Point-wise Query Reply of ADS generated by MoEF&CC dated 04.05.2018 for River Yamuna, Lot No. 23/1, Dehradun Uttarakhand by M/s Garhwal Mandal Vikas Nigam Ltd.

1. From the Cluster Certificate it is not clear that same has been calculated considering S.O 141(E) 15.01.2016 & S.O. 2269 (E) dated 01.07.2016.

Reply: Cluster Certificate has been prepared and submitted as per S.O 141(E) 15.01.2016 & S.O. 2269 (E) dated 01.07.2016. Letter from Geology and Mining Unit, Directorate of Industries, Uttarakhand confirming the same and is attached as **Annexure – I.**

2. On the cover page of EIA Report period of study is not mentioned as required as per O.M No. J-20012/11/98-IA.II (M) dated 28.10.2004.

Reply: Same has been incorporated.

3. EIA Report is not as per generic structure mentioned in Appendix-III of EIA Notification 2006.

Reply: EIA Report has been prepared as per generic structure mentioned in Appendix-III of EIA Notification 2006 and is attached **Annexure II.**

4. ToR point no 5 is not complied as mining policy and Environment policy are different

Reply: ToR Point no. 5 has been complied.

5. Copy of advertisement published in English Newspaper needs to be submitted.

Reply: Copy of advertisement published in English Newspaper is attached as **Annexure III.**

6. LoI was issued on 23.01.2013 and valid for 5 years i.e. till 22.01.2018 thus copy of valid LOI needs to be submitted.

Reply: The LOI granted in favour of GMVN Ltd. and it is valid as there is no validity condition mentioned in LOI.

7. Clear copy of advertisement (Regional and English language) needs to be submitted.

Reply: Clear copy of advertisement (Regional and English language) has been attached as **Annexure III.**

8. List of schedule-1 species duly authenticated by Forest Department needs to be submitted.

Reply: List of Schedule I species is submitted has been submitted to Chief Wildlife Warden which is under process. Receipt of the letter is attached as **Annexure IV.**

9. Conservation Plan for schedule-1 species needs to be submitted.

Reply: Conservation Plan for Schedule I species in district Dehradun has been prepared and submitted to Chief Wildlife Warden for its approval. Copy of Conservation Plan and correspondence is attached as **Annexure V.**

10. Illegible copies of all the annexures needs to be submitted.

11. Certificate from Forest Department regarding distance of mining lease from the protected area needs to be submitted.

Reply: There is no protected area falls within the 10km radius of the projects. Map showing the same is attached as **Annexure VI.**

12. A letter from State Government to the effect that District Survey Report is prepared as per Appendix-X of S.O 141(E) dated 15.01.2016 and it is a final DSR needs to be submitted.

Reply: District Survey Report is prepared as per Appendix-X of S.O 141(E) dated 15.01.2016 and it is a final DSR. Letter from Geology and Mining Unit, Directorate of Industries, Uttarakhand confirming the same and is attached as **Annexure – I.**

13. KML file of the project and combined KML file showing all the mining leases of the M/S Garhwal Mandal Vikas Nigam Ltd needs to be submitted.

Reply: KML file of the project and combined KML file showing all the mining leases of the M/S Garhwal Mandal Vikas Nigam Ltd is attached as **Annexure VII.**

14. Mining Plan approval letter is to be submitted.

Reply: Mining Plan approval letter is attached as **Annexure VIII.**

15. The advertisement of PH was given on 16.06.2014 and 10.09.2014 and Public Hearing was conducted on 10.09.2014 justification for the same needs to be submitted.

Reply: The advertisement was published on 14.05.2014 but due to some administrative issues the date of public hearing was revised twice. Advertisement of PH is attached as **Annexure III.**

16. Mining plan was approved on 03.03.2015 i.e. after the PH justification for the same needs to be submitted.

Reply: The GMVN Ltd. allotted a large no. of leases which requires lot of time to get mining plan preparation and its approval from Geology and Mining Unit, DOI Uttarakhand. So to reduce the time of Environmental Clearance procedure the same was implemented. A letter from Geology and Mining Unit, Directorate of Industries, Uttarakhand has been issued which confirms that Mining Plan is compatible in all aspects of Draft and Final EIA reports. The same already been conveyed to MoEF&CC in its agenda meetings. Mine Plan compatibility letter is attached as **Annexure IX.**

17. Original test report needs to be submitted.

Reply: Monitoring data is attached as **Annexure X.** Original test report will be submitted at the time agenda meeting.

18. It is not mentioned that which agency conducted the replenishment study.

Reply: The study is based on Dendy Bolton Method. We are in process to hire an agency for Replenishment Study.

प्रेषक,

उप निदेशक/भूवैज्ञानिक,
भूतत्व एवं खनिकर्म इकाई,
उद्योग निदेशालय उत्तराखण्ड,
जिला कार्यालय देहरादून।

सेवा में,

प्रबन्ध निदेशक,
गढ़वाल मण्डल विकास निगम लि0
74/1, राजपुर रोड, देहरादून।

संख्याः 74 **/भू0खनि0ई0/जि0कार्या0 दे0दून/2018–19** **दिनांकः** 24 **मई, 2018**

विषयः **एम0ओ0ई0एफ0 द्वारा गढ़वाल मण्डल विकास निगम के प्रस्तुतिकरण हेतु विचाराधीन राजस्व खनन लॉटों की अतिरिक्त सूचनाओं को उपलब्ध कराने के सम्बन्ध में।**

महोदय,

उपरोक्त विषयक कृपया आपके पत्र संख्या 234/खनन–ई0आई0ए0(201–19), दिनांक 24 मई, 2018 के क्रम में अपर निदेशक, भूतत्व एवं खनिकर्म इकाई, उद्योग निदेशालय उत्तराखण्ड, देहरादून के पत्र संख्या 210/खनन/भू0खनि0ई0/2018–19, दिनांक 24 मई, 2018 जिसके माध्यम से अवगत कराया गया है कि गढ़वाल मण्डल विकास निगम के राजस्व लॉट जो कि एम0ओ0ई0एफ0 में सुनवाई हेतु लम्बित है, के सम्बन्ध में उनको पूर्व में प्रेषित सूचनाओं की पुष्टि कर आख्या उपलब्ध कराने के निर्देश दिये गये है।

इस सम्बन्ध में अवगत कराना है कि :–

1. कलस्टर का विवरण एम0ओ0ई0एफ0 द्वारा जारी नोटिफिकेशन Appendix-xof S.O 141 (E), दिनांक 15.01.2016 एवं S.O 2269 (E), दिनांक 01.07.2016 के अनुसार किया गया है।
2. जिला सर्वे रिर्पोट एम0ओ0ई0एफ0 द्वारा जारी नोटिफिकेशन Appendix-xof S.O 141 (E), दिनांक 15.01.2016 के अनुसार है, जो वर्तमान में अंतिम है।

भवदीय,

24/05/18

(डा0 दीपक हटवाल)
उप निदेशक/भूवैज्ञानिक।

पृष्ठांकन संख्याः — /भू0खनि0ई0/जि0कार्या0 दे0दून/2018–19, तद्दिनांकित।

प्रतिलिपि : अपर निदेशक, भूतत्व एवं खनिकर्म इकाई, उद्योग निदेशालय उत्तराखण्ड, देहरादून को उनके उपरोक्त उल्लिखित पत्र दिनांक 24 मई, 2018 के क्रम में सूचनार्थ प्रेषित।

(डा0 दीपक हटवाल)
उप निदेशक/भूवैज्ञानिक।

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

&

ENVIRONMENTAL MANAGEMENT PLAN (EMP) REPORT

OF

RIVER YAMUNA LOT NO. 23/1 SAND, *BAJRI* & BOULDER MINING PROJECT

Village: Dumate, Tehsil: Vikasnagar,
District: Dehradun, State: Uttarakhand

Area: 30.035 Ha, Proposed Capacity: 2,80,000 TPA

Category – 'A', Sector and Schedule – Mining of Minerals 1(a)

APPLICANT

GARHWAL MANDAL VIKAS NIGAM LTD.
74/1 RAJPUR ROAD, DEHRADUN

STUDY PERIOD – OCTOBER TO DECEMBER, 2013

SUBMISSION DATE: APRIL 2015

Prepared By

GRASS ROOTS RESEARCH & CREATION INDIA (P) LTD.

(An ISO 9001:2008 Certified Co.: Accredited by QCI / NABET: Approved by MoEF&CC, GoI)
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Email: eia@grc-india.com, grc.enviro@gmail.com
Website: *http://www.grc-india.com*

GRC INDIA TRAINING & ANALYTICAL LABORATORY

(NABL Accredited & Recognized by MoEF&CC, GoI)
A unit of GRC India

INDEX

ABBREVIATIONS

AMSL	Above Mean Sea Level
AAQ	Ambient Air Quality
bgl	Below Ground Level
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
CPCB	Central Pollution Control Board
CSR	Corporate Social Responsibility
dB	Decibel
DO	Dissolved Oxygen
EAC	Expert Appraisal Committee
EIA	Environmental Impact Assessment
EMC	Environmental Management Cell
EMP	Environment Management Plan
EPA	The Environment Protection Act
GLC	Ground Level Concentration
Ha	Hectare
HFL	High Flood Level
JIR	Joint Inspection Report
KLD	Kilo litre Per Day
Km	Kilo Meter
Leq	Equivalent Noise Level
LFL	Low Flood Level
LOS	Level of Service
LoI	Letter of Intent
MoEFCC	Ministry of Environment, Forest &Climate Change
NABET	National Accreditation Board for Education and Training
NH	National Highway
NOC	No Objection Certificate
OSHA	Occupational Safety and Health Administration
PCU	Passenger Car Unit
PFR	Pre- feasibility Report
PM	Particulate Matter
PUC	Pollution Under Control
QCI	Quality Council of India
RBM	River Bed Material
RL	Reduced Level
SH	State Highway
SPCB	State Pollution Control Board
ToR	Terms of Reference
TPA	Tonnes Per Annum
USEPA	United State Environmental Protection Agency

By Speed Post

No. J-11015/125/2013-IA.II (M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110 003
Dated the 16th September, 2013

To

M/s Garhwal Mandal Vikas Nigam Ltd
74/1, Rajpur Road
Dehradun, Uttarakhand

Subject: Mining of Sand, Bajri and Boulders in River Yamuna Lot No. 23/1 of M/s Garhwal Mandal Vikas Nigam Ltd. Located at Vill-Dumate, Tehsil-Vikasnagar, Distt-Dehradun, Uttarakhand (30.035 ha)- TOR regarding.

The Proposal was received in the Ministry on 26.04.2013. The Proposal is to determine the Terms of Reference for which the proponent had submitted information in the prescribed format (Form-1) along with Pre-feasibility report.

2. The Mine Lease area is located at Village Dumate, Tehsil Vikasnagar, District Dehradun, Uttarakhand. The proposed production capacity is 2.8 Lakh TPA. The lease area lies on River Yamuna. The Mine Lease area is between 30° 30'42.15"N to 77° 50'22.59"E. The Project is located in seismic zone-IV. It is 'A' category project as due to the presence of the interstate boundary between Uttarakhand and Himachal Pradesh and Doon Valley lies within 10 Km radius of the lease area. 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 1.5 meter. Extraction of sand, bajri and boulder material will be done only during the day time and completely stopped during the monsoon season. The lease area has been decided as per the Letter of Intent (Letter No. 589/Bhu. Khani.E./2012-13 dated 23-1-2013. Total water requirement will be 3.4 KLD. This water will be supplied from the bore well from nearby villages through tankers as well as from surface water sources for dust suppression. Silt/Clay (6-12% of sand excavated) will be generated as waste, to be disposed off as filling in low-lying area, for plantation & as spreading in agricultural fields. The total cost of project would be around Rs. 17,50,000.

3. The proposal was placed before Expert Appraisal Committee in its meeting held during June 26th-28th, 2013, the Committee prescribed the following TORs 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, including subsidence study in case of underground mining 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 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. 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 'Aravali 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.
18. Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
19. 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.

20. One season (non-monsoon) primary baseline data on ambient air quality (PM10, SO2 and NOx), 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.
21. Air quality modelling 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.
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. Details of replenishment studies.

42. Details of Transportation of mined materials as per the Indian Road Congress for both the ways with loaded as well as unloaded traffic load and its impact on Environment.
43. Cumulative impact due to sand mining.
44. Proper conservation plan for Scheduled –I and II species.
45. Impact of mining on plankton.
46. Cluster approach for collection of baseline data shall be followed.
47. Appropriate Disaster Management safeguards in view of the high seismicity of the area.
48. NBWL clearance should be obtained.

4. 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.
h) For the baseline study for contiguous lease areas of similar nature 'Cluster Approach' may be adopted for collection of baseline data, which shall adequately cover every single lease area under consideration for EC.

5. 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.

6. 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. Saroj)
Director

Copy to:

(i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi
(ii) The Secretary, Department of Mines & Geology, Government of Uttarakhand, Secretariat, Dehradun.
(iii) The Secretary, Department of Environment, Government of Uttarakhand, Secretariat, Dehradun.
(iv) Chief Wildlife Warden, Government of Uttrakhand, Secretariat, Dehradun.
(v) Secretary, SCMC, Dehradun.
(vi) The Chief Conservator of Forests, Central Region, Ministry of Environment and Forests, B-1/72, Sector-A, Aliganj, Lucknow-226020.
(vii) The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office complex, East Arjun Nagar, New Delhi-1100032.
(viii) The Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
(ix) The Chairman, Uttrakhand Environment Protection & Pollution Control Board, E-115, Nehru Colony, Hardwar Road, Dehradun, Uttarakhand.
(x) The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
(xi) The District Collector, Dehradun District, Uttarakhand.
(xii) Guard File.

(Dr. Saroj)
Director

CHAPTER-I

INTRODUCTION

INDEX

1.0 PURPOSE OF THE REPORT

Environmental Impact Assessment (EIA) is one of the proven management tools for integrating environmental concerns in development process and for improved decision making as there is a need to harmonize the developmental activities with the environmental concerns into the larger interest of the society. The growing awareness, over the years, on environmental protection and sustainable development, has given further emphasis to the implementation of sound environmental management practices for mitigating adverse impacts from developmental activities. EIA study plays a vital role in sustainable development of a country. Recognizing its importance, the Ministry of Environment, Forest and Climate Change, Government of India had formulated policies and procedures governing the industrial and other developmental activities to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concern in project development.

The present Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from EAC MoEF&CC, New Delhi, GOI under EIA notification of the MoEF&CC, New Delhi, dated 14th September, 2006 as amended and also the EIA Technical Manual for Mining of Minerals (Feb, 2010) of MoEF&CC, New Delhi, Govt. of India, for seeking environmental clearance for mining of sand in the applied mining lease area.

1.1 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

The project is being proposed by Garhwal Mandal Vikas Nigam (GMVN) Limited.

The address of the proponent is given below:

Garhwal Mandal Vikas Nigam Limited,

74/1 Rajpur Road, Dehradun
Uttarakhand

Ph: - 0135-2746817, 2749308

gmvnl@gmvnl.com

The proponent has applied for environmental clearance in the name of River Yamuna Lot No. 23/1 Sand, *Bajri* & Boulder Mining Project over an area of 30.035 ha near Village: Dumate, Tehsil: VikasNagar & District: Dehradun, Uttarakhand, for the allotted lease area, decided as per the Letter of Intent vide (Letter No. 589/Bhu. Khani.E./2012-13 dated 23-1-2013 issued byGeology & Mining Unit, Directorate of Industries, Govt. of Uttarakhand. The LOI is attached as **Annexure I (A).**

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is to mine Sand, *Bajri* & Boulder from bed of river Yamuna, over an area of 30.035 Ha. near village: Dumate, Tehsil: Vikasnagar & District: Dehradun, Uttarakhand.

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project was categorized as **Category 'A'** project due to the presence of Interstate Boundary between Uttarakhand and Himachal Pradesh and also Doon Valley an eco-sensitive zone lies within the 10 km radius of the lease area

The project proposal was submitted to Ministry of Environment, Forest and Climate Change, New Delhi for its appraisal. Based on which, presentation for Terms of Reference (TOR) was held during June 26th-28th, 2013. Based on the data provided and presentation done, the Ministry of Environment, Forest and Climate Change, New Delhi has issued the Terms of Reference vide letter No. J-11015/125/2013-IA.II (M) dated 16th September, 2013.

There are four other leases lies within the 500m radius of the proposed Sand, Bajri and Boulder Mining Project, District Dehradun, Uttarakhand and the cumulative area of all the five mines is 38.28 ha.

As per the EIA Notification dated 1st July, 2016, a cluster shall be formed when the distance between the peripheries of one lease is less than 500 meters from the periphery of other lease in a homogeneous mineral area which shall be applicable

to the mine leases or quarry licenses granted on and after 9th September, 2013. (Ref: Clause (B) (i), Page No-4 in EIA Notification dated 1st July, 2016) or The leases not operative for three years or more and leases which have got environmental clearance as on 15th January, 2016 shall not be counted for calculating the area of cluster but shall be included in the Environment Management Plan and the Regional Environmental Management Plan." (Ref: Note 5, Page No-5 in EIA Notification dated 1st July, 2016)

Therefore as per the EIA Notification dated 15th January, 2016 and 1st July, 2016, the project still comes under A Category without cluster situation due to te presence of Doon Valley.

It has been proposed to mine around 2.8 lakh Tonnes per annum of minerals. The estimated project cost for the proposed project is Rs. 17, 15, 000.

The proposed mining lease area falls in Survey of India Toposheet 53F14. The mine lease co-ordinates and connectivity details are listed below:

Coordinates	Latitude:	30°30'42.15"N to 30°30'40.55"N
	Longitude :	77°50'22.59"E to 77°51'10.91"E

Connectivity Details given below:

Connectivity Details		Aerial Distance
Nearest Railway Station	Dehradun Railway Station in SE direction.	Approx 28 km
Nearest Airport	Jolly Grant Airport in SE direction.	Approx 48 km
Nearest Highway	NH-72 in W direction	Approx. 1 Km

Project's importance to the country and the region

The project involves collection of Sand, *Bajri*, & Boulder, thus the proposed mining project would improve the supply of construction materials like stone, making a positive impact on the infrastructural projects like construction of roads, buildings, bridges etc in the state.

Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer by the way of royalty.

This project operation will provide direct and indirect employment to the people residing in nearby villages improving their social/economical status.

1.3 SCOPE OF THE STUDY

The project proposal was submitted to Ministry of Environment, Forest and Climate Change, New Delhi for its appraisal. Based on which, presentation for Terms of Reference (TOR) was held during June 26th-28th, 2013. Based on the data provided and presentation done, the Ministry of Environment, Forest and Climate Change, New Delhi has issued the Terms of Reference vide letter No. J-11015/125/2013-IA.II (M) dated 16th September, 2013.

