

EXECUTIVE SUMMMARY

PROJECT PROPONENT

Uttarakhand Forest Development Corporation (UAFDC), a state owned corporation is the working agency on behalf of Uttarakhand Government engaged in removal of the minerals from the river bed. The UAFDC has got the diversion for riverbed mining of Minor minerals (RBM) like sand, boulder and bajri in the year 2002 vide letter no. 8-16/2000-FC dated 28-10-2002 for 10 yrs period. The renewal of the same is under process.

PROJECT DESCRIPTION

The proposed riverbed mining site is located in Bishanpur (a Tributary of river Ganga and supportive river) at village-Bishanpur of Haridwar District, Uttarakhand state. The proposed site comes under Forest Division of Haridwar. The river carries huge quantity of sediment consisting of stones, gravel and sand during monsoon. The area earmarked for extraction in the river near Bishanpur site is 237.918 ha. However, as per the study carried out by ICAR in April, 2013 the extraction of RBM from 51.103 ha of area has been recommended. Based on this recommended area, the estimated quantity of extractable volume of RBM from this location is 207963.22 cum only.

Location of the Project

The proposed river bed mine is located near village Bishanpur, at Tehsil & District Haridwar in Uttarakhand state. The site is well connected by NH-74 and SH-49 both at a distance of 2 km from project site, nearest railhead is Haridwar located 12 Km from the site. The nearest town is Haridwar 11 km away from the project site and nearest airport Jolly Grant (Dehradun) is at a distance of about 36 km. The coordinates of the project site is latitude 29°50'136.17"N to 29°51'35.58"N and longitude 78°09'15.13"E to 78°09'54.28"E. The elevation varies from 257 to 262 m (AMSL).The location of the project site and key features of the project site are below.

KEY ENVIRONMENT FEATURES	
Project Site	Bishanpur village, Tehsil & District: Haridwar, State: Uttarakhand
Elevation above MSL	257 – 262 m (AMSL)
Nearest Highway	NH 74 (2km) and SH 49 (2 km)
Nearest Town/Village	Haridwar 11 Km
Nearest Railway Line	Haridwar 12 Km
Nearest Airport	Jollygrant (Dehradun) 36 Km
Ecologically sensitive zones	Raja ji National Park 9.5 km
Archaeological monuments	None within the study area
Defence Installations	None within the study area
Seismicity	Seismic Zone V

KEY ENVIRONMENT FEATURES

Climatology	
Annual IMD Roorkee	Annual Mean Max Temp: 38.5°C (Summer) Annual Mean Min Temp : 18.8 °C (Winter) Annual Total Rainfall : 1156.4 mm
Site Data for post monsoon Season	Mean Max Temp: 34.15° C Mean Min Temp : 10.6° C Total Rainfall : 59.2 mm

Topography: The elevation of the proposed site ranges from 257 m to 262 m above mean sea level. In the vicinity of Siwalik Hills, the gradient is steep. Geomorphologically Haridwar district can be divided into four geomorphic units. These are flood plain, lower piedmont plain, upper piedmont plain and structural hills. Geologically the area is divided into three zones viz. Siwaliks, Bhabar and Gangetic Alluvial Plains from North to South.

Geology: The northern part, paleochannels and active floodplain of rivers have soils of sandy loam; whereas remaining part of the block is covered by silty loam soils. Important soils are ultisols, which are the brown hill soil, occurring all through the northern part of the block. These are the soils with a horizon of clay accumulation and low base supply. Entisols are the soils (also called the bhabar soil) occurring all along the foothills of Siwaliks and extends up to Tarai. These soils are without Pedogenic horizons. Though these soils consist of boulders, pebbles, sand, silt and clay, they are highly fertile. Mollisols, also called the Terai soil, occur in the southern part of the Block. They consist mainly of fine-grained sand, silt and clay. These are the soils with a nearly black, organic-rich surface horizon and high base supply. These are the most fertile soils of the Block.

SALIENT FEATURES

This mine falls under “A” category project as the lease area is >50 ha (as per MoEF Notification, 2006 and amended till date). The proposed project is manual extraction and collection of RBM (sand, boulder and bajri) by employing local labourers from dry river bed up to maximum depth of 1.5 meter as suggested by Central Soil & Water Conservation Research and Training Institute, Dehradun (The Indian Council of Agricultural Research). Mining will not be carried out during monsoon season. 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. Mining will be done only along the centre of the river leaving a margin of 25% on both sides.

