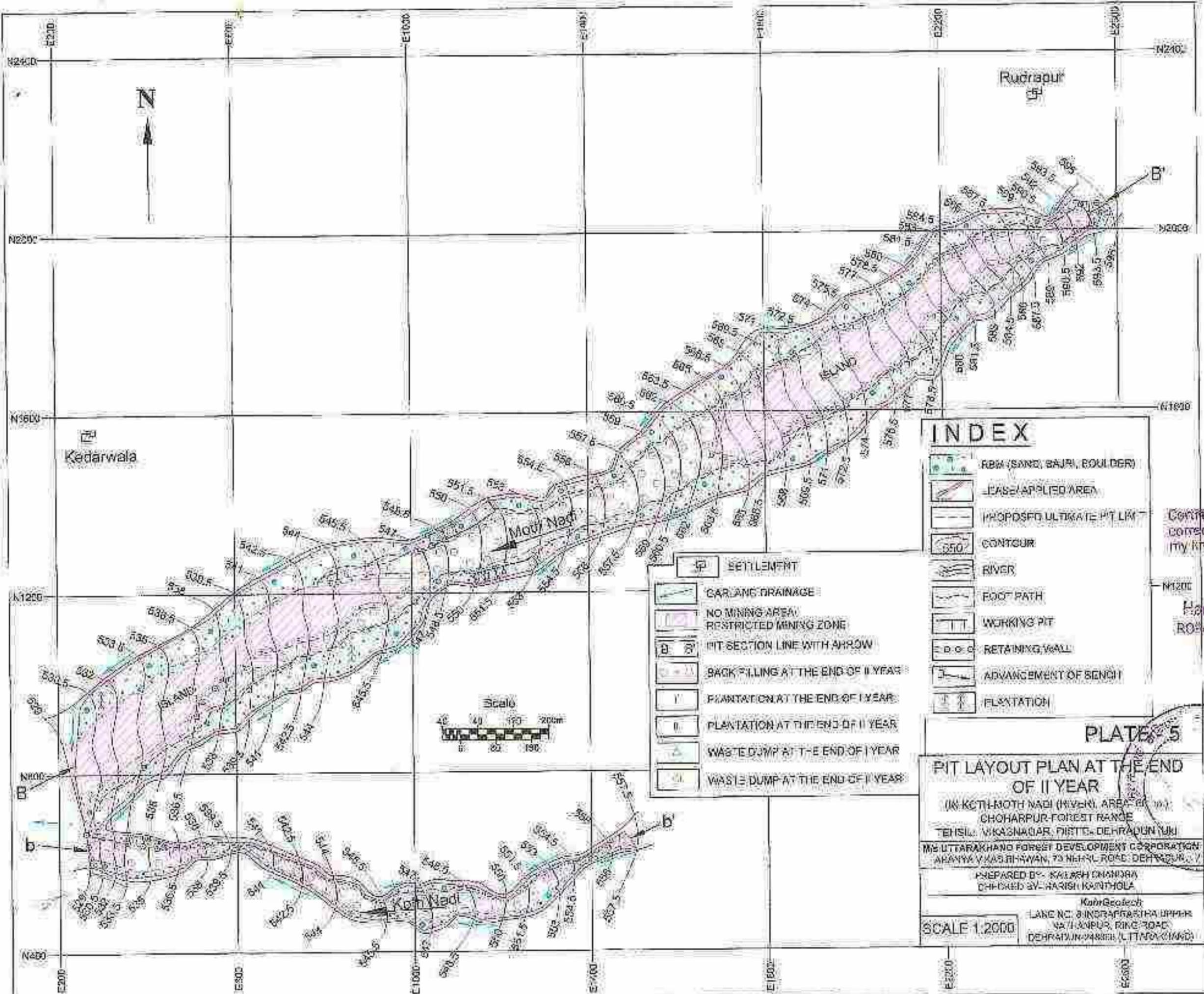
ULTIMATE PIT PLAN
 (IN KOTH-MOTH NADI (RIVER) AREA 50 Ha.)
 CHOHPUR FOREST RANGE
 TEHSIL-VIKASHNAGAR DISTT- DEHRADUN (U.P.)
 M/s UTTARAKHAND FOREST DEVELOPMENT CORPORATION
 ARAPMA VIKASH BHARAK, TS NEHRU ROAD, DEHRADUN

PREPARED BY: KALISH CHANDRA
 CHECKED BY: HARISH KISHORE

Kalin Goufch
 ENGINEER, BINDRANATH HALDER
 NATIONAL INSTITUTE OF TECHNOLOGY
 DEHRADUN-248008 (U.P. INDIA)

SCALE 1:2000

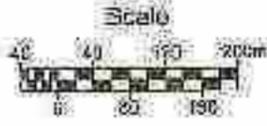




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	PLANTATION AT THE END OF 1 YEAR
	PLANTATION AT THE END OF 2 YEAR
	WASTE DUMP AT THE END OF 1 YEAR
	WASTE DUMP AT THE END OF 2 YEAR



I certify that Plan is correct to the best of my knowledge & belief.

Harish Kainthola
 RO/IDN/14/2022-A

PLATE 5

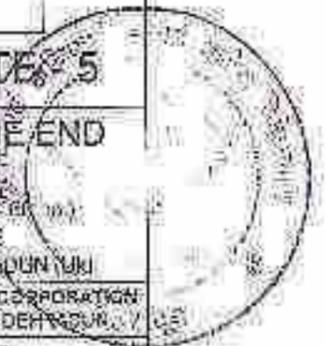
PIT LAYOUT PLAN AT THE END OF 11 YEAR

(IN KOTI-MOTH NADI (RIVER) AREA OF ...)
 CHOHPUR-Forest RANGE
 TENSIL: WAKHNAGAR, DISTT. DEHRADUN (UK)
 Uttarakhand Forest Development Corporation
 ARANYA VIKAS BHWAN, 73 NEHRU ROAD, DEHRADUN, U.P.

PREPARED BY: KALASH CHANDRA
 CHECKED BY: HARISH KAINTHOLA

Kainthola Geotech
 LANE NO. 3, INDRA PRASTHA UPPER
 VASTI ANPUR, RING ROAD
 DEHRADUN-248001, UTTARAKHAND

SCALE 1:2000



Head Office

Uttarakhand Environment Protection & Pollution Control Board
29/20, Nemi Road, Dalanwala, Dehradun (Uttarakhand)

UEP/PCB/HO/NGC-0008/2016/

1783

Date: 08/12/2016

Speed Post

To:

The Secretary,
Ministry of Environment, Forests & Climate Change,
Indira Park, Varanasi Bhawan, Jor Bagh Road,
New Delhi - 110003.

Subject: Minutes of Public Hearing of M/s Uttarakhand Forest Development Corporation Ltd.,
for collection of Sand, Bajri & Boulders from River Kotmot, Area 60Ha - reg.

Sir,

This is to inform that Uttarakhand Environment Protection and Pollution Control Board has conducted the Public Hearing of M/s Uttarakhand Forest Development Corporation Ltd., for collection of Sand, Bajri & Boulders from River Kotmot, Area 60Ha on dated 19.01.2016 at Vill-Rudrapur, Tehsil-Wikasnagar, Distt-Dehradun. The copy of the minutes of Public Hearing along with video recording, Photography of entire Public Hearing and copy of attendance sheets are enclosed herewith for your kind perusal and necessary action please.

Enclosed - as above

Yours Faithfully

(Sudarshan S. Pal)
Scientific Officer

Copy to -

1. District Magistrate, Dehradun for kind information and with request to display the minutes of respective public hearing at your office for general information please.
2. The Additional District Magistrate, Distt-Dehradun for kind information please.
3. Regional Officer (I/C) -UEP/PCB, Dehradun with direction to display the minutes of respective public hearing at your office for general information please.
4. Managing Director, M/s Uttarakhand Forest Development Corporation, Aranya Vikas Bhawan, 73-Nehru Road, Dehradun for kind information and with request to display the minutes of public hearing to the office of the panchayat/Urban Local Bodies, whose jurisdiction the project is located for general information please.
5. Information Officer, ENVIS, Uttarakhand Environment Protection and Pollution Control Board, Dehradun with request to upload of minutes of public hearing to Board's web site on priority basis.


Scientific Officer 08/12/16

मै0 उत्तराखण्ड वन विकास निगम (UKFDC) लि0 देहरादून द्वारा कोट-मोट नदी (60 हेक्टेयर) में लघु लवणों के संग्रहण के लिये पर्यावरण स्वीकृति हेतु लोक सुनवाई दिनांक 19.01.2015 (प्रातः 11.30 बजे) स्थान परियोजना स्थल, ग्राम रुद्रपुर, तहसील विकासनगर, जिला देहरादून का कार्यवृत्त।

मै0 उत्तराखण्ड वन विकास निगम, देहरादून द्वारा कोट-मोट के 60 हेक्टेयर में लघु लवणों के संग्रहण हेतु पर्यावरण स्वीकृति के लिये जन सुनवाई का आयोजन किया गया। पर्यावरणीय स्वीकृति हेतु उत्तराखण्ड पर्यावरण संरक्षण एवं प्रदूषण नियंत्रण बोर्ड, देहरादून में प्रस्ताव प्राप्त हुआ। उक्त प्रस्ताव पर्यावरण एवं वन मंत्रालय भारत सरकार की पर्यावरणीय प्रभाव मूल्यांकन अधिसूचना-2006 के अंतर्गत आच्छादित है। उक्त परियोजना की पर्यावरणीय प्रभाव मूल्यांकन आख्या, पर्यावरणीय प्रभाव अधिसूचना-1984 यथासंशोधित के अनुसार तैयार की गयी है तथा लोक सुनवाई पर्यावरणीय प्रभाव मूल्यांकन अधिसूचना-2006 के अनुसार की गयी है।

जिलाधिकारी महोदय द्वारा नामित अपर जिलाधिकारी (प्रशा0), देहरादून श्री प्रताप सिंह शाह, की अध्यक्षता में ग्राम रुद्रपुर, तहसील विकासनगर, जिला देहरादून में लोक सुनवाई आयोजित की गयी। राज्य बोर्ड के प्रतिनिधि के रूप में श्री सुभाष पवार (अ0 अभियन्ता) व श्री सुनील डबराल (अनु0 सहा0) उपस्थित थे।

अध्यक्ष महोदय की अनुमति से 11:30 बजे प्रातः लोक सुनवाई की कार्यवाही प्रारम्भ की गयी।

सर्वप्रथम उत्तराखण्ड पर्यावरण संरक्षण एवं प्रदूषण नियंत्रण बोर्ड के प्रतिनिधि श्री सुभाष पवार (अ0 अभियन्ता) द्वारा लोक सुनवाई के आयोजन के उद्देश्य के बारे में उपस्थित जन समुदाय को अवगत कराया गया और कहा गया कि उत्तराखण्ड पर्यावरण संरक्षण एवं प्रदूषण नियंत्रण बोर्ड, देहरादून को मै0 उत्तराखण्ड वन विकास निगम, देहरादून द्वारा कोट-मोट में लघु लवणों के संग्रहण/एकत्रण हेतु प्रस्ताव प्राप्त हुआ है। भारत सरकार की अधिसूचना सितम्बर-2006 यथा संशोधित के अनुसार परियोजना में पर्यावरणीय स्वीकृति हेतु जन सुनवाई का प्रावधान है। इस हेतु लोक सुनवाई की तिथि से नियमानुसार 30 दिन पूर्व दैनिक समाचार पत्र दैनिक जागरण व टाइम्स ऑफ इण्डिया को दिनांक 19.12.2014 के अंक में इस आयोजन की सूचना प्रकाशित की गयी थी। विज्ञापित के माध्यम से जन साधारण द्वारा इस परियोजना के क्रियान्वयन से पूर्व सुझाव आपत्ति, टीच टिप्पणी आदि प्राप्त होने पर यदि स्थानीय लोगों की परियोजना के बारे में कोई आपत्ति या सुझाव है तो उनके इस लक्ष्य सुनवाई के माध्यम से पर्यावरण एवं वन मंत्रालय, भारत सरकार को प्रेषित किया जायेगा। एनके द्वारा जन समुदाय से अनुरोध किया गया कि विचार, सुझाव परियोजना के प्रश्न में अथवा विषय में इस संघ के माध्यम से आकर्षित हैं, जिनकी गंभीरता कीडियो रिकार्डिंग एवं फोटोग्राफी भी की जायेगी। संघ के माध्यम से आप सभी के महत्वपूर्ण विचार इस परियोजना के क्रियान्वयन हेतु एक निर्मायक भूमिका की अभिव्यक्ति होती।