The points given by the EAC in the TOR has been considered and their compliances are as under:-

S.No.	ToR	Compliance
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.	No mining activity has been carried out prior to 1994. Hence no production has been done.
2.	A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.	A copy of LOI in support of the fact that the proponent will be the rightful lessee of the mine is attached as **Annexure I (A).**
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 lessee.	Approved Mine Plan will be Submitted along with the final EIA/EMP Report which shall be in compatible with the EIA/EMP report. The approved Mine Plan is attached as **Annexure XII (A)**. As the Public hearing was held prior to the approval of Mine Plan, A letter from Geology & Mining Unit, DoI, Dehradun, has been attached as **Annexure XII (B)**, stating that the mining characteristics remains same in both Draft & Final Report.
4.	All corner coordinates of the mine lease area superimposed on High Resolution Imagery/ toposheet Should be provided. Such an imagery of the proposed area should clearly show the landuse and other ecological features of the study area (core and buffer zone).	Corner coordinates of the mine lease area superimposed on high resolution toposheet has been incorporated in **Chapter II** (Page no.25-26)

5.	Does the company have a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed 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 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.	Yes, there is well laid Environmental Policy for the proposed project attached as a **Annexure-VI**. The project is being proposed by Garhwal Mandal Vikas Nigam Ltd., Government of Uttarakhand. Hence the policy i.e. Uttarakhand Mining Policy, 2011 will be followed. The Environmental Management Cell (EMC) has been formulated to deal with environmental issues and to ensure compliance with EC conditions. The EMC will be made in charge for reporting non compliances to the Owner.
6.	Issues relating to Mine Safety, including subsidence study in case of underground mining 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.	Mines safety for workers working at the site has been taken care of. Safety measures related to risks during mining activity, natural disasters, etc has been proposed Details about the same are given in **Chapter VII** (Page no.110-118). The proposed project is a river bed mining project. It is not an underground mining project and therefore no subsidence and blasting study is proposed.

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.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is given as **Map No. 1 in Chapter II**. All the details in the EIA report are for the life of the lease period. The details of mining & production have been given in **Chapter II** (Page no.34-39).
8.	Land use of the study area should be described delineating forest area, agricultural land, grazing land, wildlife sanctuary and 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.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated as **Map No.2, Chapter III.** There are no National Park or Wildlife Sanctuary or Migratory routes of fauna within the 10 km radius of study area. As the lease area lies in the river bed there will be no change in the land use plan of the mine lease area in preoperational, operational and post operational phases. Only the sediments will be removed from the surface.
9.	Details of the land for any Over Burden Dumps outside the mine lease, such extent of land area, distance from mine area, its land use R&R issues, if any, should be given.	The proposed project is a River Bed Mining Project, therefore there will be no Over Burden & hence no dumps are proposed in the lease area.

10.	A certificate from 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.	There is no forest land within the lease area. Inspection report confirming the same with report from forest department has been attached as **Annexure I (B).**
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 a forestation (CA) should be indicated. A copy of the forestry clearance should be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated. Report from forest department has been attached as **Annexure I (B).**
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.	There is no involvement of forest land in the project area.

13.	The vegetation in the RF / PF in the study area, with necessary details, should be given.	There are 9 Reserved Forests in the study area, which have been Detailed in **Chapter III** (Page no.62). However, No protected forests are found in the study area. The vegetation details of the same are incorporated in **Chapter III** (Page no.65) of the report.
14.	A study shall be got done to ascertain the impact of the Mining 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.	The site is adjacent to Doon Valley which is an eco sensitive zone. Details of impacts & mitigation measures are given in **Chapter IV** (Page no.84-96) of report.
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 entioned above, should be obtained from the State Wildlife Department/Chief Wildlife Warden under Wildlife (Protection) Act, 1972 and copy furnished.	There are no National Parks, Biosphere Reserves, Wildlife Sanctuaries, within 10 km of the mine lease area.

16.	A detailed biological study for 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 zones should be furnished based on 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. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in **Chapter III** (Page no.60-77) of the report. There are 3 schedule-I species found in the study area. List of Flora & Fauna of the study area has been submitted to Chief Wildlife Warden of Dehradun on 11.09.14 (letter attached as **Annexure-VIII**.
17.	Proximity to Areas declared as »Critically Polluted »or the Project areas likely to come under the »Aravali 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.	There is no area declared as »Critically Polluted and also no area of the project come under the »Aravali Range" within 10 km radius of the project site.

18.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t. CRZ, coastal features such as mangroves ,if ,any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	The proposed project is not a coastal project. Hence no approval of the concerned Coastal Zone Management Authority is required.
19.	R & R 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.	There are no inhabited areas in the allotted mine area which lies on the river bed, therefore no R&R Plan is proposed. However compensation will be paid to the land owner in case of private land in line with govt. scheme.

20.	One season (non-monsoon) primary baseline data on ambient air quality (PM10, SO2 and NOx), 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 PM1O, particularly for free silica, should be given.	Base line study was carried out for one (non-monsoon) season from Oct"13 to Dec"13.Details are provided in **Chapter III** (Page no.42-82) of this EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing micro meteorological conditions (Wind direction & wind speed) of the study area. The windrose has been given in **Chapter III** (Page no.43) of EIA/EMP Report. One Location has been selected in downwind direction within 500 m from the lease boundary. Date wise collected baseline AAQ data is attached as **Annexure III.** The location of the monitoring sites has been shown in **Map No 4** in **Chapter III.**

21.	Air quality for 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	Air quality modeling has been carried out for prediction of impact of the project on the air quality of the area. Line Source Model (published by USEPA) has been used taking into account impact of movement of vehicles which is incorporated in **Chapter IV** (Page no.87-90) of the EIA/EMP Report. The windrose showing pre-dominant wind direction has been indicated in **Chapter III** (Page no.43) of the EIA/EMP Report.
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.	The total water requirement for the project will around 3.4 KLD. The break-up for water is given in **Chapter II** (Page no.39) of the EIA/EMP Report.
23.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Necessary clearance for withdrawal of water has been obtained and attached as **Annexure-IX.**

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.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water. No artificial rainwater harvesting is proposed for the present project.
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.	There will be no impact of the project on the ground water quality as the mining will be carried out up to a depth of 1.5 meter bgl or above ground water table whichever comes first. No mining will be done in monsoon affecting surface water. The mining project will also be done in dry area of river bed; hence there will be no impact on the surface water as well.
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.	Mining will be done from the top surface to about 1.5 m below ground level or above ground water level; whichever comes first. As studied the ground water level in pre-monsoon is 2.76 m bgl in and in post-monsoon season is 2.43 m bgl. So there will be no intersection with groundwater.

<table>
<tr><td>27.</td><td>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.</td><td>The lease area lies on the bed of River Yamuna. During mining, it will be ensured that excavation will be done away from the stream flow. Moreover no modification/ diversion of the river is proposed, hence there will be no impact on the hydrology as such.</td></tr>
<tr><td>28.</td><td>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.</td><td>
<table>
<tr><td>Site elevation</td><td>Highest:479 m AMSL
Lowest: 473 m AMSL</td></tr>
<tr><td>Working depth</td><td>1.5 m bgl or above ground water level, whichever comes first.</td></tr>
<tr><td colspan="2">Groundwater depth</td></tr>
<tr><td>Pre-monsoon</td><td>2.76 m bgl</td></tr>
<tr><td>Post-monsoon</td><td>2.43 m bgl</td></tr>
</table>
Source: CGWB, Dehradun
Schematic diagram for the same is incorporated in Chapter II (Page no.35).
Surface plan with cross-section of the lease area has been attached as Annexure II (A) & Annexure II (B).</td></tr>
<tr><td>29.</td><td>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.</td><td>Plantation will be carried along the river banks or along the road sides or near the civic amenities in consultation with local authority or govt. body.

List of species to be planted is attached as Annexure XVIII.</td></tr>
</table>

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.	There will be an increase of 125 trucks carrying the minerals per day. The impact due to this has been detailed in **Chapter IV** (Page no.93-96) of the EIA/EMP Report.
31.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in **Chapter II** (Page no.39) of the EIA/EMP 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.	As the mine area lies on the river bed, the area will be reclaimed naturally with sediments, gradually during monsoon seasons. There will be construction of ramps, temporary rest shelters during operational phase; However these will be removed and the banks will be restored at the time of mine closure.

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.	Plantation will be carried along the river banks or along the road sides or near the civic amenities in consultation with local authority or govt. body. List of species to be planted is attached as **Annexure XVIII.** As the proposed project is new, no plantation has been done earlier
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.	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been proposed as given in **Chapter IV** (Page no. 89-90) of the report. Each labour will undergo pre-placement medical examination. Thereafter periodical heath check up will be arranged as stated in the **Chapter VIII** (Page no.125-126) of the report.

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.	The proposed project being a small scale manual mining project, there will be hardly any process related to health implication on the population of the nearby villages except fugitive dust emissions due to transportation of minerals by trucks. However health camps & awareness programs will be arranged for them. Details are given in **Chapter VIII** (Page no.125-126) of the report.
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.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in **Chapter VIII** (Page no.125-126) of the EIA/EMP Report.
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.	The detailed environmental Management plan to mitigate the environmental impacts has been mentioned in **Chapter X** (Page no.133-137) of the EIA/EMP Report.
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.	Details of public hearing are given in **Chapter VII** (Page no.109-110). Public hearing proceedings of the project along with action plan & budget allocation has been attached as **Annexure-XI A** & **XI B**.

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.	There is no litigation pending against the project. The LoI has been issued by the Dept. of Geology & Mining Unit, Govt. of Uttarakhand to carry out mining operation in the proposed area.
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.	The capital cost of the project is 17.15 Lakhs. The costs like for project monitoring & EMP have been given in **Chapter V** (Page no.106) & **X** (Page no.126-127) respectively.
41.	Details of replenishment studies.	The extractable quantum in the first year would be limited to the available quantum. The extractable amount for the further years may vary depending on amount/rate of actual replenishment which will be monitored by expert agencies every year. Also pillars will be erected in the mine lease area and the baseline level of the mineral (a depth of 1.5 m) will be marked, so that mining will not be done beyond that. A detailed replenishment report is attached as **Annexure XIV.**
42.	Details of Transportation of mined materials as per Indian Road Congress for both the ways with loaded as well unloaded traffic load and its impact on Environment.	The details of transportation for loaded as well as unloaded trucks with anticipated impacts due to transportation & its mitigation measures are given in **Chapter IV** (Page no.83-96) of the EIA/EMP Report
43.	Cumulative impact due to sand mining.	There will be cumulative increase in traffic load due to the adjoining project ie. River Yamuna Lot No. 23/2. The detailed cumulative analysis is attached as **Annexure XVII.**

44.	ProperConservation Plan for Schedule-I and Schedule-II species.	The details of biological environment (flora & fauna for core and buffer zone) are given in **Chapter III** (Page no. 60-77). There are 10 schedule-II species found in the study. Wildlife Management Plan prepared by the state forest dept. will be followed and necessary budget will be allotted in consultation with the forest dept. Conservation plan following the same has been prepared and Submitted to Chief Wildlife Warden for approval and attached as **Annexure X**.
45.	Impact on mining on plankton.	As the mining will be carried out on the dry part of the allotted area, as such there will be no impact on the planktons. A list of Planktons (Phytoplankton & Zooplanktons) is given in **Chapter III** (Page no. 69-74).
46.	Cluster approach for collection of baseline data shall be followed.	Cluster approach has been followed for collection of baseline data.
47.	Appropriate Disaster Management safeguards in view of the seismicity of the area.	The project area lies in Seismic Zone IV, which implies that this is highly prone to earth quakes. However there are no built in structures or permanent constructional activity for the project which would get affected. Apart from this Uttrakhand State has a devised State Disaster Management Action Plan (SDMP) prepared by Disaster Mitigation & Management Centre, Uttarakhand Secretariat which has been considered for disaster management for the proposed project. The Disaster Management Plan is attached as **Annexure XV.**

48.	NBWLclearance should be obtained.	As there is no protected area (under Wildlife Protection Act, 1972) within 10 km of the lease area, clearance from NBWL is not required.

General Points to be followed as per ToR:

1.	All documents may be properly referenced with index, page numbers and continuous page numbering	Complied.
2.	Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated	Relevant details i.e. the period & sources of data have been Mentioned in EIA-EMP Report.
3.	Where the documents provided are in a language other than English, an English translation should be provided	Yes, the same will be provided, in case of documents are in a language other than English.
4.	The Questionnaire for environmental appraisal of mining projects as prescribed by the ministry shall also be filled and submitted	The questionnaire for environmental appraisal of the project is attached in the report as **Annexure-IV**
5.	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 should be followed	Instructions for the proponents and consultants issued by MoEF&CC from time to time have been taken into consideration while preparing the EIA report.

6.	Changes, if made any in the basic scope and project parameters as submitted in Form I and PFR for securing TOR should be brought to the attention with reasons for such changes and permission should be sought out, as 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 P.H process) will be entail conducting the PH again with revised documentation.	No changes have been done in the basic scope and project parameters as submitted in Form I and PFR.
7.	As per the circular no. J-1101 1/618/2010-IA.II(I) dated 30.2.2012, you are requested to submit certified report of the status of compliance of the conditions stipulated in the environmental clearance for the existing operations of the project by the Regional Office of Ministry of Environment & Forests, if applicable.	Not applicable as this is a new mine for which Environmental clearance is yet to be received.
8.	For the Base line study for contiguous Lease areas of similar nature, the Cluster approach to be adopted for collection of baseline data, which shall be adequately cover every single lease area under consideration for EC.	The same has been taken into consideration for the cluster approach.

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10 KM BUFFER MAP OF THE STUDY AREA

77°45'0"E 77°50'0"E 77°55'0"E

30°35'0"N 30°30'0"N 30°25'0"N

HIMACHAL PRADESH

UTTARAKHAND

Project Site

YAMUNA RIVER

YAMUNA RIVER

LEGEND

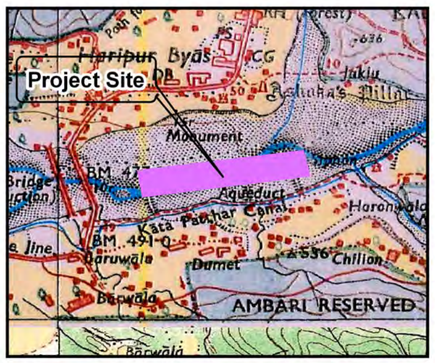
Project Site

10 KM Buffer Boundary

State Boundary

Doon Valley

Toposheet No:
53F14(Site) &53F10 ,
53F11,53F15



YAMUNA (23/1) Sand,Bajri & Boulder Mining Project,Dist: Dehradun,Uttarakhand

Fig No:1

Source:SOI Toposheet

0 0.5 1 2 3 4 5 Km

77°45'0"E 77°50'0"E 77°55'0"E

30°35'0"N 30°30'0"N 30°25'0"N

N W E S

Bhainjra
Lelta
Danda
Koti
Nichiya
Thaina
Noru
Fairly Dense Mixed Jungle
Nagheta
Kalatha
Kalsi RF
Kalsi
Tauru
Project Site
Haripur Byas
Tons River
Salahat RF
Nigli RF
Yamuna River
Mehruwala RF
Dakpatthar Dam
Dakpatthar
Bhangani
Katapatthar Canal
Vikasnagar-Barkot Road
Dumet Block RF
Vinhar RF
Mehunwala
Bhud
Ambari Block RF
Pasta
Vikas Nagar
Bulaqiwala
Rudarpur Block RF
Barwa
Gauna Nadi
Barotiwala
Kedarwala
Sheetla Rao
Chandpur Block RF

0 0.5 1 2 3 4 5 Km

Legend

- Project Site
- Buffer Boundary
- Road
- Settlement
- River
- River With Dry Channel
- Water Bodies
- Forest
- Vegetation
- Open Land
- Agricultural Land
- Agricultural Fallow Land

LU Class	Area (Ha)
Water Bodies	64.97
Vegetation	178.71
Settlement	511.57
River	254.31
Open Land	1546.45
Forest	25184.54
Agricultural Land	4687.85
Agricultural Fallow Land	1242.62
River With Dry Chhanel	759.66
Total	34430.73

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Landuse/Landcover Map of the Study Area

77°45'0"E

77°50'0"E

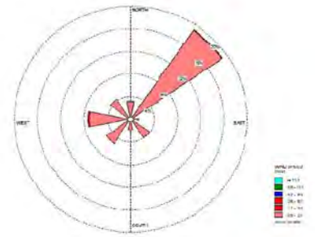
77°55'0"E

30°35'0"N

30°30'0"N

30°25'0"N

AQ4-Kalsi
SQ3
NQ4
GW3
SW3
AQ1-Project Site
NQ1
SW1
AQ3-Katapatthar
NQ3
SQ1-Baruwala
GW1
SW2
AQ2-Dakpatthar
SQ2
NQ2
GW2
NQ5-Vikasnagar
AQ5-Kedarwala



Project Site

Buffer Boundary

AQ

SQ

NQ

GW

SW

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Monitoring Map for Ambient Air Quality, Noise Monitoring, Soil Sampling,Ground Water & Surface Water Sampling

0 1.25 2.5 5

Kilometer

77°45'0"E
77°50'0"E
77°55'0"E
30°35'0"N
30°30'0"N
30°25'0"N

N
W
E
S

1500
1000
500
Amlawala Nadi
Tons River
Project Site
Yamuna River
Naro Nadi
Bin Nadi
Katapatthar Canal
Gauna Nadi
Mauti Nadi
Koti Nadi
Sheetla Rao
2000

UTTARAKHAND

Project Site

Buffer Boundary

Contour
Canal
Distributary
River
River With Dry Channel

Contour Interval :500 Meters

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Drainage Map of The Study Area

0 0.5 1 2 3 4 5
Km

CHAPTER-II

PROJECT DESCRIPTION

INDEX

2.0 TYPE OF PROJECT

The project is proposed for the excavation of Sand, *Bajri* & Boulder from the bed of River Yamuna. It is an opencast mining project where the entire activity will be done manually.

2.1 NEED FOR THE PROJECT

The project site lies on river Yamuna, which gets recharged by the rain water and carries with it huge quantity of sediment consisting of sand, *bajri*, silt, clay, etc during every monsoon season, generally. This monsoon, i.e. in 2013, the state has received > 400% rainfall, which resulted into the swelling of rivers. As a result, there is unprecedented sediment deposition in the rivers. Under such circumstances the risk of the disaster (huge flooding) may increase manifold as the river beds are already filled with sediments, if not excavated prior to the next monsoon. Hence it is quite necessary to clear the excessive sediment load from the rivers at the earliest, which otherwise will damage large tracts of land lying on both the banks of the river due to heavy and devastating floods. Hence the mining activity will channelize the river which is need of the hour.