The salient features of the proposed mining lease area are as given in the table below:

Particulars	River Bed Mine
Area	237.918 ha
Recommended area of extraction (Ref. ICAR, Dehradun)	51.103 ha
Total Reserve	244662.61 cum
Mineable Reserve	207863.22 cum

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Particulars	River Bed Mine
Expected life of mine, years	(9 months) for a lease period of 10 Years
Method of mining	Opencast, manual
Max. Depth of mining	1.5 m

Source: Mine Plan

Land: The mine-lease area for the project is 237.918 ha. The mine lease area is limited to river bed.

Water: The total water requirement for drinking purpose has been estimated as 1600 Litres/day. The water requirement for drinking purpose and will be sourced from nearby villages.

Workforce: The workforce required for mining activity comprises of mining supervisors, and other staff directly employed 267 in numbers.

Power Requirement: The mining activity will take place during day time (sunlight) only and no other equipments requiring power will be deployed for mining operations, therefore there will be no power requirement for the project.

ALTERNATIVES

Site Alternatives: 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. Unlike other industries, the project cannot be shifted to other sites.

Mining Technology

The mining operation will comprise of the following steps:-

1. Survey & Site demarcation by Forest department.
2. Site Preparation
3. Surface Mining by Hand Tools
4. Loading & Transportation of minor minerals through Trucks/ Dumpers after Computerized Weighment.

DESCRIPTION OF THE ENVIRONMENT

Baseline data generation forms a part of the Environmental Impact Assessment study, which helps to evaluate the predicted impacts on the various environmental attributes and helps in preparing an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and scope of future expansions for environmentally sustainable development.

Baseline data was generated for various environmental parameters including air, water (surface and ground water), land and soil, ecology and socio-economic status to determine quality of the prevailing environmental settings. The study was conducted during winter (October-December) season in 2014.

METEOROLOGICAL DATA

Haridwar experiences moderate sub-tropical to humid climate with three distinct seasons v.i.z. summer followed by rainy and winter seasons. The hydro-meteorological observations for Roorkee observatory has been taken as source. Temperature begins to rise from March (29.1°C) and reaches to its maximum in May (39.2°C). With the commencement of monsoon season by mid-June, the temperature begins to fall. During the winter season in the month of November to February the temperature ranges between 10.5°C and 6.1°C. The relative humidity is highest in monsoon season (85% in the morning and 79% in the evenings). The lowest humidity is observed during the month of April and May i.e. 24% (evening) and 40% in May (morning). The mean monthly wind speed is highest in the summer when it goes up to 7.4 and 7.2 km/hour in the month of May and June and the minimum wind speed is observed during winter when it is 2.6 km/hour. The potential evapo-transpiration is maximum in the month of May 198.9 mm and minimum (38.5 mm) in the month of December.

AIR ENVIRONMENT

Fifteen Ambient Air Quality Monitoring (AAQM) Stations were selected. Criteria used for designing the network were principally governed by the wind rose pattern for winter seasons and the accessibility of the selected sites. Attempts were made to locate most of the AAQ stations in predominant downwind direction with respect to the project site.

It is observed that the P98 values of PM10 ranges from 76.01 $\mu\text{g}/\text{m}^3$ to 120.76 $\mu\text{g}/\text{m}^3$. The P98 value of SO₂ and NO_x varied from 11.36 $\mu\text{g}/\text{m}^3$ to 25.61 $\mu\text{g}/\text{m}^3$ and 15.22 $\mu\text{g}/\text{m}^3$ to 36.03 $\mu\text{g}/\text{m}^3$ respectively. Thus SPM, SO₂ and NO_x concentrations were observed to be below the stipulated standards of CPCB for residential / rural region at all of the air quality monitoring locations during the study period.

In the present case, Industrial Source Complex [ISC3] 1993 dispersion model based on steady state Gaussian Plume Dispersion, designed for area sources for short term and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from area sources.

LAND-USE

Majority of the land in the 10-km radius study area is forest (49.6%) and agricultural land (16%) which covers a total of 65.6% of the total study area. Forest occupies considerable portion of the study area towards north and north-east.

The core zone is limited to river bed mostly sand, bajri and boulder besides streams of water body. There are no forest lands in the core zone.

SOIL ENVIRONMENT

The textural quality of soil is sandy loam and the pH value varies from 7.10 to 7.90.