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तत्कालीन लोक सुनवाई कार्यक्रम के अध्यक्ष श्री प्रताप सिंह शाह अपर जिलाधिकारी (प्रशा) द्वारा लोक सुनवाई में तत्स्थित जन समुदाय से कहा गया कि परियोजना के सम्बन्ध में जो भी आपत्ति एवं सुझाव हैं उन्हें मौखिक या लिखित रूप में व्यक्त करें, जिनका मिनिट्स में सम्मिलित कर पर्यावरण एवं वन मंत्रालय को प्रेषित किया जाएगा।

इस अनुक्रम में वे 0 उत्तराखण्ड वन विकास निगम, देहरादून के परामर्शी संस्था की प्रतिनिधि डा० विवेक नारायण सिंह द्वारा परियोजना से सम्बन्धित किस्तान जानकारी दी गयी एवं अक्षय करावा गया कि परियोजना का कुल क्षेत्रफल 50 है। जो कि ग्राम सद्दपुर, तहसील विकासनगर, जिला देहरादून में स्थित है। उक्त परियोजना पूर्णतः दल भूमि पर प्रस्तावित है। जिसे वन विभाग द्वारा उत्तराखण्ड वन विकास निगम को लीज पर दिया जाना है। परियोजना हेतु किसी प्रकार की निजी भूमि का प्रयोग नहीं किया जाता है। इस परियोजना का प्रमुख उद्देश्य कोल्डर बालू व बजरी का तुगान/खनन किया जाना है जिनका उपयोग विभिन्न निर्माण कार्यों में किया जायेगा। नदी में लघु तटवर्ती के इकट्ठे होने की वजह से नदी अपना मार्ग बदल देती है, एवं तुगान न होने से वर्षात में भूमि कटाव होता है, जिससे कि कृषि योग्य भूमि के साथ-साथ सड़कों/मार्गों को नुकसान पहुंचता है। खनन कार्य का वैज्ञानिक तरीके से किये जाने पर भूमि कटाव की रोकथाम के साथ-साथ स्थानीय निवासियों को रोजगार उपलब्ध होंगे एवं खनिज के कामों में भी कमी आयेगी। परियोजना से लोगों की सामाजिक एवं आर्थिक स्थिति में सुधार होगा एवं राज्य सरकार को भी राजस्व प्राप्त होगा। उन्होंने यह भी कहा कि इस परियोजना से रोजगार को बढ़ावा दिया जायेगा। इस परियोजना में नदी के तटों से 15 प्रतिशत भूमि को छोड़कर लघु तटवर्ती का संग्रहण किया जायेगा, उनको द्वारा अपनी प्रस्तुतीकरण में यह भी बताया गया कि 1.5 मीटर गहराई तक रेत, बजरी, बालू का संग्रहण किया जायेगा और संग्रहण कार्य सूर्योदय से सूर्यास्त के बीच किया जायेगा तथा संग्रहण कार्य पूर्णतया मैनुअल किया जायेगा जिसमें कोई भी मशीनरी का उपयोग नहीं किया जायेगा। यह परियोजना पूर्ण रूप से वैज्ञानिक तरीके से की जायेगी। डा० विवेक नारायण सिंह द्वारा अपने प्रस्तुतीकरण में यह भी अवगत कराया गया कि खनन कार्य से होने वाले प्रदूषण को नियंत्रण हेतु पर्यावरणीय प्रबन्धन योजना (ईएमपी) बनानी होगी है, जिसमें वायु प्रदूषण नियंत्रण हेतु सड़कों पर जल सिडकाव एवं समय-समय पर वायु गुणवत्ता का अनुभव कर तदनुसार पर्यावरणीय प्रबन्धन योजना बनानी जायेगी। पर्यावरणीय प्रबन्धन योजना के अनुभवण हेतु पर्यावरणीय सुरक्षा दल का भी गठन किया जायेगा।

प्रस्तुतीकरण के बाद परियोजना के सम्बन्ध में जन समुदाय द्वारा प्रस्तुत सुझावों एवं आपत्तियों का निवेदन निम्नानुसार है-

1. श्री इमरान खान, प्रधान, ग्राम-कोदारवाला द्वारा लोकसुनवाई का तत्काल किया गया तथा खनन कार्य से सहमति व्यक्त की गयी। उनको द्वारा कहा गया कि खनिज सामग्री में स्थानीय ग्रामीणों एवं बीबीएलए परिवारों को छूट एवं रायल्टी का कुछ भाग प्राप्त होना ही भिन्नता चाहिए, जिससे अतिप्रस्त सड़कों का निर्माण किया जा सके एवं स्थानीय लोगों को

(Signature)

(Signature)

खनन प्रदूषण मिलना चाहिए, जिससे लोगों को रोजगार मिल सके। इसके अतिरिक्त उनके द्वारा यह भी कहा गया कि खनन कार्य से पर्यावरण पर किसी भी प्रकार की क्षति न पहुंचे। उनके द्वारा यह भी सुझाव दिया गया कि खनन से प्राप्त लक्षणांश का कुछ भाग स्थानीय ग्राम पंचायतों को भी मिलना चाहिए।

2. श्री रामचरण पाल, सामाजिक कार्यकर्ता, निवासी ग्राम छरवा द्वारा लोकसुनवाई का स्वागत किया गया और कहा गया कि नदियों में खनन खुलना चाहिए। उनके द्वारा अवगत कराया गया कि ग्राम छरवा नदी से सटा हुआ गांव है, खनन न होने से नदी का तल ऊँचा हो गया है। यदि खनन नहीं किया गया तो बढ़ आने से नदी का बहाव गांव की ओर हो जायेगा। उनके द्वारा कहा गया कि खनन कार्य अवैज्ञानिक तरीके से किया जा रहा है एवं खनन सामग्री की बोरी भी ही रही है। उनके द्वारा कहा गया कि स्थानीय लोगों को खनन हेतु रायल्टी में छूट मिलनी चाहिए। श्री रामचरण द्वारा कहा गया कि सरकारों कायों हेतु खनन सामग्री में छूट में ही रायल्टी ली जाती है। अतः दुबारा रायल्टी न ली जाए।
3. श्री ज्ञानचन्द्र, निवासी वाडूवाला द्वारा कहा गया कि स्थानीय लोगों को अपने जावासीय भयों के निर्माण हेतु खनन सामग्री हेतु रायल्टी में छूट मिलनी चाहिए।
4. श्री रविन्द्र सिंह, ग्राम प्रधान, होरवल्ला द्वारा लोकसुनवाई का स्वागत किया गया और कहा गया कि स्थानीय लोगों को स्वयं के प्रयोग हेतु एवं छोड़े-खाचकरी से उप खनिजों को बिना शुल्क/रायल्टी ले जाने की अनुमति प्रदान की जानी चाहिए। उनके द्वारा यह भी सुझाव दिया गया कि सामाजिक कार्यों हेतु उप खनिजों में छूट प्रदान की जाए एवं खनन क्षेत्र का सीमांकन भी किया जाना चाहिए।
5. श्री बहादुर सिंह, पूर्व प्रधान, ग्राम सो/नत द्वारा लोकसुनवाई का स्वागत किया गया और कहा गया कि खनन कार्य से स्थानीय जूविक भूमि को नुकसान होगा। कृषक भूमि को बन्दर, सुअरों द्वारा नुकसान पहुंच रहा है। इसके लिये कोई व्यवस्था होनी चाहिए। उनके द्वारा यह भी कहा गया कि खनन के जा मानक तय किये गये हैं, उतका प्रालन किया जाए, तो खनन कार्य से सहमत है।
6. श्री संजय कुमार, निवासी चांदपुर द्वारा कहा गया कि खनन कार्य से सहमत है। उनके द्वारा सुझाव दिया गया कि खनन कार्य दिजी भूमि पर न किया जाए, घन भूमि पर ही खनन कार्य किया जाना चाहिए।

अपर जिलाधिकारी द्वारा अवगत कराया गया कि संभवत खनन कार्य घन भूमि से किया जायेगा। राज्य सरकार की खनन नीति को अनुसार खनन कार्य से प्राप्त लक्षणांश के 5 प्रतिशत भाग को खनिज विकास निधि के माध्यम से स्थानीय ग्रामीणों के विकास कार्यों में व्यय किये जाने का प्रावधान है। स्थानीय प्राणीणों द्वारा खनिज सामग्री में छूट दिये जाने की मांग के सम्बन्ध में अपर जिलाधिकारी द्वारा अवगत कराया गया कि स्थानीय निवासियों के भयों एवं समाजिका कार्यों हेतु खनिज सामग्री में राज्य सरकार खनिज नीति में कोई







प्राविधान नहीं है। ग्रामीण एवं क्षेत्रीय प्रतिनिधि राज्य सरकार के स्तर पर खनिज सम्पदाई स्वयं के उपयोग हेतु छूट के प्राविधान की मांग कर सकते हैं।

अन्त में उक्त आपत्तियों के अनुक्रम में जीएमवीएल के प्रतिनिधि द्वारा उपरोक्त सुझावों के अनुक्रम में अतगत कराया गया कि खनन कार्य वन भूमि पर किया जाना है, किसी लिजी भूमि पर खनन कार्य नहीं किया जायेगा। प्रदूषण नियंत्रण हेतु पर्यावरणीय प्रदूषण योजना के अनुसार कार्य किया जायेगा। इसके अतिरिक्त उनके द्वारा अतगत कराया गया कि स्थानीय ग्रामीणों के विकास हेतु कारपोरेट सोशियल रिस्पॉन्सिबिलिटी (CSR) के अन्तर्गत खनन कार्य से प्राप्त लाभदायक का कुछ भाग विभिन्न सामाजिक विकास कार्य में व्यय किये जाने का भी प्राविधान है। स्थानीय स्तर पर खनन कार्य होने से स्थानीय रोजगार उपलब्ध होना स्वाभाविक है। इसके अतिरिक्त उनके द्वारा बताया गया कि खनन कार्य न होने के कारण नदी का वार्षिक स्वरूप बदल जायेगा और नदी जंगल एवं कृषि भूमि का कटाव करेगा इसलिए नदी का चुगान वैज्ञानिक तरीके से करणा अति आवश्यक है। परियोजना के अन्तर्गत स्थानीय लोगों की सहभागिता का भी पूरा ध्यान रखा जायेगा। यह भी सुनिश्चित किया जायेगा कि खनन वैज्ञानिक तरीके से किया जाये जिससे पर्यावरणीय क्षति न हो।

अन्त में सभा में उपरिष्ठत व्यक्तियों द्वारा हाथ खड़े कर खनन कार्य हेतु सहमति व्यक्त की गयी।