2.2 LOCATION DETAILS

The River Yamuna Lot No. 23/1 Sand, *Bajri* & Boulder Mining Project is located near Village: Dumate, Tehsil: VikasNagar & District: Dehradun, Uttarakhand. The lease area falls in Survey of India Toposheet 53F14. The lease co-ordinates details are listed below:

Coordinates	Latitude:	30°30'42.15"N to 30°30'40.55"N
	Longitude :	77°50'22.59"E to 77°51'10.91"E

2.2.1 Lease Hold Area

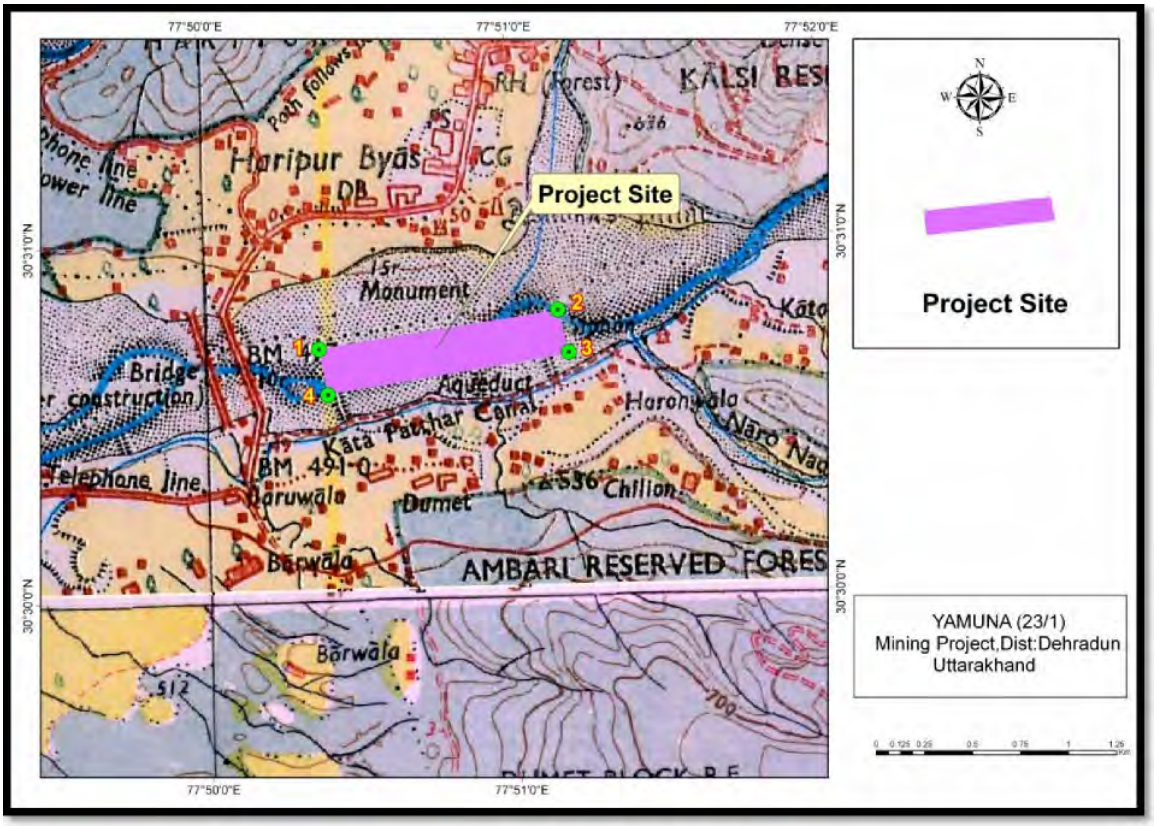
The lease hold area of 30.035 ha lies in the bed of River Yamuna, decided as per the Letter of Intent vide Letter No. 589/Bhu. Khani.E./2012-13 dated 23-1-20 13 issued by Geology & Mining Unit, Directorate of Industries, Govt. of Uttarakhand.

The site has been inspected jointly by various departments and has been recommended for mining. The Joint Inspection Letter has been attached as **Annexure I (B).**

Table 2.1: Details of the Lease Hold Area

Lot No.	Khasra No.	River	Village	Area in Ha.
23/1	649 क	Yamuna	Dumate	30.035

The general location & Project site layout with pillar coordinates are shown below:



Si.No.	Latitude	Longitude
1	30° 30' 42.15" N	77° 50' 22.59" E
2	30° 30' 47.89" N	77° 51' 09.05" E
3	30° 30' 40.55" N	77° 51' 10.91" E
4	30° 30' 34.42" N	77° 50' 23.90" E

Fig: 2.1: Pillar Coordinates of the lease area.

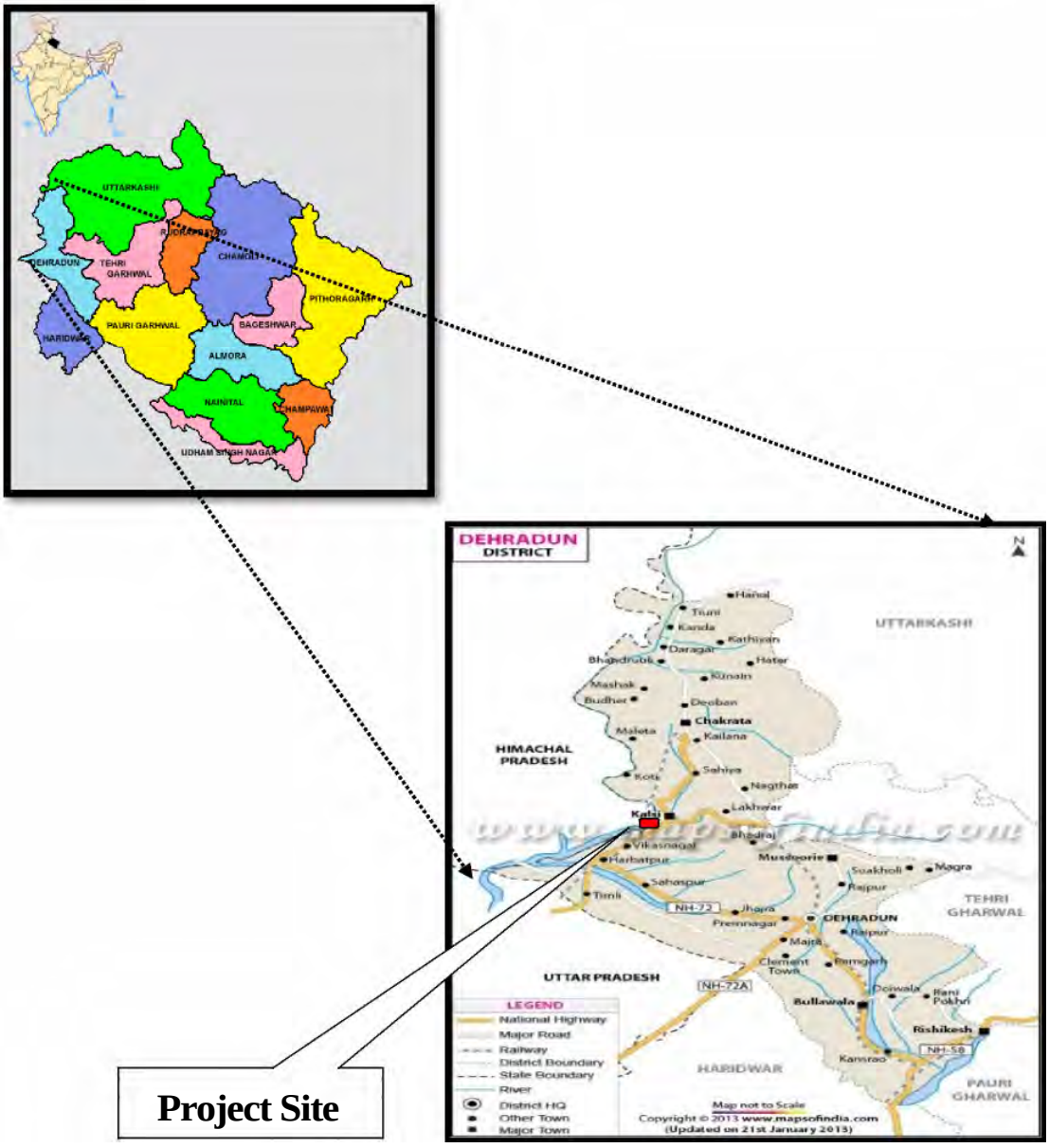


Fig 2.2: Location Map of the lease area

2.2.2 TOPOGRAPHY & GEOLOGY

Topography

Dehardun can be divided into two distinct tracts i.e. the montane tract and the sub-montane tract. The Montane Tract consists entirely of a succession of mountains and gorges. Below the Montane Tract follows the Sub-Montane Tract, which is the famous Doon valley bounded by Shiwalik hills in the south and outer scarp of the Himalayas in the north. The sub-montane tract which consists of two parallel running tracts, i.e. (a) Bhangar; and (b) Terai

The Sub-Montane Tract is situated in foothills of Himalayas. The Sub-Montane exhibits a general fall of slope from the foothills region. The slope gradually decreases and becomes almost flat at the Doon area, where the site lies.

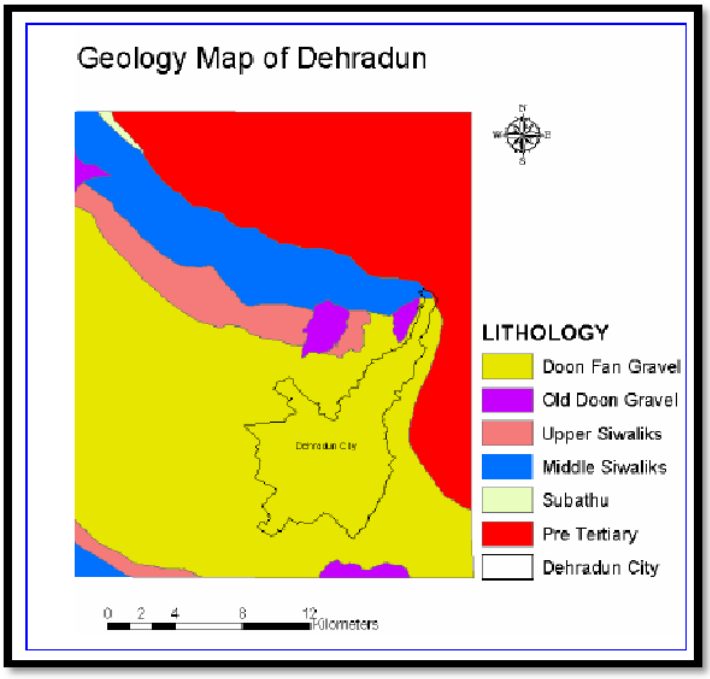
Geology

Dehradun valley was formed as an intermontane valley between lesser Himalaya in the north and the Siwaliks in the south. The present Doon valley is developed in two phases. In the first phase, around 18 million years ago there was an upliftment in the Himalaya around the Main Boundary Thrust (MBT) that raised the Mussorie Range and the Lower Himalaya. It resulted in the formation of a synclinal depression known as Doon Syncline, in which the eroded sediments of the up-lifted part were deposited and this continued for the long period. In the second phase, around 0.5 million years ago another tectonic event uplifted the Siwalik Range strata along the Himalayan Frontal Thrust (HFT) and the Doon valley came into existence (Thakur, 1995)

Age	Geological units/ Formations	Lithology
Recent	River Alluvium	Loose unconsolidated materials of sand, silt and clay derived from Upper Siwalik and Lesser Himalaya

Sub Recent to Late Pleistocene	Young Doon Gravel	Sub rounded boulders and gravels of sandstone and quartzite derived from Siwalik and Lesser Himalaya
	Old Doon Gravel	Big angularand sub-rounded boulders of quartzite and sand-stones embedded in clay.
Unconformity		
Late Pliocene To Middle Miocene	Upper Siwalik	Coarse boulders,conglomerates and clay
	Middle Siwalik	Hard and soft sand stone and clay intercalation in pockets
	Lower Siwalik	Hard sandstone, interbeded withd stone
Main Boundary Thrust		
Palaeoceneto Early Eocene	Subathu Formation	Red shale and lenticular bands of sandstone
Krol Thrust		
Pre-Tertiary	Tal	Quartzites
	Krol	Dolomitic limestone, cherty red shale, sandstone, black shale.
	Blaini / Infra Krol	Boulder beds, slate, dark shale, pink dolomite, violate quartzite and shale
	Nagthat	Quartzite and slate
	Chandpur	Phyllite, slate and limestone
	Damta	Grey slate, quartzite and turbidites

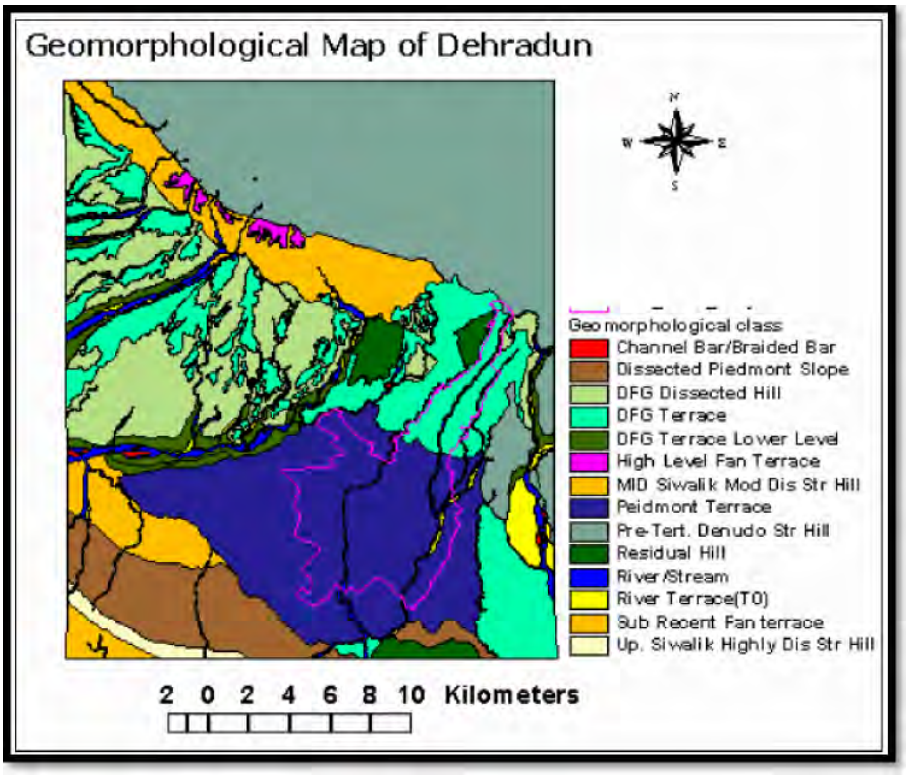
(Source: Seismic response analysis of Dehradun_pdf)



Geomorphology

Doon valley is the largest intermontane synclinal longitudinal valley in the sub Himalayan region. Many rivers such as Ganga, Yamuna, Sitla Rao, Jhakan Rao, Suswa and Asan contributed in the formation of local landforms of the valley. For different type of formations there is change in drainage pattern, as in the pre tertiary formations drainage pattern is dendritic and trellis, in the Siwaliks it is sub-parallel and dendritic whereas in the recent formations it is parallel and sinuous (Patel and Kumar, 2003). Geomorphologically the landforms in the area are formed due to erosion, deposition and tectonic activity. Nossin (1971) concluded that the valley has been uplifted by 315 to 420 meter due to differential movement along the MBT and Krol thrust. He recognised different level of fans in the valley that consist of Doon Gravel of pliestocene to recent age. Nakata (1972) suggested that the valley was formed by an intricate superimposition of alternate depositional and erosional phases caused by the climatic changes and crustal movement.

(Source: Seismic response analysis of Dehradun_pdf)



2.2.3 CLIMATE: The district has within its limits lofty peaks of the Outer Himalayas as well as the Doon Valley with climatic conditions nearly similar to those in the plains. The temperature depends on the elevation. The climate of the district, in general, is temperate. In the hilly regions, the summer is pleasant but in the Doon Valley, the heat is often intense. The temperature drops below freezing point not only at high altitudes but also even at places like Dehradun during the winters, when the higher peaks are under snow. The summer starts by March and lasts up to mid of June when the monsoon sets in. Generally, the month of May and early part of June is hottest with mean temperatures shooting upto 36.2°C at Dehradun and 24.8°C at Mussoorie. The maximum temperature rises to over 42°C at Dehradun while at Mussoorie it doesn't exceed 32°C. Winter starts from November and continue upto February. The highest maximum temperature recorded at Dehradun was 43.9°C on June 4, 1902 and that at Mussoorie was 34.4°C, on May 24th 1949. The mean daily maximum temperature during winter is 19.1°C at Dehradun and 10.2°C at

Mussoorie. The mean daily minimum temperature in January is 6.1°C at Dehradun and 2.5°C at Mussoorie. In Mussoorie the temperature drops to about -6°C to -7°C when snow fall occurs. The lowest minimum temperature at Dehradun during winter was - 1.1°C, on February 1st, 1905 and January 1945 while at Mussoorie it was -6.7°C, on February 10th.

(Source: CGWB Dehradun_pdf).

RAINFALL: The district receives an average annual rainfall of 2073.3 mm. Most of the rainfall is received during the period from June to September, July and August being the wettest months. The region around Raipur gets the maximum rainfall, while the southern part receives the least rainfall in the district. About 87% of the annual rainfall is received during the period June to September.

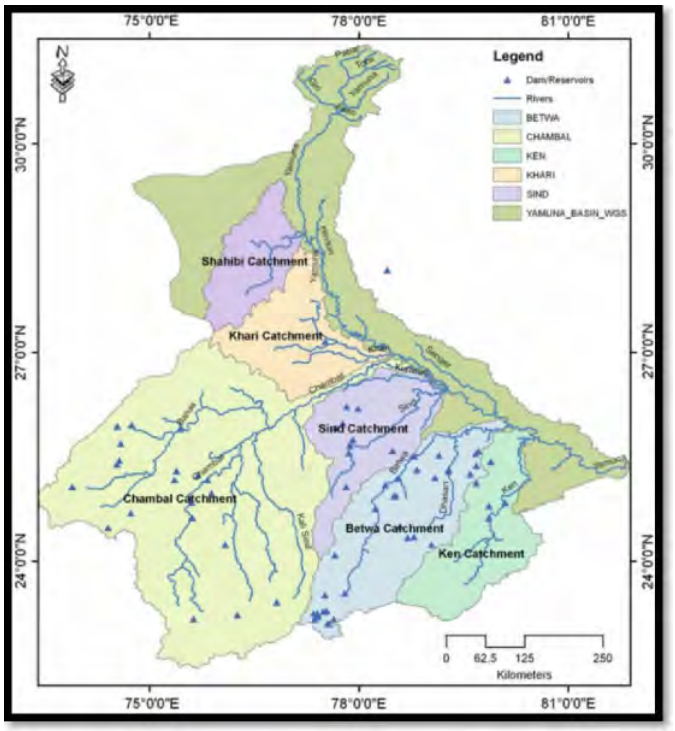
(Source: CGWB Dehradun_pdf).