WATER ENVIRONMENT

Ten surface water samples were collected for analyzing the surface water quality of the study area. All the sampling locations were taken in the villages which will be affected by the project either by mining activities or by construction of infrastructure.

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Ground water samples have been collected from seven locations for analysis.

- pH: All the samples of ground water meet the desirable limit (pH ranges from 7.22 to 7.84) as per IS: 10500.
- Turbidity: All the samples of ground water meet the desirable limit (5 NTU).
- Alkalinity: Total alkalinity in the water samples of ground water ranges from 144.6 to 183.7 mg/l. All the samples are within the permissible limit for drinking water (600mg/l) and can be used in case alternative sources of potable water are not available.
- Conductivity: The conductivity value varies from 512.4 μ S/cm to 580.3 μ S/cm.
- Total Hardness varies from 143.1 mg/l to 189.1 mg/l.

The surface water quality was found to be as under:

- The pH of the surface water samples is found normal and ranges from 7.81 to 7.96.
- Turbidity: All the samples of surface water meet the desirable limit (5 NTU)
- Alkalinity: Total alkalinity in the water samples of surface water ranges from 59.3 to 89.1 mg/l. All the samples are within the permissible limit for drinking water (600mg/l) and can be used in case alternative sources of potable water are not available.
- Conductivity: The conductivity value varies from 195.3 μ S/cm to 256.4 μ S/cm.
- Total Hardness varies from 53.9 mg/l to 88.6 mg/l.

NOISE ENVIRONMENT

The noise quality of the region describes the extent of existing noise level in the area due to vehicular movement or any other activities. Fourteen noise monitoring stations were identified to assess the noise quality in the area. The noise levels recorded in the monitoring locations during daytime were found to be in the range of 50.9 to 58.3 dB(A) and during night time the Leq value was between 38.4 and 43.5 dB(A).

ECOLOGY

Ecological Resource: The study area has ecologically sensitive receptors such as sanctuary, spots of tourist attraction and places of religious interest.

Flora: The flora of the region can be divided into Natural vegetation and Forest vegetation. The common flora which has been found in the study area consists of *Shorea robusta*, *Adina cordifolia*, *Mallotus oppositifolius*, *Terminalia arjuna*, *Bridelia retusa*, *Dalbergia sisso* and *Syzygium cumini*.

Fauna: The nearest national park to the area is Raja ji national park and which is about 4.75 kms from the mining site. Common fauna encountered in the study area are Asian Elephant, Indian Langur, Nilgai (antelope), Sambhar and Rhesus Macaque. Among birds Kingfisher, Barbets, Wood-pickers, Babblers, Golden Spectacled Warbler, Slaty Headed Parakeets and Great Hornbills are observed in the study area.

SOCIAL ENVIRONMENT

The study area falls under:-

1. Vikaskhand Dogadda, Tehsil Kotdwara & Lansdowne & District Garhwal State Uttarakhand.
2. Vikaskhand, Bahadrabad Tehsil & District Haridwar, State Uttarakhand.
3. Vikaskhand, Laksar & Khanpur Tehsil & District Haridwar, State Uttarakhand.
4. Vikaskhand Yamkeshwar, Tehsil Kotdwara, District Garhwal State Uttarakhand.
5. Vikaskhand Najibabad, Tehsil Najibabad & District Bijnor, State Uttar Pradesh.

ANTICIPATED IMPACTS AND MITIGATION MEASURES

Environmental Impact Assessment (EIA) of the proposed project has been carried out with reference to land & soil, water, noise, flora, fauna and socio economic status.

LAND ENVIRONMENT

The landscape of this area will be not be disturbed by the proposed river bed mining. Roads for transportation of mined minerals are already constructed and since existing infrastructure facilities and haul roads will be used, no further impact on land use is anticipated.

AIR ENVIRONMENT

In opencast mining the different process of handling and transportation of minor minerals in the mining activities are prone to generation of high levels of fugitive dust that may increase the levels of particulate matters to high extent. Dusts are generated due to the following mining processes:

- i. Generation of dust due to transportation of minor minerals.
- ii. Generation of dust due to movement of heavy vehicles.

The effects of air pollutants upon receptors are influenced by concentrations of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards. It was found that after mines operation the resultant Ground Level Concentration for Particulate Matters will be much below the stipulated standards. The efficient management of air quality requires the use of modeling techniques to analyze the patterns of pollutant concentrations from many individual sources of air pollutants operating simultaneously.