सबोपरान्त लोक सुनवाई की कार्यवाही अध्यक्ष महोदय की अनुमति से द्वारा समाप्त की घोषणा की गयी है। जय सुनवाई की कार्यवाही की फोटोग्राफी एवं वीडियोग्राफी की गयी है।

सल्लाहक-

1. फॉटो - 03
2. डीपीडीडी - 03
3. उपस्थिति पत्रिका - 03


(सुनील कुमार)
अनुप सहो


(प्रकाश कुमार)
ओ.ओ. अभियंता


19-1-14
(प्रकाश सिंह सहो)
अपर जिलाधिकारी (प्रशा)।
देहरादून

19/01/2018

चाहे कि मुकदमा खोलने के लिए - सुप्रीम कोर्ट - नया दिल्ली - लोक न्याय
 विभागाधीन न्याय - दिल्ली - दिल्ली हाईकोर्ट में कॉर्ट - नया
दिल्ली - दिल्ली (सिविल) के सुप्रीम कोर्ट अरी सिविल
 (सिविल) के सुप्रीम कोर्ट / सुप्रीम कोर्ट
 दिनांक 19/01/2018 (सुप्रीम कोर्ट - नया दिल्ली)
कोर्ट - नया दिल्ली - सुप्रीम कोर्ट - नया दिल्ली
सुप्रीम कोर्ट - नया दिल्ली - सुप्रीम कोर्ट - नया दिल्ली
सुप्रीम कोर्ट - नया दिल्ली - सुप्रीम कोर्ट - नया दिल्ली
सुप्रीम कोर्ट - नया दिल्ली - सुप्रीम कोर्ट - नया दिल्ली

क्रमांक	नाम व पद	पता	संयोजक	हस्ताक्षर
1)	श्री. प्रकाश सिंह	सिविल प्रशासन	875 66 55 55	
2)	श्री. प्रकाश सिंह	सिविल प्रशासन	7568 00 3225	
3)	श्री. प्रकाश सिंह	सिविल प्रशासन	7868 00 3257	
4)	श्री. प्रकाश सिंह	सिविल प्रशासन	8 40 3 5 5 5	
5)	श्री. प्रकाश सिंह	सिविल प्रशासन	8 40 3 5 5 5	
6)	श्री. प्रकाश सिंह	सिविल प्रशासन	9738 06 21 33	
7)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
8)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
9)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
10)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
11)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
12)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	
13)	श्री. प्रकाश सिंह	सिविल प्रशासन	9097 38 1 76	

क्र.सं.	नाम व पद	पता	सं.सं.	सं.सं.
14	श्रीकांत	श्रीकांत		
15	विजय सिंह	विजय सिंह	94158905311	श्रीकांत
16	विजय सिंह	विजय सिंह	9410532108	श्रीकांत
17	विजय सिंह	विजय सिंह	9411255597	श्रीकांत
18	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
19	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
20	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
21	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
22	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
23	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
24	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
25	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
26	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
27	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
28	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
29	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
30	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
31	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
32	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
33	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
34	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
35	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
36	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
37	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
38	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
39	विजय सिंह	विजय सिंह	9411518621	श्रीकांत
40	विजय सिंह	विजय सिंह	9411518621	श्रीकांत

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**SPECIES CONSERVATION PLAN
FOR SCHEDULE-I AND II FAUNA**

Soil Conservation forest Division Kalsi

Distt: Dehradun



S. No.	Name Of River	Area in ha.	Extractable Area, ha.	Mineral Availability in Cu.Mt.
1.	Kot-Mot	60.00	30.00	2,00,000.00
2.	Nara Khala	40.00	20.00	1,50,000.00
3.	Yamuna River Left Bank Dhola	40.00	20.00	2,00,000.00
	Total	140.00	70.00	5,50,000.00

Shiwalik Circle, Uttarakhand, Dehradun

**Name of Project: Collection of River Bed
Material**

**Name of Working Agency: Uttarakhand
Forest Development Corporation**

SPECIES CONSERVATION PLAN FOR SCHEDULE-I AND II FAUNA

Introduction

The proposed project is for collection of river bed material (sand, soulder and baji) in an area of 140.00 ha. from the bed of River Kai-Moi, Narokhala and Yamuna River Left Bank Dhola in Soil Conservation forest Division Kalsi in District Dehradun Uttarakhand as follows:-

S. No.	Name Of River	Area in ha.	Extractable Area, ha.	Mineral Availability in Cu.Mt.
1.	Kai-Moi	60.00	30.00	2,00,000.00
2.	Narokhala	40.00	20.00	1,50,000.00
3.	Yamuna River Left Bank Dhola	40.00	20.00	2,00,000.00
	Total	140.00	70.00	5,50,000.00

The project site comes in Choharput, Langha and Tirahi range respectively under Kalsi forest Division of Shivalik Circle, Dehradun, Uttarakhand Forest Development Corporation (UKFDC) is a statutory body constituted by the Uttarakhand State Government, involved in collection and disposal of river bed material from the rivers situated inside reserve forest areas. The project will engage local villagers in the project. There shall be no overburden from the proposed mining.

The proposed collection of river bed material lease is located at a biologically diverse area. A large number of other scheduled animals as per wildlife Protection Act, 1972 and amendments are also present in the study area. These are as given below in Table 1.

Table 1 : Schedule animals present in study area

S. No.	Zoological Name	Common Name	Schedule
1.	<i>Panthera tigris (Linnaeus)</i>	Sher	I
2.	<i>Axis axis</i>	Chital Deer, Spotted deer	III
3.	<i>Martes flavigula (Boddaert.)</i>	Chivola	
4.	<i>Lepus nigricollis (P. Cuvier.)</i>	Khargosh	
5.	<i>Canis aureus</i>	Golden jackal	II
6.	<i>Cervus unicolor</i>	Sambar	III

7.	<i>Elephas maximus</i>	Elephant	I
8.	<i>Panthera bengalensis</i>	Leopard cat	I
9.	<i>Panthera tigris</i>	Jungle cat	II
10.	<i>Macaca mulatta (Zimmermann)</i>	Bandarbanar	
11.	<i>Urocyon edwardsianus</i>	Indian gray mongoose	II
12.	<i>Rhinolophus affinis (Horsfield)</i>	Changadar	
13.	<i>Myotis indica</i>	Indian crested porcupine	IV
14.	<i>Moschus moschiferus (Linnaeus)</i>	Chachunder	
15.	<i>Ursus leonurus (Linnaeus)</i>	Canha/musa	
16.	<i>Melursus ursinus</i>	Sloth Bear	II
17.	<i>Moschus moschiferus</i>	Barking deer	III
18.	<i>Nemorhaedus goral</i>	Goral	III
19.	<i>Felis concolor</i>	Gilhari	
20.	<i>Panthera pardus</i>	Leopard	I
21.	<i>Lynx vulpes Montana (Linn.)</i>	Leopard	
22.	<i>Selenarctos thibetanus</i>	Himalayan Black Bear	II
23.	<i>Sus scrofa</i>	Wild boar	III
24.	<i>Procyon lotor (Puffin)</i>	Langour	
25.	<i>Felis concolor (Puffin)</i>	Gilhari	
26.	<i>Lynx vulpes (Linnaeus)</i>	Od. Udbilao	I

Impact

Animals are sensitive to noise and avoid human territory. Human activity can adversely affect the life cycle of wild animals. Some animals though not on a regular basis, access the river at the project stretch for drinking water. These animals are likely to shift upstream of the stretch during the collection of river bed material activities.

Although there will not be any blasting, noise from the project activities cannot be overruled. During the rainy season, there are no mining activities. During the lean period, the animals in the forest may move deeper inside to avoid the sound of the activities.

Conservation Plan

General Management Measures

To ensure minimum disturbance of the faunal species in the study area, the following conservation measures are proposed:

1. The project area shall be strictly used for only the activities permitted under the Forest Clearance and abide by the conditions therein.
2. **Boundary demarcation:** the boundary of the leased area will be marked prior to start of work at the site. Four feet high reinforced cement concrete pillars each inscribed with its serial number, GPS coordinates, forward and back bearing, and distance from adjoining pillars shall be erected. No trespassing of the workers into the adjoining forest land shall be permitted.
3. **Greenery development:** The project will not lead to any tree cutting. However as social responsibility, greenery will be developed within two km of the project area.

Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.

- | | |
|-------------------------------|----------------------------------|
| 1. Mangifera indica (amr) | 7. Terminalia belarica (Bahedra) |
| 2. Emblica officinalis (amla) | 8. Dalbergia sisso (Shisham) |
| 3. Ziziphus mauritiana (ber) | 9. Acacia catechu (Kher) |
| 4. Aegle marmelos (bel) | 10. Ailanthus excelsa (Ailantha) |
| 5. Syzygium cumini (Jamun) | 11. Toona ciliata (Toon) |
| 6. Albizia spp. (Sirus) | 12. Bombax ceriba (Senal) |

The local villagers shall be given rights over the produce of the trees. Seeds from regionally native vegetation will be used and chemical herbicides, insecticides and fertilizers restricted.

The greenery development shall be in addition to compensatory afforestation activities undertaken.

4. **Soil and Water Conservation:** The project proponent shall commit itself to river training activities and management and protection of wildlife around the project area by contribution fifty percent of the net profit earned from the mining activities to a special Purpose Vehicle (SPV).
5. **Restricted Activities:** All mining activity shall be carried out manually. No explosives and heavy machineries shall be used. Mining shall also be carried out only from 1st October to 31st May.
6. **Dust Suppression :** The sand being transported will be wet for a significant part of the year. No dust generation is anticipated during this period. On other occasions, all loaded trucks shall be covered with tarpaulin prior to transportations to avoid sand deposition on roadside vegetation and agriculture farms. Sprinkling by water tankers is proposed by the bser agency.
7. **Noise Monitoring :** Noise monitoring shall be carried out on a quarterly basis at project site and five other locations selected within the study area. Corrective actions will be planned in case of levels reported beyond the stipulated Ambient Noise Standards.
8. **Project Timings :** Animals are sensitive to noise. Hence no project activities shall be carried out from sunset to sunrise. At daytime, public addressal system (other than during emergency conditions) shall be avoided.
9. **Training :** All workers shall be trained on the do's and don't's of working on forest land. They shall not be allowed to collect fuel-wood from the adjoining forest. They shall be informed of the animals, they might spot in the project area and instructed against harming any of them. The workers shall be directed to use sanitation facilities provided and not litter the project site. Bins for wastes will be placed in rest areas and emptied daily.
10. **Awareness programmes :** Awareness Programmes shall be conducted to sensitize villagers within two km radius of the project site against harming the forest animals and

tree cutting. This shall be achieved through pamphlets, signs and panchayat meetings. The key concerns that will be targeted are:

- Importance of forests, wildlife, need for conservation.
- Discourage the villagers on hunting, animal's trophies and tree felling.
- Illegal trade on animals and the consequences.
- Reporting to forest officials in case of any suspicious activity, animal death, tree felling in the forest.
- Need to maintain sanitary conditions.

11. **Motorized vehicles**-Use of motorized vehicles beyond the haul roads and transportation routes will be restricted. The drivers will be trained to give Right of Way to any animal crossing the road. Horking will be strongly discouraged. Speed limits shall be strictly adhered to. Periodic audits of the transportation team shall be carried out on these parameters.

12. **Management Of Water**-For wild animals there should be sufficient water in the forest so that they do not encroach in the project area. Water holes, and arund will be constructed in the adjoining forest area for sufficient water.

13. **Management of Quick Response Team (QRT)**- To avoid the man-animal conflict QRT must be informed on appearance of such wild animals. Sufficient fund will be provided to QRT for regular supervision.