FLOW: The river has extremes of dry as well as flood conditions during a year. Due to high population density of the catchment, the river remains almost in dry state during January to June in many parts of its stretch and under flooded conditions during July-September. Figure 2 shows the annual flow condition of river Yamuna. During the non-monsoon period (October to June), the river flow reduced significantly and some rivers stretches become totally dry, whereas, during monsoon period (July-September), the rivers receives significant amount of water, which is beyond its conveyance capacity resulting in flood (CPCB, 2006). The river is dissected at 5 barrages during its course i.e. at Dak Patthar (about 160 km from origin in Uttaranchal); at Hathnikund (172 km distance from origin, just at foothills in Haryana); at Wazirabad (in NCT Delhi, 396km distance from origin); at Okhla (in NCT – Delhi, 418 km distance from origin); and at Mathura (Near Gokul village in U.P. about 570 km distance from origin). *(Source: Current condition of the Yamuna River-Deepshikha Sharma and Arun Kansal, TERI University).*

2.2.4 SURFACE DRAINAGE PATTERN:

The project site lies on the bed of River Yamuna, originating from the Yamunotri glacier near Bandar Punch (38° 59' N 78° 27' E) in the Mussourie range of the lower Himalayas at an elevation of about 6320 meter above mean sea level in the district Uttarkashi (Uttranchal). The catchment (table 1 &2) of the Yamuna river system covers parts of the states of Uttaranchal, Uttar Pradesh (U.P.), Himachal Pradesh, Haryana, Rajasthan, Madhya Pradesh and the entire state of Delhi. The river Yamuna traverses a distance of about 1370 km in the plain from Saharanpur district of Uttar Pradesh to the confluence with river Ganga at Allahabad. The major tributaries of the river are Tons, Betwa, Chambal, Ken and Sindh and these together contribute 70.9% of the catchment area and balance 29.1% is the direct drainage of main River and smaller tributaries. On the basis of area, the catchment basin of Yamuna amounts to 40.2% of the Ganga Basin and 10.7% of the country.

Fig 2.4: Map showing **Catchment of Yamuna River** along with its tributaries



Surface Drainage Map is also attached as **Map No. 2**

In the upper stretch, upto a distance of 200 Km, it draws water from several streams. The combined stream flows through the Shivalik range of Himachal Pradesh and Uttaranchal and enters into plains at the point called as Dak Pathar, located in Uttaranchal. From this point onwards, the river water is regulated through weir and diverted into canal for power generation. From Dak Pathar it flows to the Poanta Sahib (a famous Sikh religious place). On the right side of the Yamuna basin is the hill station of Mussourie.

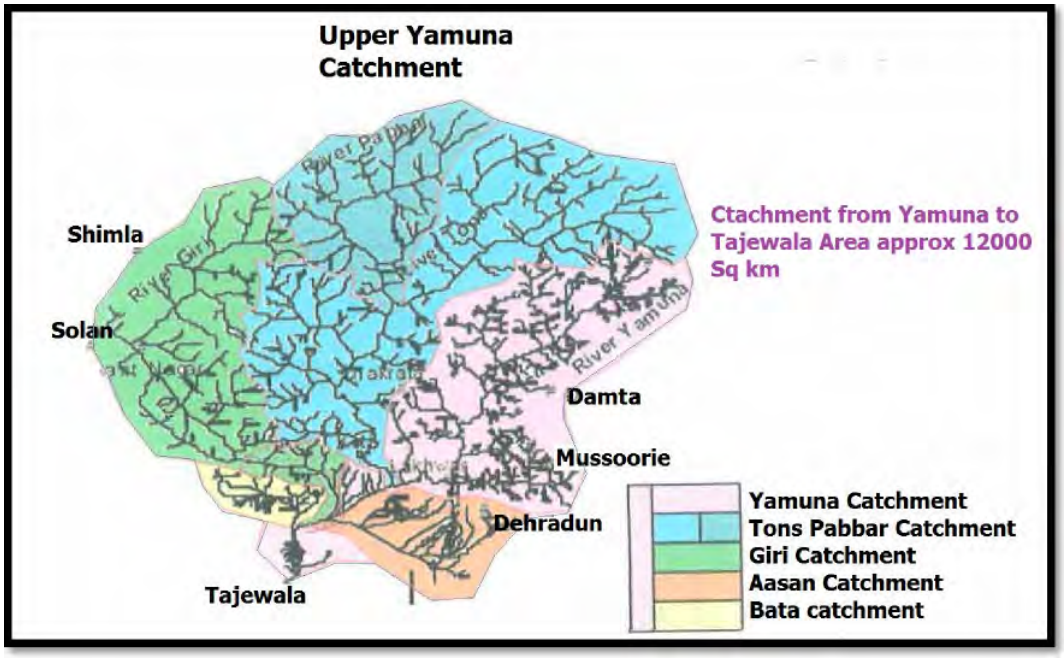


Fig 2.3 Upper Yamuna Catchment

2.2.5 WATERSHEDS

Table 2.2: Details of Catchments, Watersheds, Sub-Watersheds & MWS in Uttarakhand

Catchment	Watershed	No. of Sub Watersheds	No. of Micro Water Sheds	Total Area (Ha.)
Yamuna	**Aglar**	2	7	25,698
	Asan	3	18	82,088
	Lower Tons	3	19	45,265
	Tons	4	36	1,67,926
	Yamuna	7	80	2,29,185
Total		19	160	5,50,162

Source: Uttarakhand State Perspective and Strategic Plan 2009-2027)

Table 2.3: Number of Micro-watersheds in Dehradun.

District	No. of MWS	Area (ha)
Dehradun	95	3,05,043

(*Source: Uttarakhand State Perspective and Strategic Plan 2009-2027*)

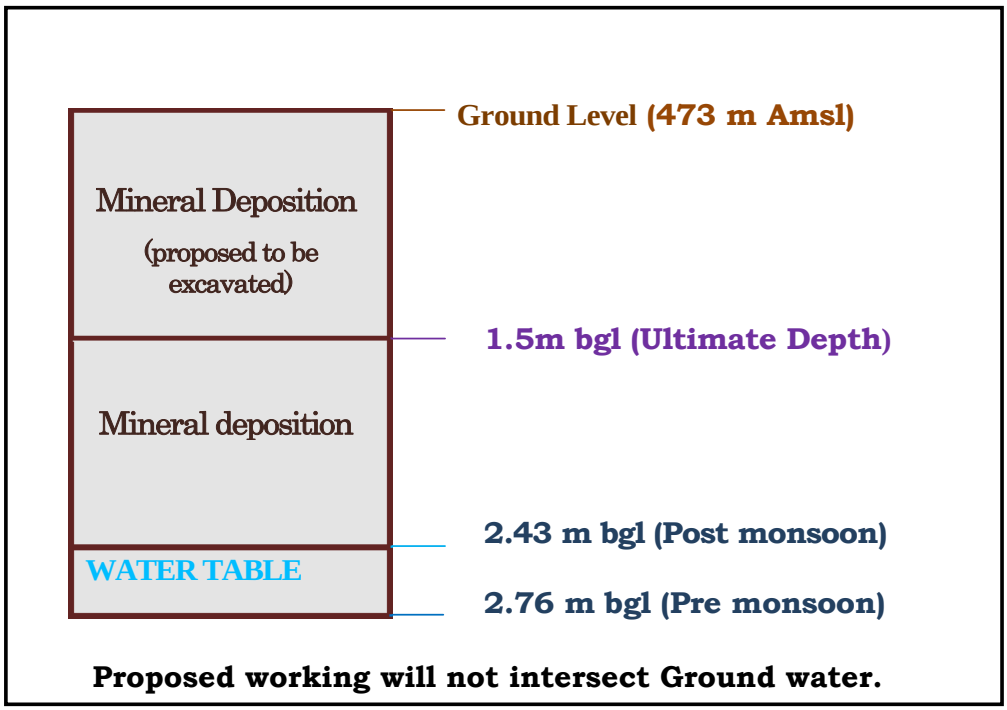
2.3 MINING

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

- This is an open-cast mining project. The operation will be entirely manual with use of hand tools like shovel, pan, sieves, pick axes, etc. The minerals will be collected in its existing form and the sand will be separated from *bajri* and boulders by sieving process.
- Mining will be done leaving a safety distance from the banks 15% of the width of the river will be left for bank stability from both the banks.
- The deposit will be worked from the surface of the bed upto 1.5 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table.

- Mining will be done only during the day time and completely stopped during the monsoon season.

SCHEMATIC REPRESENTATION OF SITE ELEVATION, WORKING DEPTH & GROUND WATER



Proposed working will not intersect Ground water.

RESERVE (AVAILABLE QUANTUM) AND PRODUCTION (EXTRACTABLE QUANTUM)

The sediments proposed to be extracted are sand, *bajri* & boulder which are generally found in the river bed in the lease area. The sediments like sand/ *bajri* along with silt & clay are brought into the bed through transport from the catchment area, are referred as "Wash Load". And the sediments which are in continuous contact with bed, carried forward by rolling/sliding are referred to as "Bed Load".

Reserve (Available Quantum):

The already existing quantity at the river bed in the lease area due to fresh depositions has been considered to be the quantum of mineral available (**Reserve**) which may be mined

out. In order to calculate this quantity, the lease area has been considered with an ultimate depth of 1.5 meter from the surface (excluding the boulder available on the surface). For the reserve tonnage estimation, the reserve quantity is multiplied with the bulk density of 2 tonnes per cum (for mixed sand and *bajri*).

The reserve for the site has been estimated to 5,40,778.48 tonnes.

Production (Extractable Quantum):

However considering the factors such as geological disturbances, volume that cannot be mined due to flow of water and also considering the safety factor, approximately 2, 80,000 tonnes has been considered to as production or the extractable quantity from the mineable area for grant of Environmental Clearance. The amount of sand & *bajri* in the total extractable quantum is assumed to be around 80%, which is likely to be replenished due to sediment inflow, gradually during the monsoon seasons.

- Of the quantum of minerals which will be excavated, only sand & *bajri* is replenishable. Boulders which may roll or come into the lease area during high flow velocity of water or during floods.
- The quantum of replenishable amount for the purpose of EIA i.e. the wash load will be obtained by using widely acceptable sediment yield calculation method i.e. “Dendy-Bolton Formula”.
- Thus the extractable quantum in the first year would be limited to the available quantum. The extractable amount for the further years may vary depending on amount/rate of actual replenishment which is to be monitored by expert agencies every year.

Process:

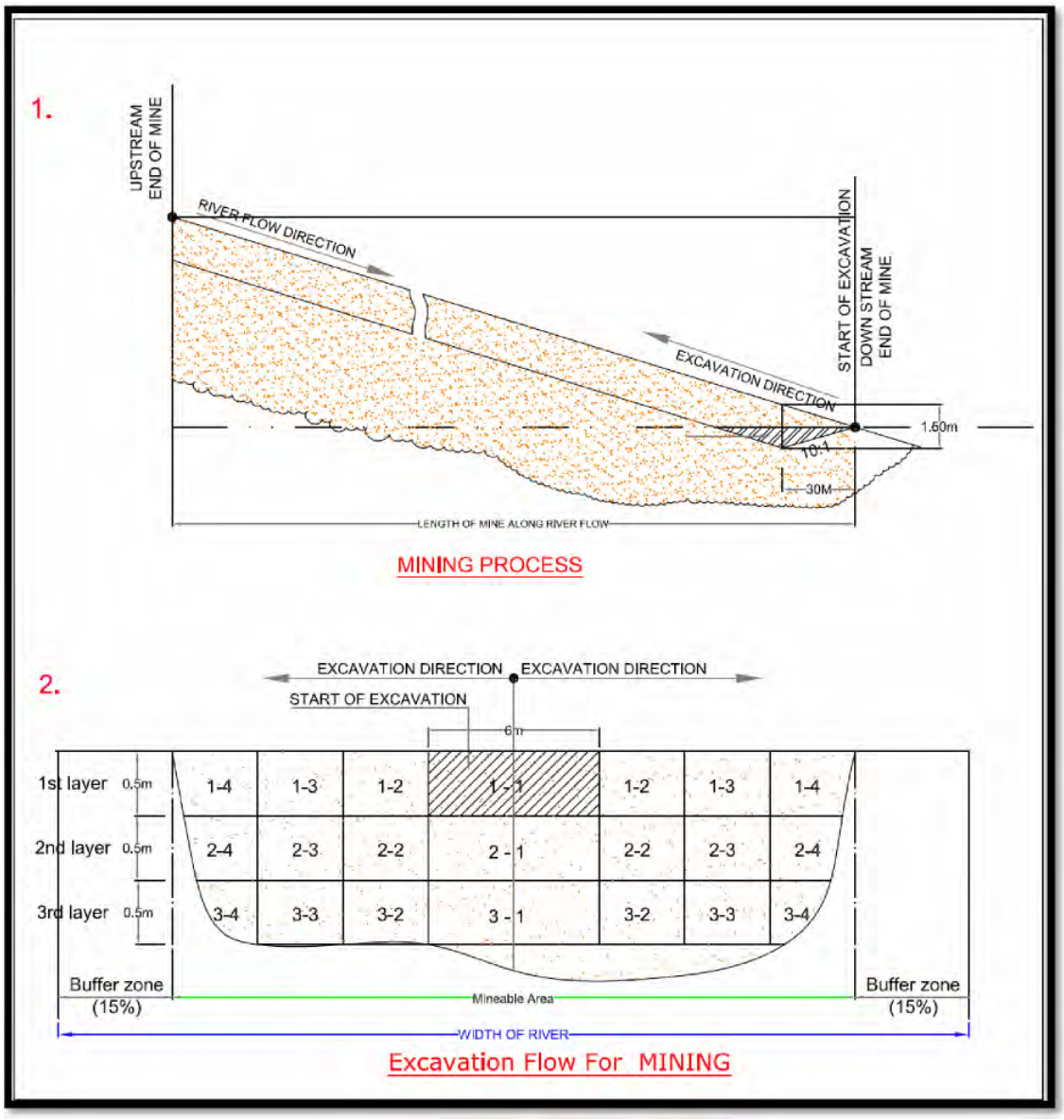
The mineable area will be demarcated with pillars after leaving the safety zone for bank stability.

1. Mining will be carried out only up to a depth of 1 .5m, using hand tools like shovel, pan, sieve etc only during the day time.
2. Mining operations will be carried in non monsoon season only, so that the excavated area in the particular year gets replenished during the subsequent year.

3. The mining in the either area will be started from the downstream end from the middle of the cross-section towards the upstream side.
4. After the first layer is excavated, the process will be repeated for the next layers.

For the 2nd year, the mining again will be continued in a similar way starting from the downstream end moving upwards of the second part.

Fig 2.4: The schematic diagram showing the mining process is given below:



Man Power Requirement:

The manpower requirement for the proposed project is given below along with the breakup, who will be utilized for excavation & loading of minerals into trucks or tractor-trolleys.

Table 2.4: Manpower requirement breakup

S. No.	Category	Numbers
1.	Administrator	1
2.	Supervisor	2
3.	Mining workers	153
4.	Additional workers*	2
TOTAL		**158**

*****Additional workers include workers for dust suppression purpose, providing water for drinking & domestic purpose, for maintenance of roads, etc.

Waste Disposal Arrangement

In this project, silt & clay is also a constituent of the River-Bed Material. The silt/clay generated have no market value, thus this material will be either used in plantation or filling low lying areas or as a spread in agricultural field.

Restriction on mining:

- As per Joint inspection Report, No mining operation shall be carried out within 100m of railway line & bridge, NH, reservoir, canal, tank or road, horizontally from the outer toe of the bank or the outer edge of the cutting as the case may be.
- The mining will not be allowed below the water table.
- The contractors will abide by Uttrakhand Minor Mineral Concession Rules, 2001 and guidelines contained in the River/Stream Bed Mining Policy and Land forms studies were taken into consideration.
- The contractors will abide at the time of mining with the term and condition as laid down under Mines Act, 1952 and Mines &

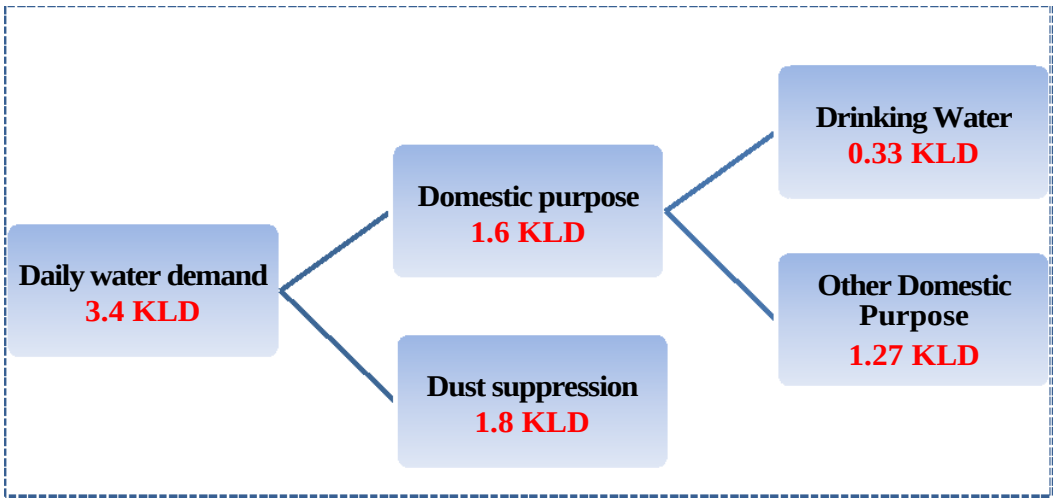
Minerals (Regulation and Development) Act, 1957, Forest (Conservation) Act, 1980and the stipulations of the EIA/EMP.

- The contractor will abide by provision of Mines Act, 1952, Interstate Migrant Work Man Act, the contractor with the satisfaction of competent authority will provide drinking water, rest shelter, first aid box, welfare facilities as Central and State Govt. labor laws.

2.4 SITE FACILITIES AND UTILITIES

Water Supply

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



The water will be supplied from available sources from nearby village.

Temporary Rest Shelter:

A temporary rest shelter will be provided for the workers near to the site for rest.

Provisions will also be made for following in the rest shelter:

- First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any.
- Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

2.5 STATUTORY REQUIREMENTS

It is accepted that effective resource management cannot be done in isolation. The proponent therefore vigorously pursues approaches towards coordination and integration where possible, so as to lead to coordinated regulatory systems.