Mitigation measures

The only air pollution sources are the road transport network of the trucks.

- i. Water sprinkling will be done on the roads regularly.
- ii. Care will be taken to prevent spillage by covering the carrying vehicles with tarpaulin and sprinkling of water, if dry.
- iii. Overloading will be kept under check by giving prior awareness.

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- iv. Only PUC certified vehicles will be deployed to keep the gas emissions under check.

UAFDC will undertake afforestation in lieu of the mining area in Uttarakhand.

WATER ENVIRONMENT

Mining causes lowering of river bed level as well as lowering of ground water table due to excessive extraction and draining out of ground water from the adjacent areas if the general ground water table is higher than the river bed level. In case the general ground water level is lower than river bed water level, than it will have positive impact as ground water table will be recharged vertically as well as laterally.

Mitigation measures

The deposits occur in the middle/bottom of the river. During the lease period, the deposit will be worked from the top surface to 1.5 m bgl or above the ground water table whichever comes first. Thus no ground water pollution is expected, as mining will not intersect ground water. It is not proposed to divert or truncate any part of the stream and at no point of time mining will be done from the stream.

NOISE ENVIRONMENT

The area in general represents calm surroundings there is no heavy traffics, industry or noisy habitation in the area. With increase in the scale of mining operations, the vehicular movements and the presence of workers may increase the noise levels slightly.

Mitigation measures

The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level and in addition, truck drivers will be instructed to make minimum use of horns at the village area. Hearing protection is generally not needed for RBM projects. Plantation of trees along the bank and approach roads will be done to dampen the noise, if possible.

ECOLOGICAL

As the mining activities will be confined to river bed area only no major impact is foreseen on flora and fauna. The most important effect of sand bed mining on aquatic habitats are bed degradation and sedimentation which can have substantial negative effect on aquatic life attached to the stream bed deposits.

Mitigation measures

Noise produced due to vehicular movement for carrying sand materials will be within permissible noise limit. Higher noise level in the area may lead to restlessness and failure in detection of calls of mates and young ones. Care will be taken not to hunt animals/birds by workers. Workers will not be allowed to discard food, polythene waste etc., which can attract animals/birds near the project site. The riparian ecosystem or the wetlands will not be destroyed by the mine owners/workers. Mining will be carried out on the dry river bed area and the river water channel will not be disturbed at all.

SOCIO-ECONOMIC ENVIRONMENT

Establishment of the mines will generally contribute positively to the socio-economic status of the study area in terms of employment direct and indirect. With the continuation of mining operations, employment opportunities and communication and connectivity will be improved. Thus this project will, in general have a positive impact.

The negative impact will be limited to some sporadic health problems, which may occur due to increase in fugitive emission in mine area for those workers, working for long.

Mitigation measures

Occupational Health & Safety: The workers working in the sand mining and its loading transportation and operation will be given safety training. All the workers will be provided with the dust mask and protective clothing. Periodic health checks as per the mine safety rules will be undertaken. The drop heights will be kept minimum and water sprinkling will be done periodically to suppress fugitive dust emission. The mining operation is limited to day time and hence therefore no significant health impacts are anticipated. The first aid box will be provided at site as per rule.

R&R Plan/Compensation Details: As it is a river bed mining project so no R& R issue is involved.

ENVIRONMENT MONITORING PLAN

Success of any Environment Management Plan depends upon the efficiency of the organizational set-up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme so that necessary corrective measures are taken to resolve them. Since environmental quality parameters at work zone are important for maintaining safety, the monitoring work forms part of the safety measures also.

PROPOSED MANAGEMENT SETUP

Environment management will be executed by a senior executive reporting to managing director. The team will be responsible for planning, execution and monitoring of all aspects of the environment, during the mining operation

A well-defined environmental monitoring program would be emphasized with trained and qualified staff that would monitor the ambient air to ensure that the pollutants level is maintained always within the permissible levels. The locations will be finalized in consultation with SPCB.

RISK ASSESSMENT

The possible risk in case of river bed mining project is bank erosion, floods and accidents which may be due to transportation. The mining is restricted to non-monsoon seasons thus no flash flood damages are anticipated.

The other hazards are road accidents, slipping, minor cuts etc A worker in the mine should be able to work under adequate safe and healthy conditions. Since mining of minor minerals is an essential aspect, safety

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of the mine and the employs it should be taken care of, by the mining rules and regulations which are well defined with laid down procedure of safety.