Specific Management Measures:

Carnivores animals Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Jungle Cat (*Felis leon*), Leopard Cat (*Felis bengalensis*).

- Alerts should be sounded in case any of these animals from the cat family are observed. It should be intimated to QRT (Quick Response Team) immediately to avoid man-animal conflict.
- The labour rest huts shall be fully covered and safe in case of any eventual attack by these animals to avoid any Man-animals conflict.
- In case of a Man-animal conflict the forest Department shall be intimated immediately within 12 hours.

Elephant (*Elephas maximus*)

- Elephant, if encountered by the project team, shall not be disturbed.
- Work shall be temporarily stalled in case an elephant tries to access the project site. It should be intimated to QRT (Quick Response Team) immediately to avoid man-animal conflict.
- In case of a Man-animals conflict, the forest department shall be intimated immediately within 12 hours.

Slough Bear (*Ursus arctus*).

Bears are known to access dustbins in search of food. To discourage bears from identifying project site as a potential source of food, the dustbins shall be cleared everyday at the end of day.

- During greenbelt development, trees attracting bear shall be avoided.

- In case of a Man-animal conflict, the forest department shall be intimated immediately within 12 hours.

Jackal (Canis aureus), Bengal Fox (Vulpes bengalensis)

- The animals shall not be chased or disturbed if they come to the project site.
- Regular clearing of the bushes is important to ensure that these animals do not frequent the project area in search of food.
- In case of a man-animal conflict, the forest department shall be intimated within 12 hours.

Responsibility

Uttarakhand Forest Development Corporation (UKFDC) shall be responsible for following all the conditions of the Conservation Plan. The project manager/Divisional Manager shall ensure that all the conditions are being complied at site and report to GIM.

Cost for implementation of Conservation Plan

Cost of implementation of the proposed conservation plan shall be part of the project cost and used under the supervision of the GIM (Uttarakhand Forest Development Corporation).

(Signature)
 प्रभागीय लक्षित प्रमुखक (खानन)
 उत्तराखण्ड वन विकास निगम,
 देहरादून

(Signature)
 प्रशासक (खानन)
 प्रकृतिक संरक्षण तथा प्रशासन
 देहरादून

(Signature)

(Signature)
 वन संरक्षक
 विभागीय वृक्ष
 उत्तराखण्ड, देहरादून

Principal Chief Conservator
 of Forest (Wildlife)
 Chief Wildlife Warden
 Uttarakhand

Cost Of implementation of proposed conservation plan for Kot-Mot River as follows:-

1. Name Of River:- Kot-Mot

Minable Area:- 60 ha

S. N.	Item		Amount (Rs. In Lacs)
1	Provision of dustbins-onetime		0.150
2	Training-annual		0.300
3	Boundary demarcations		0.500
4	Raising awareness		0.250
5	River Training	A. QRT and Water Management	5.000
		B. Construction of spur and side walls for Channelizing the river	16.000
6	12 Watchers		1.800
	Total		24.000


Principal Chief Conservator
of Forest (Wildlife)
Wildlife Warden
Biharakhand


प्रभारणीय जंगल अधिकारी (खनन)
अन्तःराज्य वन विकास निगम,
देहरादून


जिला जंगल अधिकारी
शुद्धि प्रकल्प कोष प्रशासन
देहरादून


जन-संरक्षक
शिक्षणिक वृत्त
अन्तःराज्य वन, देहरादून

Cost Of implementation of proposed conservation plan for Narokhala River as follows:-

2. Name Of River:- Narokhala

Minable Area:-40 ha

S. N	Item	Amount (Rs. In Lacs)	
1	Provision of dustbins-motive	0.150	
2	Training-annual	0.300	
3	Boundary demarcation	0.200	
4	Raising awareness	0.250	
5	River Training	A. ORT and Water Management	5.000
		B. Construction of spur and side walls for channelizing the river.	15.000
6	12 Watchers	1.800	
Total		22.90	


Regional Chief Conservator
(of Forest/Wildlife)
Chief Wildlife Warden
Uttarakhand


प्रभागीय लॉकड डाइरेक्टर (खान)।
उत्तराखण्ड वन विकास निगम,
देहरादून


प्रभागीय नगरपालिका
मुख्य कार्यकारी अधिकारी
देहरादून

प्रतिपालक


वन संरक्षक
शिवालिक पुन
उत्तराखण्ड-देहरादून

Cost Of implementation of proposed conservation plan for Yamuna River Left Bank Dhola as follows:-

3. Name Of River:- Yamuna River Left Bank Dhola

Minable Area:-40 ha

S. N.	Item		Amount (Rs. In Lacs)
1	Provision of dustbins-onetime		0.150
2	Training annual		0.300
3	Boundary demarcation		0.400
4	Raising awareness		0.250
5	River Training:	A. QRT and Water Management	5.000
		B. Construction of spur and side walls for Channelizing the river:	15.000
6	12 Watchers		1.800
	Total		32.90

Principal Chief Conservator
of Forest (Wildlife)
Chief Wildlife Warden
Uttarakhand

प्रभागीय लेजरिंग प्रयत्नक (खनर)
उत्तराखण्ड के विकास निगम,
देहरादून

प्रभागीय वनारिवाय
नृडि प्रजाति वन प्रसाध
देहरादून

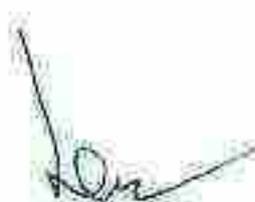
जिला वनारिवाय

अन संयोजक
शिवमलिक वृत्त
प्रसाध निगम, देहरादून

Total Cost Of implementation of proposed conservation plan for River in Kalsi Forest Division as follows:-

Amount Rs in lakhs.

S. No.	Name of River		Kot-Mm	Narokhda	Yamuna River Left Bank Dhola	Annual Cost (Rs. in Laos)
	Item					
1	Provision of dustbins- onetime		0.150	0.150	0.150	0.450
2	Training animal		0.500	0.500	0.500	1.500
3	Boundary demarcation		0.500	0.400	0.400	1.300
4	Raising awareness		0.250	0.250	0.250	0.750
5	River Training	A. QRT and Weir Management	5.000	5.000	5.000	15.000
		B. Construction of spur and side walls for Channelizing the river.	16.000	15.000	15.000	46.000
6	E2 Watchers		1.800	1.800	1.800	5.400
Total			24.000	22.900	22.900	69.800


Principal Chief Conservator
of Forest (Wildlife)
Chief Wildlife Ward
Uttarakhand


प्रभागीय जलविद्युत अधिकारी (खनन)
उत्तराखण्ड वन विकास निगम,
देहरादून


जल संरक्षक
शिवालिक वन
उत्तराखण्ड, देहरादून


जल संरक्षक
शिवालिक वन
उत्तराखण्ड, देहरादून

Hence, Rs. Sixty nine Lakh Eighty thousand shall be allocated for implementation of the conservation plan annually. Desired amount for serial number 1,2,3,4 & 6 will be provided by Forest Corporation separately. Rest works i.e. of serial number 5 will be done from the amount received through sale of the forest produce.

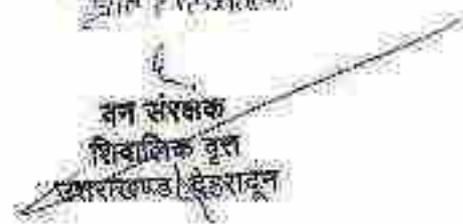
Summary

Uttarakhand Forest Development Corporation (UKFDC) commits to ensure that the project will be implemented in an environmentally sustainable order. All the proposed conservation measures shall be strictly adhered to. It is thus anticipated that the project will not lead to any significant ecological impact.


 उत्तराखण्ड वन विभाग
 वन संरक्षण विभाग
 जल संरक्षण, देहरादून


 उत्तराखण्ड वन विभाग
 वन संरक्षण विभाग
 देहरादून


 वन संरक्षण विभाग


 वन संरक्षण विभाग
 देहरादून


 Principal Chief Conservator
 of Forest (Wildlife)
 Chief Wildlife Warden
 Uttarakhand



कार्यालय प्रमुख वन संरक्षक, उत्तराखण्ड, देहरादून
पत्रांक - 302 / 32-1(आई.टी.सेल) दिनांक 13 अक्टूबर 2014 ।

उत्तराखण्ड वन-सर्वेय आपदा सेवा

सेवा में,

प्रभागीय वन विकास एजन्सिक (खजान)

उत्तराखण्ड वन विकास निगम,

देहरादून ।

विषय-

राजाजी नेशनल पार्क से हवाई दूरी के सम्बन्ध में।

सन्दर्भ-

आपका पत्रांक 889 / दिनांक 20-08-2014

महोदय,

सदरगत निम्नलिखित सम्बन्धित वन के न्यूनतम स्थानों की राजाजी नेशनल पार्क एवं तिनोश वन्यजीव विहार तथा आसन कन्जरवेशन रिजर्व के निकटतम बिन्दु से हवाई दूरी क्रमशः निम्न प्रकार से आंकी गयी है-