Various acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of, include inter alia, the following:

- Uttarakhand Mineral Policy, 2011
- Uttrakhand Minor Mineral Concession Rules, 2001
- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980

****

77°45'0"E
77°50'0"E
77°55'0"E
30°35'0"N
30°30'0"N
30°25'0"N

N
W
E
S

1500
1000
500
Amlawala Nadi
Tons River
Project Site
Yamuna River
Naro Nadi
Bin Nadi
Katapatthar Canal
Gauna Nadi
Mauti Nadi
Koti Nadi
Sheetla Rao
2000

UTTARAKHAND

Project Site

Buffer Boundary

Contour
Canal
Distributary
River
River With Dry Channel

Contour Interval :500 Meters

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Drainage Map of The Study Area

0 0.5 1 2 3 4 5
Km

CHAPTER-III

DESCRIPTION OF ENVIRONMENT

INDEX

3.0 INTRODUCTION

This section contains the description of baseline studies of the 10 km radius of the area surrounding River Yamuna Lot No. 23/1 Sand, *Bajri* & Boulder Mining Project. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

3.1 BASELINE DATA

3.1.1 LAND ENVIRONMENT

Land-Use/ land cover pattern of the study area delineating all the features has been studied through satellite imagery. The entire land use of the proposed area is a river bed which lies on Yamuna River.

The land use of the study area is tabulated below and land use map is attached as **Map no.3**

Table 3.1: Land Use cover of the project study area

S.No.	Description	Area in Ha	% share in total area
1	Open land	1546.45	4.47
2	River	254.31	0.70
3	Agricultural land	4687.85	12.60
4	Agricultural Fallow Land	1242.62	3.60
5	Settlement	511.57	1.45
6	Vegetation	178.71	5.33
7	Forest	25184.54	70.10
8	River with Dry Channel	759.66	2.20
9	Water Bodies	64.97	0.18
Total		**34430.73**	**100**

There will be no diversion or modification of any land use due to the mining activity.

3.1.2 AIR ENVIRONMENT

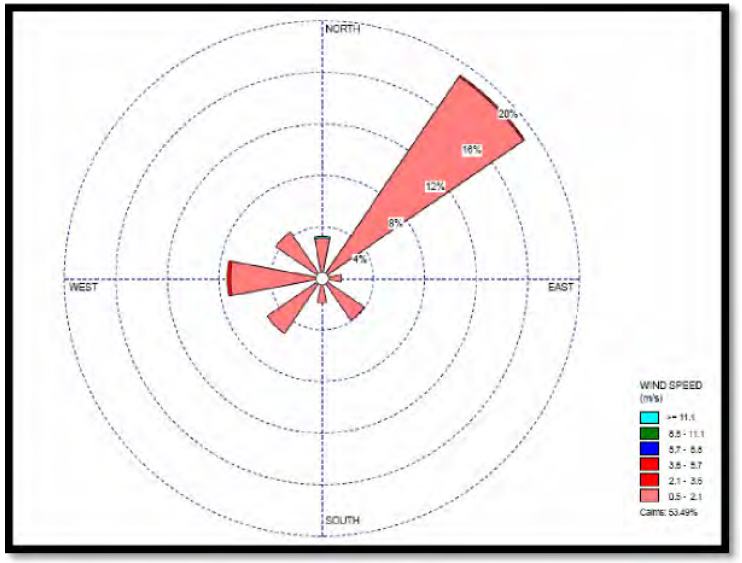
Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hourly monitoring was carried out for SO_2, NO_2, & PM_{10} twice a week at each station. This study was done during post-monsoon season for a period of 3 months (October¨13 to December¨13).

a Site-specific meteorological data

Month (2013)	Wind Speed (kmph)			Temperature (°C)			Relative Humidity (%)			Rain Fall * (mm)			Cloud Cover** (Octas of sky)
	Mean	Max	% of calm	Mean (Dry Bulb)	Highest	Lowest	Mean	Highest	Lowest	Total	24-hours Highest	No. of rainy days	Mean
October	2.4	8.6	29	17.3	29.2	7.2	56.9	95.5	22.0	21.5	2.5	9	5
November	2.0	6.3	27	16.0	27.3	6.0	56.6	95.7	21.8	0.2	0.1	2	3
December	1.7	7.7	28	14.6	23.9	5.2	56.2	95.2	21.3	0.9	0. 3	3	2

b. Wind Rose Diagram

Observation: The prominent seasonal wind direction is from NE contributing approximately 18% of the total.



c. Method of monitoring

The Central Pollution Control Board (CPCB) has published comprehensive document on emission testing regulations ("Emission Regulations Part-3, 1985"). Those procedures relevant to the particulate monitoring are summarized below:

Table 3.2: Methods adopted for PM_{10}, $PM_{2.5}$, SO_2 and NO_2

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
$PM_{2.5}$	Gravimetric method	**CPCB Guideline Vol. I May' 2011**	**5 (µg/m³)**
PM_{10}	Gravimetric method	**IS 5182 (Part-XXIII)**	**5 (µg/m³)**
Sulphur Dioxide	Improved West and Gaeke	**IS-5182 (Part-II)**	**5 (µg/m³)**
Nitrogen Dioxide	Modified Jacob & Hochheiser	**IS-5182 (Part-VI)**	**6 (µg/m³)**

i. Particulate Matter (PM):-

The CPCB method and IS 5182 (Part-XXIII) adopt a very similar approach to particulate sampling. There are some differences in the expressions used, but they are generally of no practical significance. It is recommended that CPCB method is adapted.

ii. Equipment Calibration:

For accurate testing of emission sources, the components of the sampling train is calibrated by outsource and supplier (Master Calibrator) standards and solutions are used, calibrated under certified reference material. The Ambient air quality monitoring locations are marked in **Map No. 4.**

The ambient air quality data were collected to find the existing GLC.

Table 3.3 (i) Ambient air quality monitoring stations

S.No.	Location	Station name	Distance(approx.) and direction from the lease area (km)		Zone (Core/ Buffer)
1.	**AQ1**	Project Site (near Baruwala)	-	-	Core Zone
2.	**AQ2**	Dakhpathar	5	WSW	Buffer zone
3.	**AQ3**	Katapathar	2	E	Buffer zone
4.	**AQ4**	Near Kalsi	2	N	Buffer zone
5.	**AQ5**	Kedarwala	8	S	Buffer zone

Table 3.3 (ii): Ambient Air Quality Status

Site	Particulars	$PM_{2.5}$ (µg/m³)	PM_{10}(µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)
AQ1 (24 Observations)	**Minimum**	27.1	67.8	BDL	15.1
	Maximum	33.5	76.4	5.8	19.4
	Average	29.6	70.4	5.3	16.7
	98th Percentile*	32.5	75.1	5.7	18.9
AQ2 (24 Observations)	**Minimum**	34.3	75.3	BDL	17.7
	Maximum	41.3	85.8	5.6	21.2
	Average	37.1	79.2	5.3	18.8
	98th Percentile*	40.5	84.4	5.5	20.7
AQ3 (24 Observations)	**Minimum**	28.0	59.9	BDL	9.6
	Maximum	35.0	74.9	6.0	18.5
	Average	30.9	66.8	5.7	13.8
	98th Percentile*	34.0	73.2	6.0	17.8
AQ4 (24 Observations)	**Minimum**	37.5	76.8	BDL	16.2
	Maximum	44.4	87.6	5.9	19.6
	Average	40.6	81.1	5.3	17.5
	98th Percentile*	43.8	86.4	5.8	19.3
AQ5 (24 Observations)	**Minimum**	27.6	61.7	BDL	13.1
	Maximum	35.5	70.5	5.6	17.3
	Average	31.1	64.9	5.3	14.4
	98th Percentile*	34.8	69.5	5.5	16.6
CPCB Standards (µg/m³)		60	100	80	80

*** Note:** The 98th percentile is calculated statistically only to compare with NAAQ standards of short terms values

Observations:

Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{10} amongst all the 5 AQ monitoring stations were found to be 59.9 jig/m^3 at AQ3 and 87.6jig/m^3 at AQ4, respectively.

As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80jig/m^3 for residential and rural areas has never surpassed at any station. The minimum concentrations of SO_2 were found to be Below detectable limit & maximum concentrations of SO_2 were found to be 6.0jig/m^3 at AQ3. The minimum & maximum concentrations of NO_2 were found to be 9.6jig/m^3 at AQ3 and 21.2 jig/m^3 at AQ2 respectively.

Fig3.2: Air monitoring photograph near village Dakhpathar

Free SiO_2 (µg/m^3)

S.No	AQ1	AQ2	AQ3	AQ4	AQ5
Maximum	1.35	1.50	1.19	1.53	1.23
Minimum	1.52	1.71	1.49	1.75	1.41

The standard for Respirable dust is 3mg/m^3 for 8 hour of working period where free silica content should not exceed 5% as prescribed by Directorate General of Mines Safety.

Observations:

The minimum & maximum concentrations of SiO_2 were found to be 1.19jig/m^3 at AQ3 & 1.75 jig/m^3 at AQ4 respectively.

3.1.3 WATER ENVIRONMENT

a) Ground water

Block wise net available groundwater, stage of groundwater development and category (as on 2007)

Block	Type Area	Net available ground water reserve (ham)	Current draft for all uses (ham)	Stage Groundwater Development (%)	Category
Vikasnagar	Command	1780.61	1780.61	53.78	Safe
	Non-command	19824.35	19824.35	51.23	Safe

Net annual groundwater resources availability for various uses in Dehradun district.

Block	Command/Non. Command/ Total	Net Ground water Availability (ham)	Existing Ground water Draft for domestic and industrial supply (ham)	Allocation for domestic and industrial water supply up to 2025 (ham)
Vikasnagar	Command	1780.61	45.60	312.12
	Non-command	19824.35	483.62	2878.27

Ground water resources availability, utilization stage of development is summarized as under:-

Three water samples were collected from the study area. The physico-chemical analysis of the water samples is given in the Table below.

The Ground water sampling locations are marked in **Map No. 4**

Table 3.3 (iii)

Ground water sampling locations

Station No.	Location	Approx. Distance (km)	Direction	Buffer zone/ Core zone
GW1	Baruwala	0.2	S	Core zone
GW2	Dakhpathar	5	WSW	Buffer zone
GW3	Near Kalsi	2	N	Buffer zone

Table 3.3 (iv) Physico-chemical properties of ground water near project site Baruwala, 2013)

S.No	Parameter	Limit (IS- 10500:2012)		Unit	Oct	Nov	Dec
		Desirable Limit	Permissible Limit		Baruwala		
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.82	7.42	7.56
6	Total Hardness (as CaCO3)	200	600	mg/l	320	309	305
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.11	0.08	0.12
8	Chlorides (as Cl)	250	1000	mg/l	26	21	24
9	Fluoride (as F)	1	1.5	mg/l	0.5	0.4	0.4
10	TDS	500	2000	mg/l	411	392	387
11	Calcium(as Ca2+)	75	200	mg/l	77	75	73
12	Magnesium (as Mg2+)	30	100	mg/l	31	30	29
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.05	0.06	0.04
15	Sulphate (as SO4)	200	400	mg/l	16	14	13
16	Nitrate(as NO3)	45	No Relaxation	mg/l	4	3	3
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.12	0.09	0.06
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.01	<0.01	<0.01
28	Alkalinity (as CaCO3)	200	600	mg/l	292	286	280
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.01	<0.01	<0.01
30	Boron (as B)	0.5	1	mg/l	0.2	0.2	0.1
Microbiological Parameter							
1	Total Coliform	Shall not be detectable		MPN/ 100ml	ND (<2)	ND (<2)	ND (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

Note: ND: Not detectable

Table 3.3 (v) Physico-chemical properties of ground water near Dakpathar, 2013)

S.No.	Parameter	Limit (IS- 10500:2012)		Unit	Oct	Nov	Dec
		Desirable Limit	Permissible Limit		Dakpathar		
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.81	7.68	7.57
6	Total Hardness (as CaCO3)	200	600	mg/l	146	156	138
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.14	0.12	0.13
8	Chlorides (as Cl)	250	1000	mg/l	15	20	17
9	Fluoride (as F)	1	1.5	mg/l	0.6	0.7	0.5
10	TDS	500	2000	mg/l	197	215	203
11	Calcium(as Ca2+)	75	200	mg/l	35	37	33
12	Magnesium (as Mg2+)	30	100	mg/l	14	15	13
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.06	0.05	0.07
15	Sulphate (as SO4)	200	400	mg/l	11	14	16
16	Nitrate(as NO3)	45	No Relaxation	mg/l	2	3	4
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.001	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.09	0.08	0.06
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.01	<0.01	<0.01
28	Alkalinity (as CaCO3)	200	600	mg/l	130	134	126
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.01	<0.01	<0.01
30	Boron (as B)	0.5	1	mg/l	0.2	0.2	0.1
Microbiological Parameter							
1	Total Coliform	Shall not be detectable		MPN/100 ml	ND (<2)	ND (<2)	ND (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

Note: ND: Not detectable

Table 3.3 (vi) Physico-chemical properties of ground water near Kalsi, 2013)

S.No	Parameter	Limit (IS-10500:2012)		Unit	Oct	Nov	Dec
		Desirable Limit	Permissible Limit		Near Kalsi		
1	Colour	5	15	Hazen	<5	<5	<5
2	Odour	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
3	Taste	Agreeable	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	1	5	NTU	<1	<1	<1
5	pH	6.5-8.5	No Relaxation	-	7.12	7.42	7.31
6	Total Hardness (as CaCO3)	200	600	mg/l	132	144	140
7	Iron (as Fe)	0.3	No Relaxation	mg/l	0.05	0.05	0.03
8	Chlorides (as Cl)	250	1000	mg/l	18	24	21
9	Fluoride (as F)	1	1.5	mg/l	0.3	0.3	0.2
10	TDS	500	2000	mg/l	176	203	209
11	Calcium(as Ca2+)	75	200	mg/l	32	35	33
12	Magnesium (as Mg2+)	30	100	mg/l	12	13	14
13	Copper (as Cu)	0.05	1.5	mg/l	<0.01	<0.01	<0.01
14	Manganese(as Mn)	0.1	0.3	mg/l	0.02	0.03	0.05
15	Sulphate (as SO4)	200	400	mg/l	8	11	14
16	Nitrate(as NO3)	45	No Relaxation	mg/l	2	3	4
17	Phenolic Compounds (as C6H5OH)	0.001	0.002	mg/l	<0.001	<0.001	<0.001
18	Mercury (as Hg)	0.00 1	No Relaxation	mg/l	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	0.003	No Relaxation	mg/l	<0.01	<0.01	<0.01
20	Selenium (as Se)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
21	Arsenic (as As)	0.01	0.05	mg/l	<0.01	<0.01	<0.01
22	Cyanide (as CN)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
23	Lead (as Pb)	0.01	No Relaxation	mg/l	<0.01	<0.01	<0.01
24	Zinc (as Zn)	5	15	mg/l	0.03	0.03	0.06
25	Anionic Detergent (as MBAS)	0.2	1	mg/l	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	0.05	No Relaxation	mg/l	<0.01	<0.01	<0.01
27	Mineral oil	0.5	No Relaxation	mg/l	<0.01	<0.01	<0.01
28	Alkalinity (as CaCO3)	200	600	mg/l	113	122	128
29	Aluminum (as Al)	0.03	0.2	mg/l	<0.01	<0.01	<0.01
30	Boron (as B)	0.5	1	mg/l	0.1	0.2	0.1
Microbiological Parameter							
1	Total Coliform	Shall not be detectable		MPN/ 100ml	ND (<2)	ND (<2)	ND (<2)
2	E.coli	Shall not be detectable		E.coli /100ml	Absent	Absent	Absent

Note: ND: Not detectable

Observation:

Analysis results of ground water in the study area reveal the following: -

- pH varies from 7.12 to 7.82.
- Total hardness varies from 132 mg/l to 320 mg/l.
- Total dissolved solids vary from 176 mg/l to 411 mg/l.

The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.

Fluorides and nitrates are within the permissible limits. Most of the parameters in ground water sources are well within the permissible limits as per IS: 10500-199 1, Drinking Water Standards.

Fig3.3: Ground water monitoring photograph at village Dakhpathar

b) Surface water

Three water samples were collected from the study area from River Yamuna. The Surface water sampling locations are marked in **Map No. 4.** The physico-chemical analysis of the water samples is given in the Table 3.3 (vii).

Table 3.3 (vii)
Surface water sampling locations

Station No.	Location	Direction	Distance (Km)	Core Zone/Buffer Zone
SW1	Project Site	Centre	-	Core Zone
SW2	Upstream	NE	4Km	Buffer Zone
SW3	Downstream	SW	5 Km	Buffer Zone

Table 3.3 (viii)
Physico-chemical properties of surface water (October, 2013)

S.No.	Parameter	Unit	S.W1	S.W 2	S.W. 3
1	pH	-	7.78	7.65	7.79
2	Dissolved Oxygen	mg/l	8.9	9.3	8.7
3	BOD (3 Days at 27 °C)	mg/l	2.6	2.7	2.7
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.20	0.27	0.20
6	Boron	mg/l	0.2	0.2	0.2
7	Conductivity	µmhos/cm	386	368	376
8	Temperature	(°C)	20	20	20
9	Turbidity	NTU	7	6	6
10	Magnesium hardness (as CaCO3)	mg/l	62	58	61
11	Total Alkalinity (as CaCO3)	mg/l	143	142	141
12	Chloride (as Cl)	mg/l	20	17	20
13	sulphate (as SO4)	mg/l	12	10	10
14	Nitrate (as NO3)	mg/l	0.9	0.7	0.7
15	Fluoride (as F)	mg/l	0.5	0.4	0.5
16	Sodium (as Na)	mg/l	6	8	6
17	Potassium (as K)	mg/l	1.8	1.6	1.6
18	TKN (as N)	mg/l	0.5	0.4	0.4
19	Total Phosphorous (as P)	mg/l	<0.01	<0.01	<0.01
20	COD	mg/l	8	10	10
21	Phenolic compounds (as C6H5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.07	0.07	0.06
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	0.06	0.05	0.07
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.00 1	<0.00 1	<0.00 1
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	232	223	228
	Microbiological Parameters				
1	Total Coliform	MPN/100ml	220	270	240
2	Faecal Coliform	MPN/100ml	90	110	80

Table 3.3 (ix)
Physico-chemical properties of surface water (Nov, 2013)

S.No.	Parameter	Unit	S.W. 1	S.W. 2	S.W. 3
1	pH	-	7.75	7.61	7.75
2	Dissolved Oxygen	mg/l	9.1	9.4	8.9
3	BOD (3 Days at 27 °C)	mg/l	2.2	2.5	2.3
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.20	0.24	0.32
6	Boron	mg/l	0.1	0.2	0.2
7	Conductivity	µmhos/cm	369	354	374
8	Temperature	(°C)	19	20	19
9	Turbidity	NTU	6	5	5
10	Magnesium hardness (as CaCO3)	mg/l	60	56	59
11	Total Alkalinity (as CaCO3)	mg/l	141	138	145
12	Chloride (as Cl)	mg/l	18	16	18
13	sulphate (as SO4)	mg/l	10	9	9
14	Nitrate (as NO3)	mg/l	0.8	0.6	0.6
15	Fluoride (as F)	mg/l	0.4	0.3	0.4
16	Sodium (as Na)	mg/l	6	7	9
17	Potassium (as K)	mg/l	1.6	1.4	1.6
18	TKN (as N)	mg/l	0.4	0.3	0.3
19	Total Phosphorous (as P)	mg/l	<0.01	<0.01	<0.01
20	COD	mg/l	6	8	9
21	Phenolic compounds (as C6H5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.06	0.06	0.05
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	0.05	0.04	0.06
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.00 1	<0.00 1	<0.00 1
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	223	212	225
	Microbiological Parameters				
1	Total Coliform	MPN/100ml	230	280	220
2	Faecal Coliform	MPN/100ml	80	110	90

Table 3.3 (x)
Physico-chemical properties of surface water (Dec, 2013)

S.No.	Parameter	Unit	S.W. 1	S.W 2	S.W. 3
1	pH	-	7.79	7.86	7.85
2	Dissolved Oxygen	mg/l	8.7	9.1	8.7
3	BOD (3 Days at 27 °C)	mg/l	1.8	2.1	2.1
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.38	0.46	0.38
6	Boron	mg/l	0.2	0.1	0.2
7	Conductivity	µmhos/cm	380	361	387
8	Temperature	(°C)	18	19	18
9	Turbidity	NTU	5	4	4
10	Magnesium hardness (as CaCO3)	mg/l	58	53	59
11	Total Alkalinity (as CaCO3)	mg/l	145	140	150
12	Chloride (as Cl)	mg/l	18	16	18
13	sulphate (as SO4)	mg/l	11	10	10
14	Nitrate (as NO3)	mg/l	0.9	0.7	0.8
15	Fluoride (as F)	mg/l	0.6	0.5	0.6
16	Sodium (as Na)	mg/l	11	13	11
17	Potassium (as K)	mg/l	1.4	1.7	1.5
18	TKN (as N)	mg/l	0.4	0.5	0.6
19	Total Phosphorous (as P)	mg/l	<0.01	<0.01	<0.01
20	COD	mg/l	8	9	11
21	Phenolic compounds (as C6H5OH)	mg/l	<0.001	<0.001	<0.001
22	Lead (as Pb)	mg/l	<0.01	<0.01	<0.01
23	Iron (as Fe)	mg/l	0.06	0.05	0.07
24	Cadmium (as Cd)	mg/l	<0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	0.04	0.04	0.07
26	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
27	Mercury (as Hg)	mg/l	<0.00 1	<0.00 1	<0.00 1
28	Chromium (as Cr)	mg/l	<0.01	<0.01	<0.01
29	Nickel (as Ni)	mg/l	<0.01	<0.01	<0.01
30	TDS	mg/l	230	218	235
	Microbiological Parameters				
1	Total Coliform	MPN/100ml	200	220	210
2	Faecal Coliform	MPN/ 100ml	80	80	70

Observation:

The analysis results indicate that the pH ranges between 7.61 and 7.86. Dissolved Oxygen (DO) was observed in the range of 8.7 to 9.4 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 1-3 mg/l.