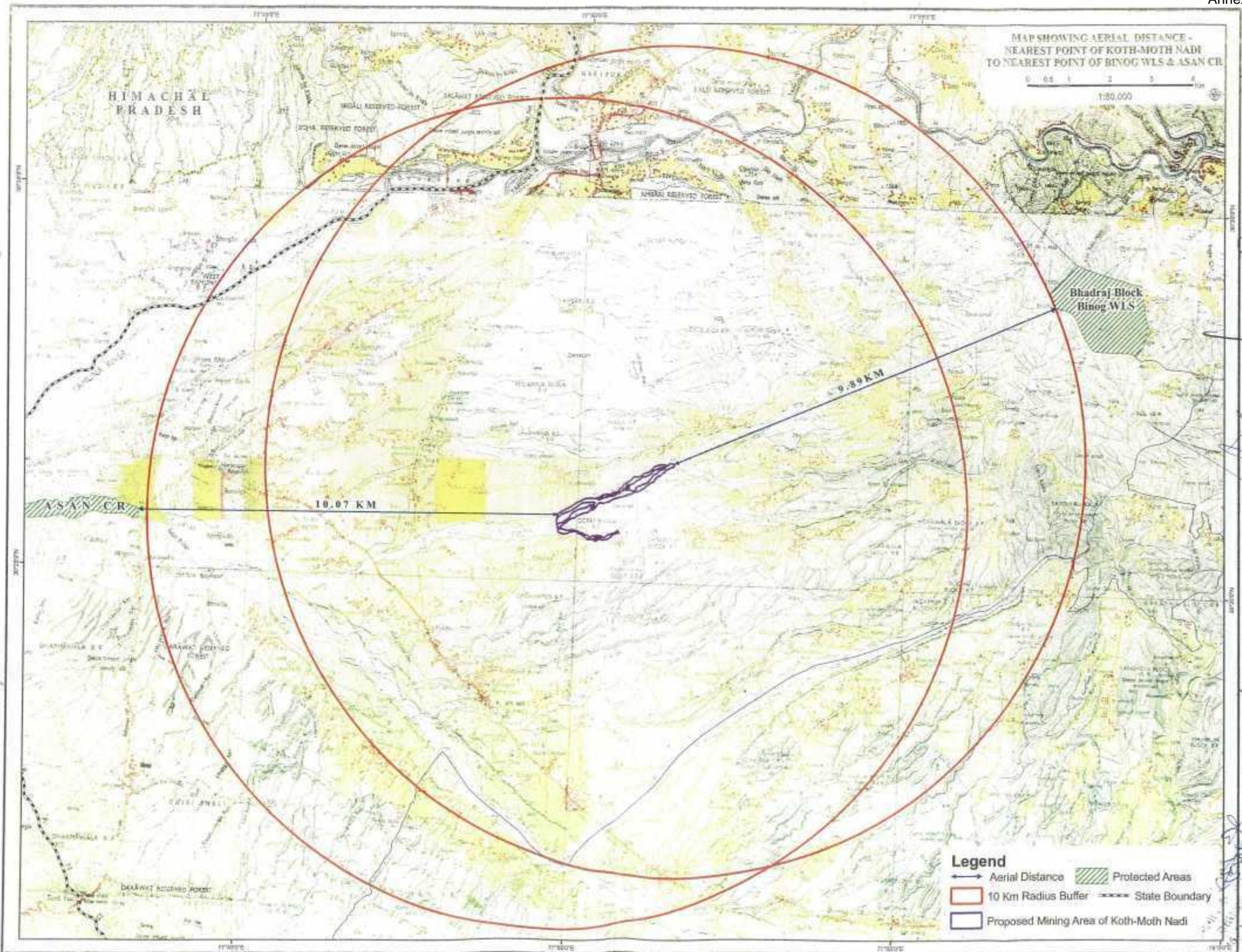
NAME		ARIAL DISTANCE In Km	DESCRIPTION
Jakhan-I 78° 11' 59.941" E 30° 11' 25.126" N	Rajaji National Park 78° 7' 16.450" E 30° 6' 50.575" N	11.20	Nearest Point of Jakhan-I to Nearest Point of Rajaji National Park
Jakhan-II 78° 9' 52.243" E 30° 8' 30.959" N	Rajaji National Park 78° 7' 16.450" E 30° 6' 50.575" N	5.12	Nearest Point of Jakhan-II to Nearest Point of Rajaji National Park
Yamuna Left Dhuala-I 77° 34' 46.527" E 30° 24' 56.299" N	Asan CR 77° 39' 31.686" E 30° 26' 3.612" N	7.78	Nearest Point of Yamuna Left Dhuala-I to Nearest Point of Asan CR
Yamuna Left Dhuala-I 77° 34' 41.596" E 30° 23' 58.417" N	Rajaji NP 77° 55' 10.453" E 30° 12' 36.894" N	38.44	Nearest Point of Yamuna Left Dhuala-I to Nearest Point of Rajaji National Park
Narokhala 77° 52' 55.615" E 30° 28' 30.116" N	Asan CR 77° 43' 18.805" E 30° 25' 45.337" N	15.99	Nearest Point of Narokhala to Nearest Point of Asan CR
Narokhala 77° 52' 57.560" E 30° 28' 33.703" N	Binog WLS 77° 57' 4.795" E 30° 28' 58.185" N	6.55	Nearest Point of Narokhala to Nearest Point of Binog WLS
Koth Moth 77° 51' 27.871" E 30° 26' 34.394" N	Binog WLS 77° 57' 11.307" E 30° 28' 46.676" N	9.89	Nearest Point of Koth Moth to Nearest Point of Binog WLS
Koth Moth 77° 49' 41.262" E 30° 25' 52.018" N	Asan CR 77° 43' 18.805" E 30° 25' 45.337" N	10.07	Nearest Point of Koth Moth to Nearest Point of Asan CR

Koth-Moth 77° 50' 27.766" E 30° 25' 33.827" N	Rajaji NP 77° 57' 21.463" E 30° 14' 24.845" N	23.06	Nearest Point of Koth Moth to Nearest Point of Rajaji National Park
Ramgarh Rao 77° 52' 58.039" E 30° 17' 54.562" N	Rajaji NP 77° 57' 21.463" E 30° 14' 24.845" N	9.42	Nearest Point of Ramgarh Rao to Nearest Point of Rajaji National Park
Swarna 77° 53' 28.594" E 30° 23' 54.902" N	Binog WLS 77° 57' 46.259" E 30° 28' 14.336" N	10.40	Nearest Point of Swarna to Nearest Point of Binog WLS
Swarna 77° 51' 43.306" E 30° 22' 43.900" N	Rajaji NP 77° 57' 21.463" E 30° 14' 24.845" N	17.59	Nearest Point of Swarna to Nearest Point of Rajaji National Park
Song 78° 7' 21.749" E 30° 16' 55.159" N	Rajaji NP 78° 1' 23.619" E 30° 14' 59.749" N	10.07	Nearest Point of Song to Nearest Point of Rajaji National Park

बसन्त

(रंजना कल्ला)

मुख्य वन संरक्षक (प्रशासन)
उत्तराखण्ड, देहरादून।



Handwritten notes and signatures on the right margin:

77 नम आभार
 मयूर वर प्र.वि. मयूर
 प्र.वि. मयूर
 उत्तराखण्ड का विकास निगम
 "प्रत्येक विकास प्रकल्प"
 उत्तराखण्ड का विकास निगम
 उत्तराखण्ड का विकास निगम
 उत्तराखण्ड का विकास निगम



NABL

National Accreditation Board for Testing and Calibration Laboratories

(An Autonomous Body under Department of Science & Technology, Govt. of India)

CERTIFICATE OF ACCREDITATION

MANTEC ENVIRONMENTAL LABORATORY

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

D-36, Sector-6, Noida, Gautam Budh Nagar, Uttar Pradesh

in the discipline of

CHEMICAL TESTING

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Certificate Number T-1417
Issue Date 11/09/2015



Valid Until 10/09/2017

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the additional requirements of NABL.

Signed for and on behalf of NABL

N. Venkateswaran

N. Venkateswaran
Program Manager

Anil Rella

Anil Rella
Director

Prof. S. K. Joshi

Prof. S. K. Joshi
Chairman



रा.प्र.प्र.बो.

राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड

(विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार के अधीन स्वायत्तशासी निकाय)

प्रत्यायन प्रमाण-पत्र

मेनटेक एन्वायरनमेंटल लेबोरेटरी

का मूल्यांकन और प्रत्यायन निम्न मानक के अनुसार

आई.एस.ओ./आई.ई.सी. 17025:2005

“परीक्षण एवं अंशशोधन प्रयोगशालाओं की सक्षमता की सामान्य अपेक्षाएँ”

गौतम बुद्ध नगर, उत्तर प्रदेश

में स्थित इसकी सुविधाओं के लिए

रासायनिक परीक्षण

के विषय क्षेत्र में किया गया।

(इस प्रयोगशाला के अत्यायन के विषय क्षेत्र की जानकारी एवं ए. प्र. प्र. बो. का फेसबुक www.rppb.in से भी प्राप्त कर सकते हैं।)

प्रमाण-पत्र संख्या P-1417

जारी करने की तिथि 11/09/2015



वैधता की तिथि 10/09/2017

यह प्रमाण-पत्र उपर्युक्त मानक तथा राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड की अतिरिक्त अपेक्षाओं का निरंतर संतोषपूर्वक अनुपालन किए जाने पर अनुबंध में निर्दिष्टानुसार प्रत्यायन के क्षेत्र के लिए वैध रहेगा।

रा.प्र.प्र.बो. की ओर से हस्ताक्षरित

एन. वेंकटरामन

एन. वेंकटरामन
कार्यक्रम प्रबन्धक

अनिल रैलिया

अनिल रैलिया
निदेशक

प्रो. श्रीकृष्ण जोशी

प्रो. श्रीकृष्ण जोशी
अध्यक्ष



NABL

SCOPE OF ACCREDITATION

Laboratory: Mantec Environmental Laboratory, D-36, Sector-6, Noida, Gautam Budh Nagar, Uttar Pradesh

Accreditation Standard: ISO/IEC 17025: 2005

Discipline: Chemical Testing **Issue Date:** 11.09.2016

Certificate Number: T-1417 **Valid Until:** 10.09.2017

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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
1.	AIR, GASES AND ATMOSPHERE			
1.1	Ambient Air	Respirable Particulate Matter/ PSE 10	IS 5182 (Part 3): 2012	0 µg/m ³ to 1000 µg/m ³
		Suspended Particulate Matter	IS 5182 (Part 4): 2010	5 µg/m ³ to 1000 µg/m ³
		Sulphur Dioxide as SO ₂	IS 5182 (Part 2): 2012	1 µg/m ³ to 1000 µg/m ³
		Nitrogen Dioxide as NO ₂	IS 5182 (Part 5): 2006	0.1 µg/m ³ to 750 µg/m ³
		Ammonia as NH ₃	CPCB Guidelines, Vol. 1 (May 2011), MEL/SOP/01/Section No.17, Issue No. 01 & Issue Date 18.10.2014.	1 µg/m ³ to 1000 µg/m ³
		Ozone as O ₃	IS 5182 (Part 9): 2003	10 µg/m ³ to 2000 µg/m ³
		Carbon Monoxide as CO	IS 5182 (Part 10): 2009 (NDR Method)	0.01 ppm to 200 ppm
		Particulate Matter 2.5	CPCB Guidelines, Vol. 1 (May 2011), MEL/SOP/01/Section No.13, Issue No. 01 & Issue Date 18.10.2014.	3 µg/m ³ to 1000 µg/m ³
		Lead as Pb	IS 5182 (Part 22): 2009	0.3 µg/m ³ to 20 µg/m ³
		Arsenic as As	CPCB Guidelines, Vol. 1 (May 2011), MEL/SOP/01/Section No. 22, Issue No. 01 & Issue Date 18.10.2014.	2.0 ng/m ³ to 20 ng/m ³


Anuja Anand
Convenor


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Program Manager



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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Ambient Air	Nickel as Ni	CPCB Guidelines, Vol. 1 (May-2011) MEI/SOP/01/ Section No. 23 Issue No. 01 & Issue Date: 18.10.2014	1.0 ng/m ³ to 30 ng/m ³
		Benzene, Toluene and Xylene	IS 5182 (Part 11): 2006	3.0 µg/m ³ to 50 µg/m ³
		Benzo(a)Pyrene	IS 5182 (Part 12): 2004	1.0 µg/m ³ to 1000 ng/m ³
II:	WATER:			
1.	Drinking Water, Surface Water, Ground Water & Waste Water	pH	IS 3025 (Part 11): 2008	1 to 14
		Conductivity	IS 3025 (Part 14): 2002	2 and above up to 20000 µmhos/cm
		Alkalinity as CaCO ₃	IS 3025 (Part 23): 2003	1 mg/l to 5000 mg/l
		Chloride as Cl	IS 3025 (Part 32): 2007	2 mg/l to 5000 mg/l
		Total Hardness as CaCO ₃	IS 3025 (Part 21): 2009	1 mg/l to 5000 mg/l
		Total Dissolved Solid	APHA 2540-C IS 3025 (Part 16): 2006	1 mg/l to 250000 mg/l
		Chemical Oxygen Demand	APHA 5220 IS 3025 (Part 58): 2006	4 mg/l to 250000 mg/l
		Sodium as Na	IS 3025 (Part 45): 2003 Flame Photometer	1 mg/l to 1000 mg/l
		Potassium as K	IS 3025 (Part 45): 2003 Flame Photometer	1 mg/l to 1000 mg/l