The chlorides and Sulphates were found to be in the range of 16-20 mg/l and 9-12 mg/l respectively.

Bacteriological examination of surface water samples revealed the presence of total coliform in range of 200 MPN/ 100 ml to 280 MPN/ 100 ml against the limit of 5000 MPN/ 100 ml.

Based on the results it is evident that most of the parameters of the samples comply with "Category B" standards of CPCB, indicating it as organized outdoor bathing.

3.1.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth"s crust, a medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 3 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Map No. 4.**

The physico-chemical characteristic of these soil samples is given in Table No. 3.3 (xi).

Table No. 3.3 (xi) Description of soil sampling locations

Station No.	Location	Direction	Approx. Distance (km)	Core Zone/Buffer Zone
SQ1	Baruwala(P.S)	-	-	Core Zone
SQ2	Dakhpathar	WSW	5	Buffer Zone
SQ3	Near Kalsi	N	2	Buffer Zone

Fig3.4: Soil sampling photograph at village Baruwala

Table 3.3 (xii): Physico-chemical properties of soil

S.N	Parameter	Unit	Baruwala (near P.S)	Near Kalsi	Dakpathar
1	Texture	-	Sandy Loam	Clay Loam	Sandy clay loam
	Sand	%	62.3	40.8	60.1
	Silt	%	19.5	30.1	11.7
	Clay	%	18.2	29.1	28.2
2	Ph (1:2)	-	7.78	7.34	7.14
3	Electrical Conductivity (1:2)	µmhos/cm	284	466	408
4	Cation exchange capacity	meq/ 100 gm	16.4	14.7	17.1
5	Exchangeable Potassium	mg/kg	113	62.0	187
6	Exchangeable Sodium	mg/kg	123	99.0	156
7	Exchangeable Calcium	mg/kg	2518	2236.0	2555
8	Exchangeable Magnesium	mg/kg	361	356.0	384
9	Sodium Absorption Ratio	-	0.61	0.51	0.76
10	Water Holding Capacity	%	25.9	31.2	26.3
11	Porosity	%	38.6	32.8	38.4

Observations:

Samples collected from identified locations indicate the soil is Sandy loamy type which has low water retention potential .The pH value ranging from 7.14 to 7.78, which shows that the soil is alkaline in nature. The water holding capacity is found in between 2 5.9% to 31.2%.

3.1.5 NOISE ENVIRONNENT

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986. The noise level monitoring locations are marked in **Map No. 4.**

Table 3.3 (xiii): Noise quality monitoring stations

S. No.	Location	Station Name	Approx. Distance(km)	Direction	Zone (Core/ Buffer)
1.	NQ1	Baruwala(P.S)	-	-	Core zone
2.	NQ2	Dakhpathar	5	WSW	Buffer Zone
3.	NQ3	Katapathar	2	E	Buffer Zone
4.	NQ4	Near Kalsi	2	N	Buffer Zone
5.	NQ5	VikasNagar	8	S	Buffer Zone

Table No. 3.3 (xiv): Noise level status

S. No.	Location	Zone	Leq LIMIT (as per CPCB Guidelines), in dB(A)		Leq Value monitored, in dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	NQ 1	Industrial Zone	75	70	50.4	39.8
2	NQ2	Residential Zone	55	45	53.4	41.7
3	NQ3	Residential Zone	50	40	48.6	37.9
4	NQ4	Residential Zone	55	45	53.1	41.5
5.	NQ5	Silence Zone	55	45	48.7	39.3

* Day Time Leq in dB(A) (6.00AM TO 10.00PM)
Night Time Leq in dB(A) (10.00PM TO 6.00AM)

Results

Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 53.4 dB(A) at NQ-2 & 48.6 dB(A) at NQ3 respectively. The maximum & minimum noise levels at night time were found to be 41.7 dB (A) at NQ2 & 37.9 dB(A) at NQ3 respectively.

There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.

3.1.6 BIOLOGICAL ENVIRONMENT

Biodiversity reflects the potential of a regional ecosystem. Biota of a particular area is considered as indicators of the environment as they quickly respond not only to one environmental factor but also an interactive group of factors. These communities influence and react sensitively to changes in the balance of environmental stresses.

Biological diversity comprises the variability of genus, species and ecosystems and is very crucial for maintaining the basic processes on which the life depends. On the basis of biological physiology biodiversity broadly can be divided into two category 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 contributes to 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 the 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 nearby the project site.

The study was conducted in the project area to assess all possible consequences on the biological environment. Flora and fauna surveys and data collection conducted for assessing the biological diversity and its status over a period of time that forms an integral part of Impact Assessment Techniques. The present study is highlighting the various issues pertaining to floristic diversity and the faunal wealth in the core area *i.e.* Yamuna River (Lot. 23/1) Sand, *Bajri* & Boulder Mining Project, District Dehradun (Uttarakhand) and buffer zone *i.e.* area within 10 km radius.

3.1.6.1. Description of Study Area

Yamuna River (Lot. 23/1) Sand, *Bajri* & Boulder Mining Project, District Dehradun (Uttarakhand) is executed over an area of 30.035 ha on dry river bed of Yamuna River between 30°30'42.15"N to 30°30'40.55"N and 77°50'22.59"E to 77°51'10.91"Eunder the Seismic Zone-IV as per IS-1893 (part-1)-2002.Present mine is located near the interstate boundary of Himachal Pradesh and Uttarakhand.

Dehradun is located in the Doon Valley in the foothills of the Himalayas nestled between two of India's mightiest rivers - the Ganges on the east and the Yamuna on the west. Dehradun district fall under the sub-tropical climatic condition and situated between 29.45°N to 30.15°E. The geographical coverage of Dehradun district is about 3088 sq. km. Dehradun is famous for its picturesque landscape and pleasant climate and provides a gateway to the surrounding region. It is well connected and in proximity to popular Himalayan tourist destinations.

There is no any forest area present in Core zone as mining activates have been proposed on the dry river bed in Yamuna River systems. Also, due to the location of mining site on river bed, agriculture and fishing activities will not be performed by local inhabitants at the mining site. The drainage pattern of the district is dendritic. Location of present project in the buffer zone and land use pattern along with the drainage is shown in Fig. 3.5.

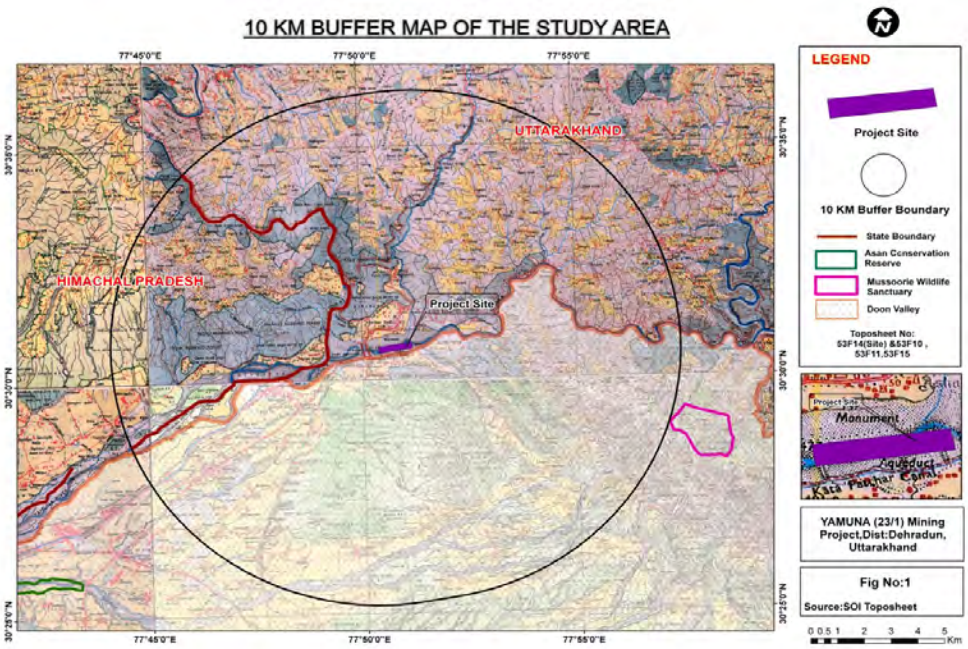


Fig.3.5: Location of Yamuna River (Lot. 23/1) Sand, *Bajri* and Boulder mining project

There is no any Eco-sensitive zone, National parks and Wildlife Sanctuary present within the buffer zone as per "Wildlife Protection Act (1972)". On the other hand, several reserved forest are present in the buffer area which are listed in Table 3.4(i).

Table 3.4(i): Details of Forest present in the buffer zone of present mining Project

S. No.	Name of the Forest	Distance and Direction
1	Ambari Reserved Forest	About 1 km in S direction.
2	Dumate Block Reserved Forest	About 2 km in S direction.
3	Salahat Reserved Forest	About 2 km in NW direction.
4	Kalsi Reserved Forest	About 3 km in N direction.
5	Nigali Reserved Forest	About 2 km in WNW direction.
6	Gojar Reserved Forest	About 6 km in W direction.
7	East YamunaReserved Forest	About 7 km in WSW direction.
8	Ambari Reserved Forest	About 1 km in SSE direction.

3.1.6.2. Climate

The climate of Dehradun is very cold in winter and pleasant in summer. In rainy season the climate is very cool & full of greenness. The climate is sub-tropical interspersed between cold weather, hot weather and southwest monsoon. The cold weather commences in November and continues till the end of February, which is characterized by cloudless days and very cold nights with much fog and dew. Summers are too hot and winters are too cold and foggy in Terai region. In summers, Pauri district is pleasant. The temperature varies from 1 degree Celsius in the year to 40° C. Summer months are May, June and July whereas Dec. and Jan. are very cold.

3.1.6.3. Soil

Soil in the Dehradun district sandy loam**.** The soil survey was carried out to assess the soil characteristics of the area. For studying soil quality of the region, various samples were collected to assess the existing soil conditions in and around the area. Soil monitoring data of Pauri district shows that the texture of soil at all locations is Sandy Loam. The monitoring sites have sand ranging from 90% to 79% in soil samples. Silt content varies from 5% to 16%, while Clay content varies from 5% to 15% in the soil samples.

3.1.6.4. Drainage

The Dehradun district of Uttarakhand falls directly into the Ganga river basin and mainly consists of mountain ranges, large valleys, uneven landscapes, breaked cliffs, rivers and rivulets. The important rivers are Asan, Yamuna, Tons, Sheetla, Swarna, Suddhowala, Song and Rispana River etc. On the other hand, present mining site is located in the riverbed of Yamuna River which is major tributary of Yamuna River. The river Yamuna flows from North to South in the buffer area.

3.2. Methodology

3.2.1. Period of Sampling

The ecological survey has been conducted during Post monsoon season for the collection of primary data of flora-fauna, vegetation, soil and other environmental observations. The details are given as below:

Post-monsoon: October to December
Core zone : At the project site
Buffer zone : Around 10 km radius of the project site

3.2.2. Mode of Data Collection

Detailed survey was conducted to evaluate floral and faunal composition of the study area. Primary data on floral and faunal composition was recorded during site visit and secondary data was collected from the Forest Department and published relevant literature. Inventory of flora and fauna has been prepared on the basis of collected data. The mode of data and parameters considered during field investigations is given in Table 3.4(ii).

Table 3.4(ii): Mode of Data Collection & Parameters Considered During the Survey

Aspect	Data	Mode of Data Collection	Parameters Monitored
Terrestrial Ecology	Primary data collection	By field survey	Floral and Faunal diversity
	Secondary data collection	* Department of Forest, Uttarakhand *Fisheries Department Uttarakhand * Official website of Dehradun district	Floral and Faunal diversity, Types of vegetation, forest type, Importance etc.

3.3. Biological Component of Core Zone

3.3.1. Flora

In the proposed project, mining activities for Sand, Bajri andBoulder shall be carried out from the dry riverbed of River Yamuna after monsoon period. River Yamuna is a perennial system, but after monsoon water level and water current seen very slowly.Most of the parts becomes of the Yamuna river becomes dry at proposed mining site. The project shall also not lead to any change in landuse and voids will be replenished every year after successive rains. There is no any major vegetation (Trees) have been observed in the mine leased area. Whereas, nearby the core zone some common species of vegetation such as *Ageratum conyzoides, Amaranthus spinosus, Calotropis procera, Cannabis sativa, Chenopodium album, Hydrolea zeylanica*, *Ipomoea carnea* and *Solanum xanthocarpum, Ipomea* sp., *Polygonum capitatum*, *Indigofera gerardiana,Euphorbia* sp. and *Cyperus* sp. have been documented.

3.3.2. Fauna

Core zone of the proposed mine area is situated on the dry river bed of the Yamuna River. So, there is no mammals, avifauna and fish fauna observed during the study period. On the other hand, it was also observed that there is no any bird's nest in the core zone.

3.4. Biological Component of Buffer Zone

3.4.1. Flora of the Buffer Zone

3.4.1.1. Forests

The present study on the floral assessment for the proposed project activity is based on extensive field survey of the area. The study has been conducted during post monsoon season. The plant species were identified with the help of some standard taxonomic books and taxonomists of related fields. The other relevant data on bio-diversity, like economically important plant species and medicinal plant, Rare and endangered species in the study area have been collected from secondary sources like forest and wildlife departments. The details of forest cover in Dehradun district is given in Table 3.4(iii).

Table 3.4(iii): Forest Cover Area in Dehradun District, Uttarakhand (Area inkm^2)

Geographical Area	Very Dense Forest	Moist Dense Forest	Open Forest	Total	Percent of GA
3,088	584	695	328	1,607	52.04
Source: *ENVIS Newsletter,* Dehradun, Uttarakhand, *2011.*					

3.4.1.2. Vegetation in and around Human Settlement

Vegetation pattern in villages and surrounding areas are slightly different from the rest of the areas. The common species grown near villages are mostly edible or useful plants. The diversity of vegetation in Yamuna River and its adjacent areas was assessed in terms of the physiognomy of its floral elements. A list of some common valuable and edible plant species recorded nearby the human settlement is given Table 3.4(iv).

Table 3.4(iv): Plant Species Present Nearby Human Settlement

Sl. No.	Name of species	Local Name
1	*Albizzia lebbek*	Siris
2	*Alnus nepalensis*	Utis
3	*Bauhinia variegata*	Kachnar
4	*Bombax ceiba*	Semal
5	*Cedrus deodara*	Deodar
6	*Cinnamomum tamala*	Tejpat
7	*Celtis australis*	Kharik
8	*Dalbergia sissoo*	Shisham
9	*Mallotus philippinensis*	Ruin
10	*Morus alba*	Tut
11	*Pinus roxburghii*	Chir
12	*Populus ciliata*	Poplar
13	*Pyrus pashia*	Mehal
14	*Quercus incana*	Ban oak
15	*Rhododendron arboretum*	Burans
16	*Cedrela toona*	Tun
Source: GRC Survey Data and information of Department of Forest, Uttarakhand		

3.4.1.3. Terrestrial Flora of the Buffer Zone

Buffer zone of the Yamuna River (Lot. 23/1) Sand, Bajri and Boulder mine area is mainly consist of agricultural land, forest land and lower land of the plateau with human settlements. Several species of flowering plants were recorded in Yamuna basin.Common medicinal plants found in the area include *Achyranthes aspera, Aconitum balfourii, Aconitum heterophyllus, Allium humile, Angelica glauca, Arisaematortuosum, Berberis aristata, Berberis lycium, Carumcarvi, Delphinium denudatum, Picrorhizakurrooa*and*Zanthoxylum armatus*. The common and dominant tree species observed in the entire buffer area were *Abies pindrow, Quercus semecarpifolia, Aesculus indica, Cedrus deodara, Juglans regia, Pinus wallichiana, Picea smithiana, Cupressus torulosa*and *Carpinusviminea*. Whereas,plant species comes under the RET category are not observed in the buffer and core zone of present project. A list of flora of the study area is given Table 3.4(v).

Table 3.4(v): List of Flora of Buffer Zone of Present Mining Project

S. No.	Scientific name	Local name	Family
Trees			
1	*Aegle marmelos*	Bel	Rutaceae
2	*Albizzia lebbek*	Bhandir or Siris	Leguminosae
3	*Alnus nepalensis*	Utis	Betulaceae
4	*Bauhinia variegate*	Kachnar	Leguminosae
5	*Bombax ceiba*	Semal	Malvaceae
6	*Citrus limon*	Nimu	Rutaceae
7	*Dalbergia sissoo*	Shisham	Fabaceae
8	*Emblica officinalis*	Amla	Euphorbiaceae
9	*Ficus auriculata*	Timal	Moraceae
10	*Ficus bengalensis*	Bargad	Moraceae
11	*Ficus palmate*	Bedu	Moraceae
12	*Ficus religiosa*	Pipal	Moraceae
13	*Grevillea robusta*	Silver oak	Proteaceae
14	*Mallotus philippinensis*	Ruin	Euphorbiaceae
15	*Mangifera indica*	Aam	Anacardiaceae
16	*Melia azedarach*	Dhenk	Meliaceae
17	*Musa paradisiacal*	Kela	Musaceae
18	*Pinus roxburghii*	Chil	Pinaceae
19	*Prunus armeniaca*	Chuli	Rosaceae
20	*Punicagranatum*	Aanar	Punicaceae
21	*Sapindus mukorossi*	Ritha	Sapindaceae
22	*Syzygium cumini*	Jamun	Myrtaceae
23	*Toona serrata*	Kakuru	Meliaceae
Shrubs			
1	*Adhatoda vasica*	Basinga	Acanthaceae
2	*Berberis aristata*	Karmshal	Berberidaceae
3	*Calotropis gigantea*	Aak	Asclepiadaceae
4	*Colebrookea oppositifolia*	Bindu	Lamiaceae
5	*Coriaria nepalensis*	Makhoi	Coriariaceae
6	*Debregeasiahypoleuca*	Sihanru	Urticaceae
7	*Eupatorium adenophorum*	Kala bansa	Asteraceae
8	*Lantana camara*	Lantana	Verbenaceae
9	*Opuntia dillenii*	Nagphani	Cactaceae
10	*Plectranthuscoesta*	Chichiri	Lamiaceae
11	*Princepia utilis*	Bhekal	Rosaceae
12	*Pyracanthacrenulata*	Ghingaru	Rosaceae
13	*Ricinus communis*	Arandi	Euphorbiaceae
14	*Rosa brunonii*	Kunja	Rosaceae
15	*Rubusellipticus*	Hinsar	Rosaceae
16	*Rumexhastatus*	Bhilmora	Polygonaceae
17	*Urtica parviflora*	Kandali	Urticaceae

18	*Zanthoxylum alatum*	Timbur	Rutaceae
19	*Ziziphus mauritiana*	Ber	Rhamnaceae
Herbs			
1	*Achyranthes aspera*	Puthkanda	Amaranthaceae
2	*Artemisia capillaris*	Pati	Asteraceae
3	*Bidens bipinnata*	Kuru	Asteraceae
4	*Bergenialigulata*	Silphara	Saxiferaceaa
5	*Chenopodium album*	Bathwa	Chenopodiaceous
6	*Datura suaveolens*	Datura	Solanaceae
7	*Euphorbia hirta*	Dudhi	Euphorbiaceae
8	*Galinsoga parviflora*	Marchya	Asteraceae
9	*Hedychium spicatum*	Banhaldu	Zingiberacea
10	*Oxalis corniculata*	AmritSak	Oxalidaceae
11	*Polygonum chinense*	Janglipalak	Polygonaceae
12	*Sonchus asper*	Dudhi	Asteraceae
13	*Thalictrumfoliolosum*	Mamiri	Ranunculaceae
14	*Tridex procumbens*	Ground weed	Amaranthaceae
Climbers			
1	*Bauhinia vahlii*	Malo	Leguminosae
2	*Clematis connata*	Kanguli	Ranunculaceae
3	*Ipomea purpurea*	Besharam	Convolvulaceaea
Grasses			
1	*Apluda mutica*	Tachula	Gramineae
2	*Cynodon dactylon*	Dhub	Gramineae
3	*Chrysopogon fulvus*	Godia	Gramineae
4	*Parthenium hysterophorus*	Congress grass	Compositae
Ferns			
1	*Pteris*sp.	Fern	Pteridaceae
2	*Adiantum*sp.	Fern	Pteridaceae
Source: GRC Survey Data supported by Department of Forest, Uttarakhand			

3.4.1.4. Aquatic Flora of the Buffer Zone

Aquatic flora referred to as phytoplankton and macrophytes (Plants that have adapted to living in aquatic environment such as River, lakes, Ponds, dams). During the present investigation, some Phytoplankton and Macrophytic vegetation were collected from and different Yamuna River and Asan Wetland along with some others streams present in the buffer area is given in Table 3.4(vi) and 3.4(vii).

Table 3.4 (vi): Phytoplankton Present recorded from River Yamuna River

Sl. No.	Name of the Individuals		
	Chlorophyceae		**Cyanophyceae**
1	*Ankistrodesmus* sp.	1	*Anacystis*sp.
2	*Ankistrodesmus falcatus*	2	*Aphanocapsa montana*
3	*Cosmarium* sp.	3	*Aphanothece* sp.
4	*Coelastrum* sp.	4	*Arthrospira massartiia*
5	*Oocystis* sp.	5	*Chroococcus* sp.
6	*Scenedesmus* sp.	6	*Gloeocapsa*sp.
7	*Scenedesmus dimorphos*	7	*Lyngbya*sp.
8	*Scenedesmus armatus*	8	*Merismopedia* sp.
9	*Spirogyra* sp.	9	*Microcystis flos-aquae*
10	*Tetraedron* sp.	10	*Nostoc*sp.
11	*Westella* sp.	11	*Oscillatoria* sp.
	Bacillariophyceae	12	*Spirulina* sp.
1	*Achnanthes* sp.		**Euglenophyceae**
2	*Amphora ovalis*	1	*Euglena* sp.
3	*Ceratonies arcus*	2	*Euglena acus*
4	*Cyclotella* sp.	3	*Trachelomonas* sp.
5	*Cymbellatumida*		**Dinophyceae**
6	*Fragillaria sp.*	1	*Ceratium*sp.
7	*Melosira granulata*		**Xanthophyceae**
8	*Navicula grimmii*	1	*Tribonema*sp.
Source: GRC Survey Data			

Table 3.4(vii): Aquatic Macrophytes Present in the River Yamuna River

S. No.	Name of the Plants
1	*Alternanthera philoxeroides*
2	*Azolla pinnata,*
3	*Ceratophyllum demersum*
4	*Eichhornia crassipes*
5	*Hydrilla verticillata*
6	*Lemna perpusilla*
7	*Najas graminea*
8	*Nymphaeanouchali*
9	*Nymphoides indica*
10	*Potamogeton crispus*
11	*Potamogeton pectinatus*
12	*Spirodela polyrhiza*

13	*Utricularia* sp.
14	*Vallisneria sp.*

3.4.2. Fauna of the Buffer zone

A list of animals of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The animals thus recorded were cross checked with Wildlife Protection Act (1972) for their schedule. 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.

3.4.2.1. Mammals

The mammalian diversity of Uttarakhand represented by more than 75 species is one of the richest in the country. Dehradun district has several mammal species but animals belongs to Schedule-I category as per "Wild Life Protection Act (1972)" were not observed in the buffer area.List of mammal species present in Buffer zone of present study area is given in Table 3.4(viii).

Table 3.4 (viii): Mammal Species Present in Buffer Zone of Yamuna River (Lot. 23/1) Sand,*Bajri* and Boulder Mining Project

SL. No	English Name	Scientific Name	Schedule Status (WPA-1972)	IUCN Status
MAMMALS				
1	Leopard	*Panthera pardus*	I	NT
2	Bandicoot Rat	*Bandicota indica*	V	LC
3	Barking deer	*Muntiacus muntjac*	III	LC
4	Common Mongoose	*Herpestes edwardsi*	II	NA
5	Fulvous Fruit Bat	*Rousettus leschenaulti*	V	LC
6	Goral	Naemorhedus goral	II	NT
7	Grey Musk Shrew	*Suncus murinus*	-	LC
8	Indian Bush Rat	*Golunda ellioti*	V	LC
9	Indian Field Mouse	*Mus booduga*	V	LC
10	Indian Flying Fox Bat	*Pteropus giganteus*	V	LC
11	Indian Giant Squirrel	*Ratufa indica*	II	LC
12	Indian porcupine	*Hystrix indica*	IV	LC
13	Indian Wild Boar	*Sus scrofa*	III	LC
14	Jungle cat	*Felis chaus*	II	LC
15	Rhesus Macaque	*Macaca mulatta*	II	LC
16	Sambar	*Cervus unicolor*	III	VU

17	Three-striped Palm Squirrel	*Funambulus palmarum*	II	LC
18	Wild boar	*Sus scrofa*	III	LC
19	Pea Fowl	*Pavo cristatus*	I	LC
Source: GRC Survey Data supported by Department of Forest, Uttarakhand				
IUCN Status: DD: Data Deficient, **LC**: Least Concern, **VU**: Vulnerable, **NE**: Not Evaluated, **EN**: Endangered, **NT**: Near Threatened.				

3.4.2.2. Reptiles

Reptile species present in the buffer area of present mining project are listed in Table 3.4(ix).

Table 3.4(ix): Reptiles and Lizards species present in Buffer Zone of Yamuna River (Lot. 23/1) Sand, Bajri and Boulder Mining Project

SL. No	English Name	Scientific Name	Schedule (WPA,1972)	IUCN
Reptiles (Snakes)				
1	Common Krait	*Bungarus caeruleus*	IV	NA
2	Banded Krait	*Bungarus fasciatus*	IV	NA
4	Indian Cobra	*Naja naja*	II	LC
5	King Cobra	*Ophiophagus Hannah*	II	VU
6	Rat Snake	*Ptyas mucosus*	II	NA
Lizards				
1	Rock Lizard	*Agama buberculatus*	-	DD
2	Chameleon	*Chamelion calcarata*	II	DD
3	Indian House Gecko	*Hemidactylus flaviviridus*	-	DD
Source: GRC Survey Data supported by Department of Forest, Uttarakhand				
IUCN Status :DD: Data Deficient, **LC**: Least Concern, **VU**: Vulnerable, **NE**: Not Evaluated, **EN**: Endangered, **NT**: Near Threatened.				

3.4.2.3. Avian Fauna

During the present study period a large number of local birds are noticed in the buffer zone of Yamuna River (Lot.23/1) Sand, Bajri and Boulder Mining Project area. But, no bird's habitats like nesting, breeding and forging patterns are noticed in the core zone. No fixed pattern in migratory behavior is noticed. List of avian fauna present in the buffer zone is given in Table 3.4(x).

Table 3.4(x): List of Avian Fauna Present in the Buffer Zone of the Present Study

SL. No	English Name	Scientific Name	Schedule status (WPA, 1972)	IUCN Status
1	Jungle Myna	*Acridotheres fuscus*	IV	LC
2	Common Myna	*Acridotheres tristis*	IV	LC
3	Clamorous Reed Warbler	*Acrocephalus stentoreus*	IV	LC
4	Crimson Sunbird	*Aethopyga siparaja*	IV	LC
5	Common Kingfisher	*Alcedo atthis*	IV	LC
6	House Swift	*Apus nipalensis*	IV	LC
7	Spotted Owlet	*Athene brama*	IV	LC
8	Common Rose finch	*Carpodacus erythrinus*	IV	LC
9	Purple Sunbird	*Cinnyris asiaticus*	IV	LC
10	Rock Pigeon	*Columba livia*	IV	LC
11	Jungle Crow	*Corvus macrorhynchos*	IV	LC
12	House Crow	*Corvus splendens*	IV	LC
13	Common Quail	*Coturnix coturnix*	IV	LC
14	Common Cuckoo	*Cuculus canorus*	IV	LC
15	Indian Cuckoo	*Cuculus micropterus*	IV	LC
16	Rufous Treepie	*Dendrocitta vagabunda*	IV	LC
17	Black Drongo	*Dicrurus macrocercus*	IV	LC
18	Red Jungle fowl	*Gallus gallus*	IV	LC
19	Coppersmith Barbet	*Megalaima haemacephala*	IV	LC
20	White Wagtail	*Motacilla alba*	IV	LC
21	House Sparrow	*Passer domesticus*	IV	LC
22	Jungle Bush Quail	*Perdicula asiatica*	IV	LC
23	Scarlet Minivet	*Pericrocotus flammeus*	IV	LC
24	Alexandrine Parakeet	*Psittacula eupatria*	IV	LC
25	Rose-ringed Parakeet	*Psittacula krameri*	IV	LC
26	Red-vented Bulbul	*Pycnonotus cafer*	IV	LC
27	Spot-winged Starling	*Saroglossa spiloptera*	IV	LC
28	Grey Bushchat	*Saxicola ferreus*	IV	LC
29	Oriental Turtle Dove	*Streptopelia orientalis*	IV	LC
30	Common Babbler	*Turdoides caudata*	IV	LC

31	Jungle Babbler	*Turdoides striata*	IV	LC
32	Common Hoopoe	*Upupa epops*	IV	LC
Source: GRC Survey Data supported by Department of Forest, Uttarakhand				
IUCN Status: **LC**=Least Concern, **EN**=Endangered, **NT**=Near Threatened				

3.4.2.4. Aquatic Fauna

I. Zooplankton

Zooplankton is commonly found in all types of aquatic habitats. These are recognized as secondary producers and considered as one of the best tools for environmental monitoring programme. During the present survey zooplankton diversity of different habitats was assessed. List of zooplankton species recorded from selected water bodies present in the buffer zone present mining project is given in **Table 3.4(xi)**.

Table 3.4(xi): Zooplankton Species Recorded from Yamuna River

Name of the Groups	**Name of the Taxa**
Protozoa	*Arcella* sp.
	Centropyxis sp.
	Difflugia sp.
	Paramoecium sp.
Rotifera	*Asplanchna brightwelli*
	Brachionus angularis
	Brachionus calciflorus
	Brachionus falcatus
	Brachionus sp.
	Cephlodella gibba
	Filinia longiseta
	Keratella cochlearis
	Keratella tropica
	Lecane closterocera
	Lecane luna
Copepoda	*Cyclops* sp.
	Mesocyclops sp.
	Thermocylops sp.
	Diaptomus sp.
	Nauplius larvae
Cladocera	*Alona intermediate*

	Bosmina sp.
	Bosmina longirostris
	Chydorus sp.
	Daphnia sp.
	Daphnia pulex
	Diaphanosoma excisum
Ostracoda	*Cypris* sp.
	Stenocypris sp.
Source: GRC Survey Data	

II. Macro-invertebrates

Macro-invertebrates are commonly found in all types of aquatic habitats such as streams, rivers, wetlands, lakes and ponds. The term macro-invertebrate used for those animals that have no backbone and can be seen with the naked eye. These animals generally include insects, crustaceans, molluscs and annelids. They are significant within the food chain as larger animals such as fish and birds rely on them as a food source. Various macro-invertebrate species were collected and identified from Yamuna River of the buffer zone of present mining project is given in Table **3.4(xii)**.

Table 3.4(xii): Macro-invertebrates recorded from Yamuna River

Name of the Groups	Name of the Taxa
Mollusca	*Corbicula* sp.
	Corbicula striata
	Gyraulus sp.
	Lamellidens sp.
	Melanoides scabra
	Thira tuberculata
Diptera	*Chironomus* sp.
	Chironomus plumosus
	Tendipes kiefferulus
Oligochaete	*Dero dagitata*
	Pheretima sp.
	Tubifex tubifex
Crustacea	*Gammarus pulex*
	Palemone sp.
Trichoptera	*Glossosoma* sp.
	Hydropsyche sp.
Ephemeroptera	*Baetis nymph*
	Caenis runlorum
Source: GRC Survey Data	

III. Amphibian

Amphibians are commonly at the places along the margin of aquatic and terrestrial systems. Due to presence of several water bodies like river and streams etc. the study area is providing shelter to many amphibian species. During the present survey period, some amphibian species commonly observed in the buffer zone of the present mining project are given in **Table 3.4(xiii).**

Table 3.4(xiii): Amphibian Species Present in the Buffer Zone of Present Mining Area

Sl. No.	Common name	Scientific name	Schedule Status (WPA,1972)	IUCN Status
Toad / Frog				
1	Common Indian toad	*Duttaphrynus melanostictus*	IV	NA
2	Indian skipper frog	*Euphlyctis cyanophlyctis*	IV	NA
3	Indian bull frog	*Hoplobatrachus tigerinus*	IV	NA
Source:GRC Survey Data supported by Department of Forest, Uttarakhand				

IV. Fishes

Present mining area is proposed on the dry riverbed. Fish species present in the buffer area of present mining project are listed in **Table 3.4(xiv)**.

Table 3.4(xiv): Fish species found in Yamuna River of Buffer Zone

Family	Scientific Name	IUCN status
Order- Beloniformes		
Family: Belonidae	*Xenentodon cancila*	LC
Order- Cyprinidontiforms		
Family: Aplocheilidae	*Aplocheilus panchax*	LC
Family: Cyprinidae	*Amblypharyngodon mola*	LC
	Puntius conchonius	VU
	Labeo calbasu	LC

	Labeo dero	LC
	Labeo bata	LC
	Labeo dyocheilus	LC
Order- Clupeiformes		
Family: Clupeidae	*Gudusia chapra*	LC
Order- Perciformes		
Family: Nandidae	*Nandus nandus*	LC
Order- Siluriformes		
Family: Pangasidae	*Pungasius pungasius*	LC
Family: Sisoridae	*Bagarius bagarius*	VU
Family: Siluridae	*Heteropneustes fossilis*	LC
Family: Mastacembelidae	*Macrognathus pancalus*	NT
Order- Tetraodontiformes		
Family: Tetraodontidae	*Tetraodon fluviatilis*	NE
Source : GRC data supported by Department of Fisheries, Uttarakhand **IUCN Status=LC:** Least Concern**, EN:** Endangered**, NT:** Near Threatened, **VU:** Vulnerable.		

3.5. Agricultural land

About 90 per cent of the population of Uttarakhand depends on agriculture. The total cultivated area in the State is 7, 84,117 ha. Uttarakhand is an agrarian state. About 80% of the population of the state is dependent on agriculture for its livelihood. 12% of the available land is irrigated and 64% are fed by natural springs. The topography of Uttaranchal is characterized by sandy soils which do not retain water for long time. Due to unavailability of moisture in the soil the crop productivity is not very good in the region. Also, due to variation in altitude the rainfall also differs from place to place affecting the crop production. The major crops produced in the state include Rice, Wheat, Barley, Corn, Mandua, Hangora etc. The state is a major supplier of fruits like Apple, Leachy, Pulam, Naashpati, and Maalta etc. The climatic and soil conditions allow growing sub-tropical and temperate fruits, vegetables and ornamentals. The various fruits grown in the state include mango, citrus, litchi, guava and jackfruit etc.