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Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Chemical Testing	Issue Date	11.09.2016
Certificate Number	T-1417	Valid Until	10.09.2017
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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Drinking Water, Surface Water, Ground Water & Waste Water	Sulphate as SO ₄	IS 3025 (Part 26)- 2009	1 mg/l to 1000 mg/l
		Phosphate as PO ₄	IS 3025 (Part 31)- 2005	0.1 mg/l to 100 mg/l
		Nitrate as NO ₃	IS 3025 (Part 34)- 2009	1 mg/l to 100 mg/l
		Acidity	IS 3025 (Part 22)- 2005	1 mg/l to 100 mg/l
		Temperature	IS 3025 (Part 9)- 2002	4 °C to 100 °C
		Dissolved Oxygen	IS 3025 (Part 18)- 2003	0.1 mg/l to 10 mg/l
		Biochemical Oxygen Demand	IS 3025 (Part 43)- 2005	1 mg/l to 70 mg/l
		Oil & Grease	IS 3025 (Part 39)- 2003	0.4 mg/l to 10 mg/l
		Total Suspended Solid	IS 3025 (Part 17)- 2006	2.0 mg/l to 100 mg/l
		Colour	IS 3025 (Part 4)- 2012	1 Hazen to 500 Hazen
		Turbidity	IS 3025 (Part 10)- 2006	1 NTU to 500 NTU
		Calcium as CaCO ₃	IS 3025 (Part 30)- 2009	1 mg/l to 2500 mg/l
		Magnesium as CaCO ₃	IS 3025 (Part 16)- 2009	0 to 2500 mg/l
		Nitrite Nitrogen (NO ₂ -N)	IS 3025 (Part 14)- 2009/ APHA (22 nd Edition)	0.01 mg/l to 100 mg/l
		Ammonia (as Total Ammonia -N)	IS 3025 (Part 34)- 2009/ APHA (22 nd Edition)	0.2 mg/l to 100 mg/l
	Free Residual Chlorine	IS 3025 (Part 26)- 2009	0.1 mg/l to 10 mg/l	


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Accreditation Standard: ISO/IEC 17025: 2005

Discipline: Chemical Testing Issue Date: 11.08.2015

Certificate Number: T-1417 Valid Until: 10.09.2017

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S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Drinking Water, Surface Water, Ground Water & Waste Water	Anionic Detergents	IS 13128: 2005 Annexure K	0.05 mg/l to 50 mg/l
		Fluoride as F ⁻	IS 3025 (Part 60): 2008	0.02 mg/l to 20 mg/l
		Silica as SiO ₂	IS 3025 (Part 35): 2003	0.01 mg/l to 100 mg/l
		Boron as B ₂ O ₃	IS 3025 (Part 57): 2004	0.02 mg/l to 10 mg/l
		Phenolic Compound	IS 3025 (Part 43): 2003	0.001 mg/l to 50 mg/l
		Manganese as Mn	IS 3025 (Part 59): 2006	0.01 mg/l to 100 mg/l
		Hexavalent Chromium as Cr ^{VI}	IS 3025 (Part 52): 2003	0.01 mg/l to 100 mg/l
		Iron as Fe	IS 3025 (Part 53): 2009	0.01 mg/l to 100 mg/l
		Mercury as Hg	IS 3025 (Part 48): 2003	0.001 mg/l to 50 mg/l

~~XXXXXXXXXXXXXX~~


Anuja Anand
Convener


N. Venkataswaran
Program Manager

QUESTIONNAIRE FOR ENVIRONMENTAL APPRAISAL
(MINING SECTOR PROJECTS)

Note 1: All information given in the form of annexures should be part of this file itself. Annexures as separate files will not be accepted.

Note 2: Please enter x in appropriate box where answer is Yes/No

1. GENERAL INFORMATION

A. NAME OF THE PROJECT Mining of Sand, Bajri and Boulder (minor Minerals) from River Bed of Kot Mot by M/s Uttarakhand Forest Development Corporation

B. OBJECTIVE OF THE PROJECT make the villagers self established, work for their betterment in terms of providing better education, sanitary facilities and education system.

C. LOCATION OF MINE (S)

VILLAGE	TEHSIL	DISTRICT	STATE
Rudrapur	Vikasnagar	Dehradun	Uttarakhand

D. DOES THE PROPOSAL RELATE TO:

- | | | | | |
|------------------------------------|-----|--------------------------|----|--------------------------|
| 1. NEW MINE | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 1. EXPANSION | | | | |
| (I) INCREASE IN ML AREA | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| (II) INCREASE IN ANNUAL PRODUCTION | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 3. RENEWAL OF ML | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| 4. MODERNIZATION | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |

II. SITE INFORMATION

A. Geographical Information

- LATITUDE: 30°26'34.69" to 30° 25' 40.72"
- LONGITUDE 77°52'47" to 77° 49' 39.22"
- SURVEY OF INDIA TOPO SHEET NO. (OPTIONAL) 4

4. ELEVATION ABOVE MEAN SEA LEVEL 505 AMSL

B. TOTAL LEASE AREA (IN HA) 60 Hectares

A. DOMINANT NATURE OF TERRAIN: Hilly

III. LAND USAGE OF THE LEASE AREA (IN HA) The project falls completely under river in forest land.

A. AGRICULTURAL	00
B. FOREST LAND (RIVER BED)	60
C. WASTE LAND	00
D. MANGROVES	00
E. GRAZING	00
F. MARSHY	00
G. SURFACE WATER BODIES	00
H. OTHERS (SPECIFY)	00
TOTAL	60 Hectares

IV. WHETHER THE MINE LEASE AREA FALLS IN SEISMICALLY ACTIVE ZONE?

Yes No ZONE NO: IV

IF YES, EARTH QUAKES IN LAST 10 YEARS

A. Severity (Scale): --

B. Impact i.e. Damage to : --

1. Life Yes No
2. Property Yes No
3. Existing mine Yes No

V. WHETHER THE PROPOSED PROJECT FALLS IN LANDSLIDE PRONE ZONE?

Yes No

VI. BREAK -UP OF THE LAND USE PROPOSED

A. MINING LEASE AREA
(IN HECTARES)

1. AREA TO BE MINED

VII. DISTANCE OF WATER BODIES (IN KM)

DISTANCE OF	RIVER BANK *	DISTANCE	OTHER WATER BODIES SEA / CREEK / LAKE ETC. (SPECIFY)
Mine lease boundary	KOT MOT RIVER	00	None
Ancillary facilities	KOT MOT RIVER	00	None

*From highest flood line / high tide line

VIII. FOR PROJECTS FALLING WITHIN CRZ

A. Whether the mineral to be mined is of rare/strategic nature and not available outside CRZ?

Yes No

If so, annex a scaled location map duly certified* by the Chief Hydrographer indicating low tide line* (LTL), high tide line* (HTL), mining lease area and its distance from LTL and HTL, sand dunes and settlements within 10 km.

IX. INDICATE AERIAL DISTANCE FROM THE PERIPHERY OF CORE ZONE / BUFFER ZONE OF FOLLOWING:

S.NO.	AREAS	NAME	AERIAL DISTANCE FROM (IN KM.)
1	NATIONAL PARK	--	--
2	SANCTUARY/TIGER RESERVE/ELEPHANT/ANY OTHER RESERVE	Binog Wildlife Sanctuary	9.89 Kms, NE
3	CORE ZONE OF BIOSPHERE RESERVE	--	--
4	HABITAT FOR MIGRATORY BIRDS	Asan Barrage	45.03 Kms , W
5	ARCHAEOLOGICAL SITES (I) NOTIFIED (II) OTHERS	--	--
6	DEFENSE INSTALLATION	Indian Military Academy	19.18 Kms
7	INDUSTRIES/THERMAL POWER PLANTS	--	--
8	OTHER MINES	--	--
9	AIRPORTS	Jolly grant Airport	43 Kms
10	RAILWAY LINES	Dehradun Railway station	23.60 Kms
11	NATIONAL / STATE HIGHWAYS	NH-72	4.0 Km in SW Direction

X. DESCRIPTION * OF FLORA & FAUNA IN THE CORE AND BUFFER ZONES

[* Consult the Wildlife (Protection) Act, 1972 as amended subsequently and list species with (1) Common name (2) Scientific name and (3) under which schedule of the Wildlife (Protection) Act,1972 and as amended subsequently ,the identified species fall. Get the list authenticated by an Expert in the field / credible scientific institute / Chief Wildlife Warden Office.]

A. FLORA

SL. NO	PARCTICULARS	CORE ZONE	BUFFER ZONE
1.	Agricultural crops	none	none
2.	Commercial crops	none	none
3.	Plantation	none	Sheesham, Gulmohar, lichi, aam etc
4.	Natural vegetation / forest type	Jangli Pudina, Kapok, Durban, Datura etc	Katahal, jangli pudina, Kapok, durban, dhatura etc.
5.	Grass lands	none	none
6.	Endangered species	none	none
7.	Endemic species	none	none
8.	Others (Specify)	none	none

B. FAUNA

SL. NO	PARCTICULARS	CORE ZONE	BUFFER ZONE
1.	Total listing of faunal elements	Common Mongoose, Small Indian Mongoose, Five-striped Palm Squirrel, Indian Field Mouse, Common House Rat	MACAQUE, LANGUR, MONGOOSE, SPOTTED DEER, PANTHERA TIGRIS, ELEPHAS MAXIMUS
2.	Endangered species	None	PANTHERA TIGRIS(LINNEUS), ELEPHAS MAXIMUS
3.	Endemic species	None	None
4.	Migratory species	None	None
5.	Route of migratory species	--	--
6.	Details of aquatic fauna, if applicable	None	Rohu, Katla, Mahasheer and Mangu

XI. DETAILS OF MINERAL RESERVES

Quantity (in Million tonnes)

A. PROVEN	6.37
B. INDICATED	4.247
C. INFERRED	2.124
D. MINEABLE RESERVES	10.619

XII. MAJOR GEOLOGICAL FORMATION/DISTURBANCES IN THE MINE AREA

- A. Geological & Structural maps submitted Yes No
- B. Geomorphologic contour map / section submitted Yes No

XIII. PRODUCTION OF MINERAL AND LIFE OF MINE

A. RATED CAPACITY OF MINE (MILLION TONNE/ANNUM)

B. LIFE OF MINE (YEARS)

C. LEASE PERIOD (YEARS)

D. DATE OF EXPIRY OF LEASE (D /M /Y)

E. IN CASE OF EXISTING MINES: This is a new mine. Hence, not applicable.

1. DATE OF OPENING OF MINE

2. AVG. PRODUCTION IN THE LAST FIVE YEARS
(MILLION TONNES/ANNUM)

3. AVG. / PROJECTED PRODUCTION FOR THE NEXT 10 YEARS
(MILLION TONNES/ANNUM)

F. WHETHER PLANS & SECTIONS PROVIDED Yes No

XIV. TYPE AND METHOD OF MINING OPERATIONS

S.NO.	A. TYPE		S.No.	B. METHOD	
1	Open-Cast		1	Manual	
2	Underground		2	Semi-mechanised	
3	Both		3	Mechanised	

XV. ANCILLARY OPERATIONS FOR MINERAL PROCESSING

A. Existing -None

- B. Additional – Simple hand tools like Shovel, pans and sieves followed by followed by picking, attacking and loading.

XVI. LOADING, TRANSPORTATION AND UNLOADING OF MINERAL AND WASTE ROCKS ON SURFACE:

- A. Manual-
- B. Tubs, mine cars, etc.
- C. Dumpers/Trucks-
- D. Conveyors (belt, chain, etc.)
- E. Others (specify)

XVII. MINE DETAILS

- A. OPEN-CAST MINES

Stripping ratio (mineral to over burden in tonne/ m³) 9: 1

- B. UNDERGROUND MINES ~~6~~one

XVIII. SURFACE DRAINAGE PATTERN AT MINE SITE

- A. WHAT IS THE PRE-MINING SURFACE DRAINAGE PATTERN AT THE SITE?

The entire river stretch is around 3.16 Kms in one tributary and 1.57 Kms in another tributary. The river flows from North East direction to South West West direction. The river banks comprises of Dense Forests on either sides. The northern sides, however comprises of some agricultural land. The river is seasonal and maximum flow occurs during the monsoon seasons.

- B. Do you propose any modification / diversion in the existing natural drainage pattern? Yes No

Provide location map indicating contours, direction of flow of water, and proposed route/changes, if any i.e. realignment of river/nallah/ any other water body falling within core zone.

Provided

XIX. VEHICULAR TRAFFIC DENSITY

- A. Existing 187 PCU/hr
- B. After the proposed activity 187.791PCU/hr

C. Whether the existing road network is adequate? Yes No

D. If no, provide details of alternative proposal

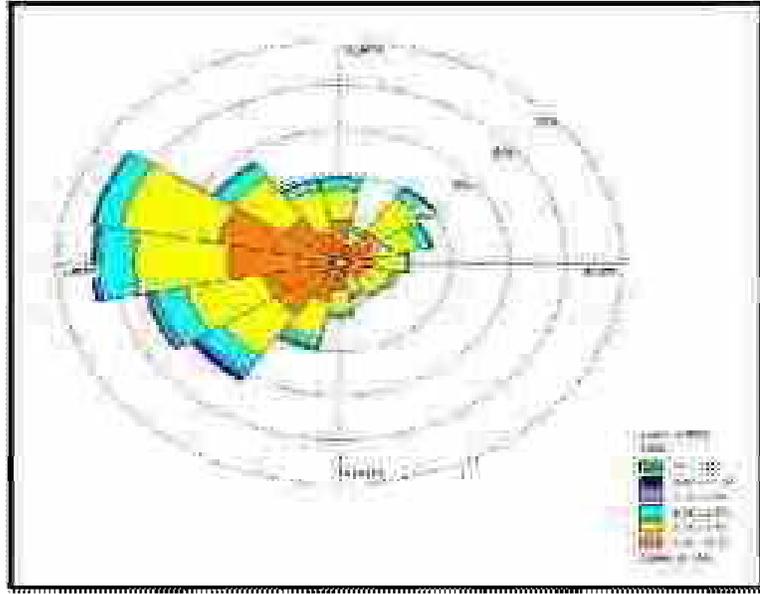
XX. MINERAL(S) TRANSPORTATION FROM THE MINE SITE

Qty. (in TPD)		Percentage (%)
A. Road	100	%
B. Rail		
C. Conveyors		
D. Rope way		
E. Water ways		
F. Pipeline		
G. Others (Specify)		
TOTAL	100	%

XXI. STATUS OF MINING LEASE AREA (IN FILE) mining lease area is 60 Hectares, which is already acquired)

XXII. BASELINE METEOROLOGICAL & AIR QUALITY DATA

- A. 1. Micro-meteorological data (Continuous monitoring for full season except monsoon through autographic instrument)(attached)
- 2. Seasonal wind rose pattern (16 points of compass i.e. N, NNE, NE, ---)



2. Site specific monitored data

- FREQUENCY COUNT

	DIRECTIONS / WIND CLASSES (M/S)	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	TOTAL
1	348.75 - 11.25	42	31	11	2	0	0	86
2	11.25 - 33.75	18	14	5	0	0	0	37
3	33.75 - 56.25	38	39	10	2	1	1	91
4	56.25 - 78.75	29	33	10	1	0	1	74
5	78.75 - 101.25	28	24	3	0	0	0	55
6	101.25 - 123.75	22	19	6	0	0	0	47
7	123.75 - 146.25	21	19	2	0	0	0	42
8	146.25 - 168.75	16	17	4	0	0	0	37
9	168.75 - 191.25	27	21	5	2	0	0	55
10	191.25 - 213.75	40	37	8	2	0	3	90
11	213.75 - 236.25	62	49	20	5	4	1	141
12	236.25 - 258.75	61	62	24	6	0	2	155
13	258.75 - 281.25	88	72	28	4	2	0	194
14	281.25 - 303.75	98	77	20	2	1	0	198
15	303.75 - 326.25	53	49	14	3	1	0	120
16	326.25 - 348.75	32	42	9	1	1	0	85
	Sub-Total	675	605	179	30	10	8	1507
	Calms							701
	Missing/Incomplete							0
	Total							2208

• FREQUENCY DISTRIBUTION

	DIRECTIONS / WIND CLASSES (M/S)	0.50 - 2.10	2.10 - 3.60	3.60 - 5.70	5.70 - 8.80	8.80 - 11.10	>= 11.10	TOTAL (%)
1	348.75 - 11.25	1.90217	1.40399	0.49819	0.09058	0	0	3.89493
2	11.25 - 33.75	0.81522	0.63406	0.22645	0	0	0	1.67572
3	33.75 - 56.25	1.72101	1.7663	0.4529	0.09058	0.04529	0.04529	4.12138
4	56.25 - 78.75	1.31341	1.49457	0.4529	0.04529	0	0.04529	3.35145
5	78.75 - 101.25	1.26812	1.08696	0.13587	0	0	0	2.49094
6	101.25 - 123.75	0.99638	0.86051	0.27174	0	0	0	2.12862
7	123.75 - 146.25	0.95109	0.86051	0.09058	0	0	0	1.90217
8	146.25 - 168.75	0.72464	0.76993	0.18116	0	0	0	1.67572
9	168.75 - 191.25	1.22283	0.95109	0.22645	0.09058	0	0	2.49094
10	191.25 - 213.75	1.81159	1.67572	0.36232	0.09058	0	0.13587	4.07609
11	213.75 - 236.25	2.80797	2.2192	0.9058	0.22645	0.18116	0.04529	6.38587
12	236.25 - 258.75	2.76268	2.80797	1.08696	0.27174	0	0.09058	7.01993
13	258.75 - 281.25	3.98551	3.26087	1.26812	0.18116	0.09058	0	8.78623
14	281.25 - 303.75	4.43841	3.48732	0.9058	0.09058	0.04529	0	8.96739
15	303.75 - 326.25	2.40036	2.2192	0.63406	0.13587	0.04529	0	5.43478
16	326.25 - 348.75	1.44928	1.90217	0.40761	0.04529	0.04529	0	3.84964
	Sub-Total	30.5707	27.4004	8.10688	1.3587	0.4529	0.36232	68.2518
	Calms							31.7482
	Missing/ Incomplete							0
	Total							100

4. RAINFALL (IN MM)
- (i) Total (Annual) : 2149 mm
- (ii) 24 hr highest : 655.6 mm
5. WIND SPEED (KMPH)
- (i) Max. :31.68 kmph
- (ii) Min :1.8 kmph
- (ii) % of Calm :31.75 %

6. TEMPERATURE (DEG. CELSIUS)

MONTH	TEMPERATURE (°C)	
	MAXIMUM	MINIMUM
MARCH 2015	35	16
APRIL 2015	40	22
MAY 2015	43	30

7. RELATIVE HUMIDITY (%)

MONTH	RELATIVE HUMIDITY (%) MEAN
MARCH 2015	63
APRIL 2015	51
MAY 2015	49

B. AMBIENT AIR QUALITY DATA* (RPM, SPM, SO₂, CO)

*Frequency of monitoring should be as per guidelines of CPCB and monitoring should cover one full season except monsoon.

1. Season & period for which monitoring has been carried out : March to May, 2015
 2. Frequency of sampling : Twice a week
 3. No. of samples collected at each monitoring station : 24
- ** For mineral specific site only

#Annex a location map indicating location of AAQ stations, their direction & distance w.r.t. project site.

#Attach additional sheets as required to provide complete data as monitored for one season.

S. NO.	LOCATION CODE	LOCATION NAME
1.	A1	Mine Site Rudrapur
2.	A2	Rampur
3.	A3	Sahaspur
4.	A4	Herbertpur
5	A5	Vikasnagar

XXIII. STACKEMISSION DETAIL , IF ~~AN~~ Not Applicable

XXIV. DETAILS OF FUGITIVE EMISSIONS DURING MINING OPERATIONS ~~Not applicable~~

XXV. AIR QUALITY IMPACT PREDICTION (AQIP)

SITE CODE	SITE NAME	PM ₁₀ CONCENTRATION (µg/M ³)		
		BASELINE	INCREMENTAL	CUMULATIVE
A1	Rudrapur	78	7.0	85
A2	Rampur	78	1.0	79
A3	Sahaspur	74	3.0	77
A4	Herbetpur	78	Nil	78
A5	Vikaspur	80	1.0	81
MAXIMUM		80	7.0	85

XXVI. WATER REQUIREMENT³(DAY)

S. NO.	ACTIVITY	WATER REQUIRED (KLD)	SOURCE
1.	Domestic	15	Tanker Supply
2.	Dust Suppression	6.0	Treated water from Bio-Digester Toilets
3.	Green Belt	6.0	

XXVII. SOURCE OF WATER SUPPLY-

Through Tanker Supply

XXVIII. LEAN SEASON FLOW IN CASE OF RIVER (CUMEC) ~~33.62 cumes~~

XXIX. GROUND WATER POTENTIAL OF THE AREA

A. Average water table (meters) below ground level

1. Pre-monsoon

2.29 mbgl

2. Post-monsoon

2.52 mbgl

XXX. PHYSICO-CHEMICAL ANALYSIS* OF WATER AT INTAKE POINT (*ALL PARAMETERS AS PER DRINKING WATER STANDARDS)

The total water requirement shall be fulfilled by Authorized tanker water suppliers. Hence this analysis is not applicable.

XXXI. COMPETING USERS OF THE WATER SOURCE

The water required shall be met with the authorized tanker water suppliers, who have prior permissions from the concerned authority.

B. Are you planning to provide waste water treatment plant? Yes No

If yes, provide a flow sheet for treatment.

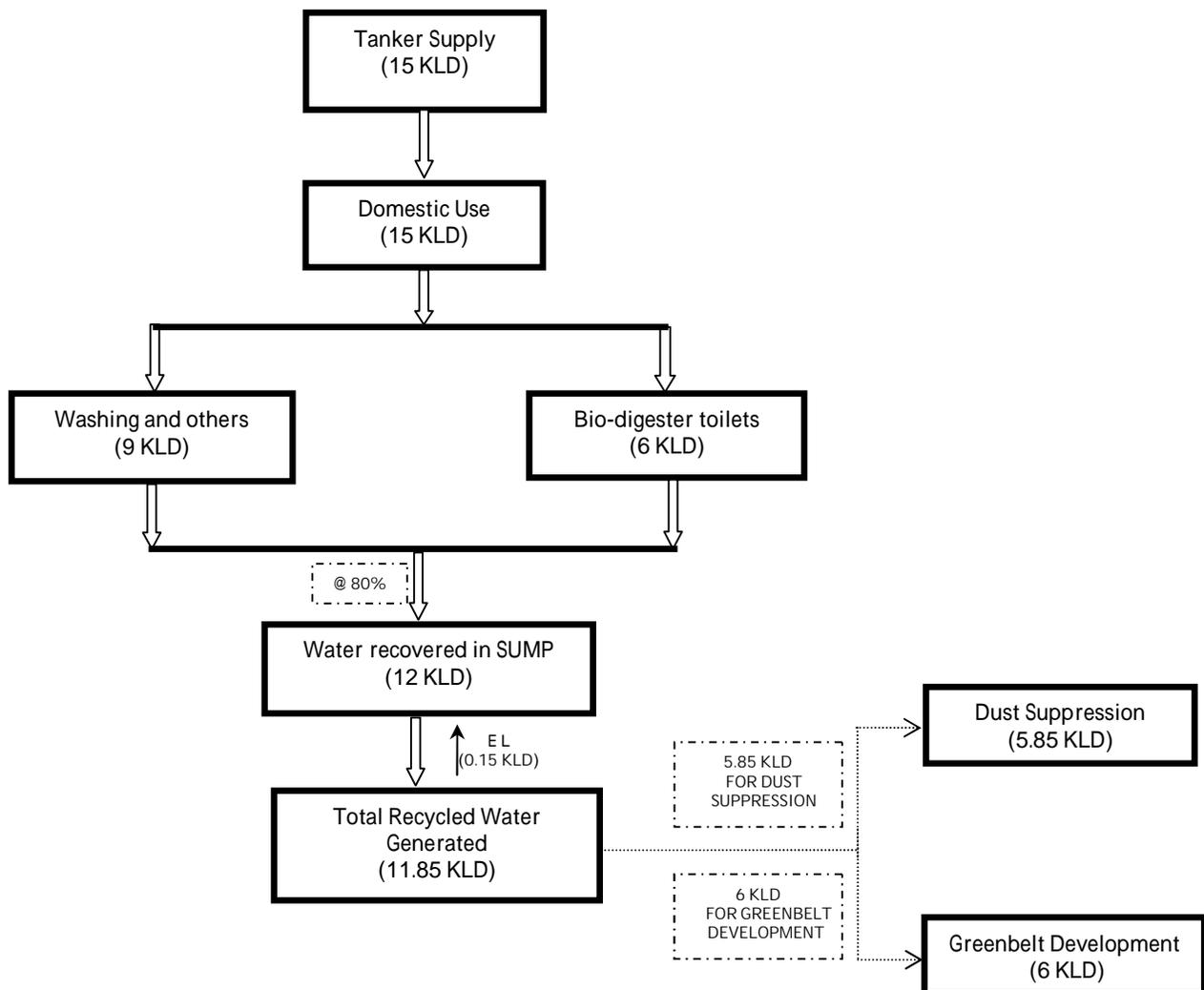
C. Quantity of water recycled / reused/ to be recycled in: none

D. Point of final discharge: none

E. Users of discharge water :none

F. Details of the Water body where final effluent is/will be discharged :none

XXXIII. WATER BALANCE STATEMENT IN THE FORM OF FLOW DIAGRAM INDICATING SOURCE (S), CONSUMPTION (SECTION-WISE) AND OUTPUT.



XXXIV. SOLID WASTE

- A. Solid waste quantity and quality: Only 10 % of the excavated material will be waste which will be mostly soil and stones which will be used for reclamation purpose.

Annex layout plan indicating the dump sites

- B. 1. Does waste (s) contain any hazardous/toxic substance/
radioactive materials or heavy metals?

Yes

No

2. If yes, provide details and precautionary measures.

C. Recovery and recycling possibilities

D. Possible user (s) of the solid waste

- E. 1. Is the solid waste suitable for backfilling?

Yes

No

1. If yes, when do you propose to start backfilling: Reclamation will be done simultaneously each year. Thus reclamation will start at the end of the first year.

F. Reclamation & rehabilitation plan : Enclosed

G. In case waste is to be dumped on the ground, indicate

1. Associated environmental problems : None
2. Number & type of waste dumps
 - (i) Height of dumps (metres)
 - (ii) Slope of the dump (angle)
 - (iii) Proposed bio-engg. mitigation measures

XXXV. NOISE LEVEL (DB)

A. SOURCE

LOCATION CODE	LOCATION NAME	CATEGORY	NOISE LEVEL DB(A)		REFERENCE LEVEL DB(A)	
			DAYTIME (LD)	NIGHT-TIME (LN)	DAYTIME (LD)	NIGHT-TIME (LN)

N1	Mine Site	Rural & Residential Area	51.8	41.9	55	45
N2	Rampur	Rural & Residential Area	50.6	42.6	55	45
N3	Sahaspur	Rural & Residential Area	52.4	43.4	55	45
N4	Herbertpur	Rural & Residential Area	49.7	41.7	55	45
N5	Vikas Nagar	Rural & Residential Area	52.5	40.6	55	45

B. Abatement measures: The procedure followed for carrying out mining operations will be open cast manual method, thus no noise pollution will occur except the vehicles used for transportation. Thus following measures would be taken:-

- Avoid overloading of vehicles
- Regular maintenance of the vehicles
- Ensure that every vehicle has a valid PUC certificate

XXXVI. FUEL/ENERGY REQUIREMENTS

A. TOTAL POWER REQUIREMENT (MW) power requirement(As it is manual open cast mining)

B. SOURCE OF POWER (MW) No power requirement(As it is manual open cast mining)

C. DETAILS OF FUELS None

A. What major occupational and community health and safety hazards (surface and U/G fire, inundation, explosion etc.) are anticipated?

Community health and safety hazards will be negligible. The dust occurring due to transportation activities may cause some respiratory problem.

B. What provisions have been made/ proposed to conform to health and safety requirement?

Health check-up for the workers will be conducted at regular intervals of two months in a year. The health camps status will be monitored and the information will be furnished to the approving authority. Environment Management Cell will also coordinate with general public, regulatory authorities, local administration to appraise environmental performance of the mine.

C. In case of an existing mine, furnish a comprehensive report on health

status of the workers. : New Mine

D. Mineralogical composition of RPM (dust): None

E. Details of personal protective equipment provided/ to be provided to the workers: Not required.

F. Information on radiation protection measures, if applicable. :None

XXXIX. PLANTATION

No. and type of trees planted & proposed

1. EXISTING None
2. PROPOSED Neem, Bel, Katahal, Semal, Amla and Aam

XL. HUMAN SETTLEMENT

POPULATION STATUS OF THE BUFFER ZONE

Total population: 1698560

POPULATION STATUS OF THE CORE ZONE

Total population: 502658

(* As per latest available census record or actual survey)

XLI. REHABILITATION & RESETTLEMENT (R&R) ~~Not~~ **Not** Required

C. Population to be displaced / Land outtees : None

D. Whether R&R plan has been finalised? If yes salient features of R&R plan for outtees

1. Site where the people are proposed to be resettled & facilities to be provided
2. Compensation package including funds earmarked
3. Agency/ Authority responsible for their resettlement
4. Period by which resettlement of Project Affected People will be over

XLII. POLLUTION CONTROL

A. Details of pollution control measures

- Avoid overloading of vehicles
- Regular maintenance of the vehicles
- Ensure that every vehicle has a valid PUC certificate

XLIII. CAPITAL COST OF THE PROJECT IN RS. ~~RS. 2415~~ **RS. 2415** Lakh

XLIV. COST OF ENVIRONMENTAL PROTECTION MEASURES IN ~~RS. 2415~~ **RS. 2415** Lakh

COMPONENTS	SCHEDULE AND DURATION OF MONITORING/EXECUTION	IMPLEMENTING AGENCY	APPROXIMATE UNIT COST (PER LOCATION)	TOTAL COST (PER YEAR)
AIR	Once in every Six Month except monsoon	UKFDC	Rs. 5,000/-	75,000
WATER	Once in every season	UKFDC	Rs. 3,000/-	52,000
NOISE	Once in every season	UKFDC	Rs. 3,000/-	84,000
SOIL	Twice in a year	UKFDC	Rs. 3,000/-	30,000
TOTAL				2,41,000

XLV. AMOUNT EARMARKED / PROPOSED FOR SOCIO -ECONOMIC WELFARE MEASURES FOR THE NEARBY VILLAGES OTHER THAN R&R PLANS.

- A. Villages (name) to be adopted , if any : Rudrapur
- B. Socio -economic package: Medical Camps in the interval of 2 months free of cost including free medicines.
- C. Amount earmarked (in Rs. Lakh) : 4.82 Lakhs

XLVI. PUBLIC HEARING

- A. Date of Advertisement : 19.12.2015
- B. Newspapers in which the advertisement appeared :Dainik Jagran (Hindi) and Times of India (English)
- C. Date of hearing (D/M/Y) : 19.01.2016
- D. Public Hearing Panel chaired by & members present: Mr. Subhash Pawar (Executive Engineer) [UEPPCB], Sunil Dabraal (Assistant Engineer) [UEPPCB] and Dr. V.N. Singh (Dy. General Manager)[Mantec Consultants Pvt. Ltd.]
- E. No. of people attended the public hearing meeting and number of people from the lease area.
- F. Summary/details of public hearing in tabular form

ISSUES RAISED BY PUBLIC	RESPONSE/COMMITMENT OF PROJECT PROPONENTS	SUGGESTIONS MADE BY PUBLIC HEARING
Discount for villagers and Part of royalty to be spent on the development of Village roads	No Provisions for discount	Discussion with ADM regarding discount to be done.

F. Summary/details of public hearing in tabular form

Issues raised by Public	Response/Commitment of Project Proponents	Suggestions made by public hearing
Discount for villagers and Part of royalty to be spent on the development of Village roads	No Provisions for discount	Discussion with ADM regarding discount to be done.
Usage of a part of project cost for village development	5 % of the project cost will be used for improvement of villages	5 % of the project cost will be used for improvement of villages
Scientific mining should be done, and no illegal mining to be done.	Scientific mining will be done.	Mining will be done only in scientific manner.

XLVII. Whether the following approvals* (wherever applicable) have been obtained?

- | | | | | |
|--|-----|-------------------------------------|----|-------------------------------------|
| A. Site clearance from MoEF | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| B. NOC from State Pollution Control Board | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| C. NOC from Atomic Energy Division | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| D. Mining plan approval from IBM / Ministry of Coal | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| E. Forestry clearance under FCA, 1980 | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> |
| F. Chief Controller of Explosives | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| G. Commitment regarding availability of water and power from the concerned State Authorities | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |

XLVIII. Was /is there any court case relating to the project or related activities? If so, details thereof: No

The data and information given in this Performa are true to the best of my knowledge and belief.

Date: 27/06/2016

Place: Dehradun



(STS Lepcha)
Managing Director

Uttarakhand Forest Development Corporation
73 Nehru Road, Aranya Vikas Bhavan, Dalanwala,
Dehradun 248001

Given under the seal of
organization
on behalf of whom the applicant
is signing.

PROFORMA

S.No.	Documents	Refer Proforma Ques.No.
1.	A scaled map (1 : 2500) duly certified* by the Chief Hydrographer indicating low tide line* (LTL), high tide line* (HTL), mining lease area and its distance from LTL and HTL, sand dunes and settlements within 10 Km.	8(A)
2.	Geological and structural maps.	12 (A)
3.	Geomorphological contour map / section.	12 (B)
4.	Plan and sections	13 (F)
5.	A location map of the mine lease area indicating existing water bodies (river, nallah, other drainage channel), direction of flow of water, contours and proposed changes in alignment of river/stream/nallah/any other water body, if any.	18 (B)
6.	Seasonal wind rose diagrams for day time, night time and 24 hours period.	22(A.2)
7.	A location map indicating AAQ stations, their direction and distance with respect to the project site.	22(B)
8.	Physico-chemical analysis report of water at intake points (all parameters as per drinking water standards)	30
9.	Water balance statement in the form of flow diagram indicating input source(s), consumption (section-wise) and output.	33
10.	Analysis report of water 100 m upstream and 100 m downstream of discharge point	32 (F.4)
11.	Layout map indicating solid waste / top soil dump site(s)	34(A)
12.	Mine site reclamation and rehabilitation plan.	34(F)
13.	Fuel analysis report	36(C)
14.	A report on health status of workers	38(C)
15.	Public hearing report	46(F)
16.	A copy of site clearance letter.	47(A)
17.	A copy of NOC from the State Pollution Control Board	47(B)
18.	A copy of NOC from the Atomic Energy Division	47(C)
19.	A copy of mining plan approval from IBM / Ministry of Coa I	47(D)
20.	A copy of forestry clearance	47(E)
21.	A copy of approval of Chief Controller of Explosives	47(F)
22.	Copies of commitments regarding availability of water and power from the concerned State authorities	47(G)