3.6. Fishery

The Uttarakhand state completely falls directly into the Ganga river basin and which is mainly consists of some other important rivers systems such as River Yamuna, Tons, Asan etc. Besides these, several reservoir, Lakes and ponds are present in the Uttarakhand.There are many fishermen co-operative societies are working in Uttarakhand. Fisheries are an important economic activity in the state for additional employment and income generation. Large populations in the state consume fish and fish products. The aquaculture resources in the state are mainly rivers, canals, pond, reservoirs and tanks. Some important fishes having more commercial values are present in different lentic and lotic water bodies in the buffer area of Jogiyara Sand and Boulder mining areasuch as:*Catla catla, Cirrhinus mrigala, Cirrhinus reba, Labeo calbasu, Labeo dero, Puntius sarana, Tor putitora, Chela labuca, Schizothorax labiatus, Nemacheilus beavani, Mystus cavasius, Mystus vittatus, Clupisoma garua, Glyptothorax cavia, Heteropneustes fossilis, Nandus nandus, Anabas testudineus, Channa marulius, Channa punctatus, Mastacembelus armatus* and*Botia almorhae.*

3.7. Occurrence of Schedule-I and Rare, Endangered and Threatened Species (RET)

Overall studies reveal that plant species come under the category of RET and Schedule-I species have not been observed from the buffer zone of Yamuna River (Lot.21/3) Sand, Bajri and Boulder Mining Projectarea. So, there is no need of conservation plan. However, all care will be taken for protection of others flora & fauna also, if any in the lease hold area.

3.1.7 SOCIO ECONOMIC & ITS BASELINE DATA:

The socio economic and its baseline data has been collected to comprehend socio-economic status of the people living in the study area and also to assess the impact of the project on it.

METHODOLOGY

For Socio-Economic Impact assessment of the proposed Sand, *Bajri* & Boulder mining project on River Yamuna, Villages Dumate, Tehsil Vikasnagar, District Dehradun, Uttarakhand, systematic analysis of various Socio-Economic characteristics, both in terms of quality and quantity has been done. Accordingly, both qualitative and quantitative data was collected from secondary sources. For collection of secondary data GRC approached the Census Authority in the state for published data/information, visited state and district portal and referred to administrative records of the state and district administration. The qualitative data deals with description; they can be observed but not measured. Hence, codes were extensively used during collection of qualitative data. They were decoded after data processing to facilitate data analysis and report writing.

STUDY AREA

The study area consists of lease area and buffer area. There is no vegetation in the leased out area excepting few small bushes. There are 74 villages and two towns in the study area. All the habitations are located in Uttarakhand. The district and sub-district wise distribution of villages is presented in the table below:

Table 3.5(i): Sub-district wise distribution of villages and towns in the

S. No	Name of the Sub-district	Number of Villages	Number of Towns
District: Dehradun, Uttarakhand			
1	Chakrata	1	-
2	Kalsi	41	-
4	Vikasnagar	27	2
5	Rishikesh	1	-
	Total	**70**	**2**
District: Sirmaur, Himachal Pradesh			
1	Paonta Sahib	4	**-**
	Total	**4**	
Grand Total		**74**	**2**

BASELINE DATA

Baseline data refers to basic information collected before a project/scheme is implemented. It is used later to provide a comparison for assessing actual impact of the project. The present report is provided with the following base line data for the study area as a whole.

Table 3.5(ii): Particulars of the Study Area

S.N.	Description	Number	Percentage to Respective total
1	**Gender wise total Population of the Study area**	**148911**	**100**
	Male	77771	52.2
	Female	71140	47.8
	Sex Ratio (No. of females per 1000 males)	914.7	
2	**Gender wise total Population (0-6 age group)**	**20169**	**100**
	Male	10400	51.6
	Female	9769	48.4
	Sex Ratio of 0-6 age group population (No. of females per 1000 males)	939.3	
3	**Number of Households and household size**	**25294**	
	Average House Hold size for the study area as a whole	6	
	Highest Household size in the study area	11	
	Lowest Household size in the study area	1	
4	**Total Population of Schedule Caste Community in the study area**	**34286**	**100**
	Male	18041	52.6
	Female	16245	47.4
	Sex Ratio (No. of females per 1000 males)	900.4	
5	**Total Population of Schedule Tribe Community**	**43608**	**100**
	Male	22801	52.3
	Female	20807	47.7
	Sex Ratio (No. of females per 1000 males	912.5	

6	**Total population of General Community (including OBC)**	**71017**	**100**
	Male	36929	52.0
	Female	34088	48.0
	Sex Ratio of General Community population (including OBC) (No. of females per 1000 males	923.1	
7	**Total Literates in the study area**	**97018**	**100**
	Male	55754	57.5
	Female	41264	42.5
	Over all literacy rate in the study area	**75.4**	
	Male	82.8	
	Female	62.7	
	Gender gap in literacy rate	20.1	
8	**Total Workers in the study area**	**58725**	**100**
	Male	41034	69.9
	Female	17691	30.1
	Overall Gender Gap in work participation rate	39.8	
	Overall Dependency Rate of Non-workers over workers	153.6	
9	**Total Main Workers in the study area**	**46188**	**100**
	Male	34022	73.7
	Female	12166	26.3
	Over all gender gap in work participation rate of main workers	47.4	
10	**Total Marginal Workers in the study area**	**12537**	**100**
	Male	7012	56.0
	Female	5525	44.0
	Over all gender gap in work participation rate of Marginal workers	12	
11	**Total Household Industrial Workers in the Study Area**	**1536**	**100**
	Male	1034	67.3
	Female	502	32.7
12	**Total Agricultural Workers in the study Area**	**32852**	**100**
	Male	19832	60.4
	Female	13020	39.6
13	**Total Cultivators in the Study Area**	**26753**	**100**
	Male	15280	57.1
	Female	11473	42.9
14	**Total Agricultural Labour in the Study Area**	**6099**	**100**

	Male	4552	74.6
	Female	1547	25.4
15	**Total Others Worker in the Study Area**	**24337**	**100**
	Male	20168	82.9
	Female	4169	17.1

Source: Census 2011

Various amenities available in the study area are tabulated below:

Table 3.5(iii): List of amenities available in the study area

SI.No	Amenities	Type	No. of villages	Number of institutions	No. of Towns	Number of institutions
1	Educational Institutions	Primary School	58	88	1	4
		Middle school	24	27	1	1
		Secondary School	7	9	1	1
		Senior Secondary School	7	8	2	2
		Adult Literacy Center	18	30	-	-
		Other School	5	7	-	-
2	Health facilities	Allopathic Hospital	7	11	-	-
		Allopathic Dispensary	7	7	-	-
		Ayurvadic Hospital	2	2	-	-
		Ayurvadic Dispensary	1	1	-	-
		Maternity & Child Welfare Center	14	18	-	-
		Primary Health Sub-Centre	6	6	2	2
		Family Welfare center	2	2	-	-
		Child Welfare Cnter	8	10	1	2
		Health Center	4	6	-	-
		Registered Medical Practicenors	7	15	2	10
		Community Health Workers	16	19	-	-
3	Drinking Water	Well	3	-	-	-
		Hand pump	8	-	-	-
		Tub well	4	-	1	-
		Tap	68	-	2	-
4	Electricity	Power for domestic uses	47	-	2	200 connection
		Power for Agriculture uses	5	5	1	100 connection

		All purpose	14	14	1	400 connection
5	Approach Road	Only Paved Roads	11	-	1	350 Km.
		Only Mud Roads	8	-	-	-
		Both paved and Mud Roads	6	-	1	200 Km.
		Paved, Mud and Foot Road	6	-	-	-
7	Banks & Credit Societies	Commercal bank *(Pagdandi)*	7	7	1	15
		Cooperative bank	4	4	-	-
		Agriculture Credit Societies	4	4	-	-
8	Communication Facilities	Bus Services	28	-	1	-

The impact assessment based on this data collected has been discussed in **Chapter VI** (Page no.106-118).

****

77°45'0"E 77°50'0"E 77°55'0"E

30°35'0"N 30°30'0"N 30°25'0"N

N W E S

Bhainjra
Lelta
Danda
Koti
Nichiya
Thaina
Noru
Fairly Dense Mixed Jungle
Nagheta
Kalatha
Kalsi RF
Kalsi
Tauru
Project Site
Haripur Byas
Tons River
Salahat RF
Nigli RF
Yamuna River
Mehruwala RF
Dakpatthar Dam
Dakpatthar
Bhangani
Katapatthar Canal
Vikasnagar-Barkot Road
Dumet Block RF
Vinhar RF
Mehunwala
Bhud
Ambari Block RF
Pasta
Vikas Nagar
Bulaqiwala
Rudarpur Block RF
Barwa
Gauna Nadi
Barotiwala
Kedarwala
Sheetla Rao
Chandpur Block RF

0 0.5 1 2 3 4 5 Km

Legend

- Project Site
- Buffer Boundary
- Road
- Settlement
- River
- River With Dry Channel
- Water Bodies
- Forest
- Vegetation
- Open Land
- Agricultural Land
- Agricultural Fallow Land

LU Class	Area (Ha)
Water Bodies	64.97
Vegetation	178.71
Settlement	511.57
River	254.31
Open Land	1546.45
Forest	25184.54
Agricultural Land	4687.85
Agricultural Fallow Land	1242.62
River With Dry Chhanel	759.66
Total	34430.73

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Landuse/Landcover Map of the Study Area

77°45'0"E

77°50'0"E

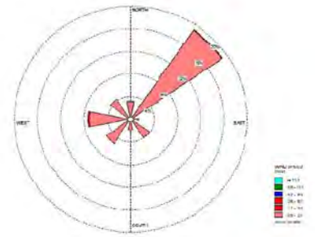
77°55'0"E

30°35'0"N

30°30'0"N

30°25'0"N

AQ4-Kalsi
SQ3
NQ4
GW3
SW3
AQ1-Project Site
NQ1
SW1
AQ3-Katapatthar
NQ3
SQ1-Baruwala
GW1
SW2
AQ2-Dakpatthar
SQ2
NQ2
GW2
NQ5-Vikasnagar
AQ5-Kedarwala



Project Site

Buffer Boundary

AQ

SQ

NQ

GW

SW

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Monitoring Map for Ambient Air Quality, Noise Monitoring, Soil Sampling,Ground Water & Surface Water Sampling

0 1.25 2.5 5

Kilometer

CHAPTER-IV

ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

INDEX

4.0 GENERAL

All industrial and/or development projects are likely to have an impact on the natural set up of the environment. This impact may be beneficial or adverse, depending on the improvement or the deterioration it brings, about change in the status of air, water, land, ecology, natural systems, socio-cultural life styles and economics of the population. Depending on the nature of activities and baseline environment status, the impacts are assessed for their importance. On the basis of the impact analysis, the mitigating action and future monitoring requirement are paid attention to in the Environmental Management Plan for countering or minimizing the impacts.

Keeping in mind, the environmental baseline scenario as detailed in **Chapter III** (Page no.42-82) and the proposed mining activity described in **Chapter II** (Page no.34-39), it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted.

4.1 LAND ENVIRONMENT

The proposed extraction of streambed materials, mining below the existing streambed, and alteration of channel-bed form and shape may lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology if, the operations are not carried out systematically.

The mining and allied activities involved in river bed mining result in creation of temporary haul roads and formation of mined pits inside river, etc. affecting the landuse pattern. In this project, silt and clay are also produced as a constituent of the River-Bed Material, which are considered to be waste.

Anticipated Impacts:

- Undercutting and collapse of river banks.
- Excessive and unscientific riverbed material mining is a threat to dams and

nearby structures.

- River bank cutting and erosion.
- Upstream erosion as a result of an increase in channel slope and changes in flow velocity.
- Downstream erosion due to increased carrying capacity of the stream
- Downstream changes in patterns of deposition.
- Changes in channel bed and habitat type.

Mitigation measures:

- Since the project is mainly for sand, *bajri* and boulder excavation (soil deficient), no loss of top soil is involved.
- The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere.
- No mining is proposed in the vicinity of important structure like bridges/ dams.
- Mining will be done leaving a safety distance of 15% of the width of the river from the bank inwards for bank protection.
- In this activity, the work is proposed to be done manually which will avoid adverse effects associated with heavy machinery and their functioning.
- The mining is planned in non monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
- Grasses and bushes which have fibrous roots at the first instance are proposed to grown along the banks which enhances the binding properties of the soil. Hence protecting the banks.
- The systematic and scientific removal of sand, *bajri* and boulder will not cause bed degradation.
- Restoration of bank will be ensured at the end of mine closure every year.

4.2 WATER ENVIRONMENT

Anticipated Impacts:

Mining of sand from within or near a river bed has a direct impact on the physico-chemical habitat characteristics. These characteristics include in stream roughness elements, depth, velocity, turbidity, sediment transport and stream discharge. Altering these habitat characteristics can have deleterious impacts on both in-stream biota and associated riparian habitat.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

i. alteration of flow patterns resulting from modification of the river bed
ii. an excess of suspended sediment
iii. Damage to riparian vegetation and in-stream habitat

The disturbance activities can also disrupt the ecological diversity in many ways.

Mitigation measures

Project activity will be carried out only in the dry part of the river bed. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water either from the river or tapping the ground water.

In the lean months, the proposed sand mining will not expose the base flow of the river and hence, there will not be any adverse impact on surface hydrology.

The deposit will be worked from the top surface up to a maximum depth of 1 .5m below ground level or above the ground water table whichever comes first. Hence mining will not affect the ground water regime as well.

Further mining will be completely stopped during the monsoon seasons to allow the excavated area to regain its natural profile.

4.3 AIR ENVIRONMENT

Anticipated Impacts:

Emission of fugitive dust is envisaged due to:

i. Mining Activities includes excavation and lifting of minerals. The whole process will be done manually. Therefore the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.

ii. Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads. Evaluation of fugitive dust emission has been done by using line source model as given below:

Air Modeling

A detailed study on emission sources and quantification of pollutant concentration by means of dispersion modeling is required to access the environmental impact of a mine. On the basis of the predicted increments to air pollutant concentrations, an effective mitigation and environmental plan can be devised for sensitive areas. In case of river bed sand, stone & *bajri* mining, as there is no blasting and drilling activities, the impacts may only be caused by material handling and transportation activities. The material is mostly wet, and therefore effect is minimal.

FUGITIVE DUST- MODELING

Air quality modeling was done using line source model as published by USEPA "Emission Factor Documentation for AP-42", in section 13.2.2, for transportation though unpaved roads. Emission factors to be used in Line source dispersion equation is adopted from formula as given below:

$E=k * (s/12)^a * (W/3)^b / (M/0.2^c)$ ..... (1)

Where

E = Emission Rate (lb/VMT)

s = Surface material Silt Content (%) = 10%

W=Mean Vehicle Weight (tonnes) = 10 tonnes

M= Surface material moisture content (%) = 2.5%

K, a, b & c are empirical constants with values given as below:

Constant	PM 10
k	2.6
a	0.8
b	0.4
c	0.3

Thus for vehicles of 10 tonners, the Emission Rate using equation **(1)** is**:**

E = 1.06873 lb/VMT

E = 0.002679 g/s/m

Concentration of the fugitive dust was calculated using the formula given in "Workbook of Dispersion Modeling" by Turner. The Concentration of the fugitive Dust is given below:

$C = (2/\pi)^{1/2} (E / \sigma z\, u) \text{Exp}- [(h^2) / (2\, \sigma z^2)] \times 10^6$.....(2)

Where

C = Hourly Concentration in microgram/ m^3

E = Emission Rate = 0.002679 g/s/m

υ = Wind Speed =2.1 m/s

h = 0 m

Modeling was done for an infinite line source assuming unpaved road. For conservative calculation wind was assumed to blow at a velocity of 2.1 m/s

perpendicular to the road. The results for 24 hourly concentration values are given in the Fig. 4.1:

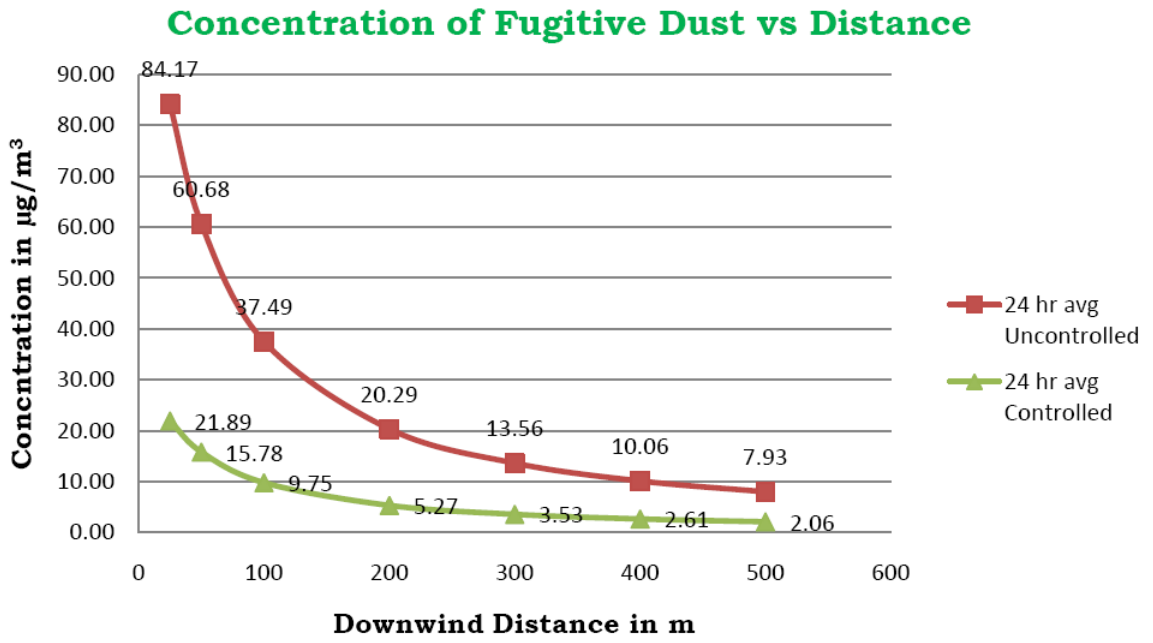


Fig.4. 1 Graph showing Concentration of Fugitive dust vs Distance in 24 hr average unscientific and scientific way

It is observed that the ground level concentration (GLC) decreases from **84.17 µg/m³** at **25 m** to **7.93 µg/m³** at **500 m** from the centre line of the road. These values have been predicted for a dry unpaved road in an uncontrolled scenario. However, the GLC at **25 m** will further reduce down to **21.89 µg/m³** and **2.06 µg/m³** at **500 m** in a controlled scenario i.e. through water sprinkling.

Mitigation measures

The collection and lifting of minerals will be done manually. Therefore the dust generated is likely to be insignificant as there will be no drilling & blasting. The only air pollution sources are the road transport network of the trucks. The mitigation measures like the following will be resorted:

- Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further by 74% (*Ref. Haul road dust control by WR REED & JA Organiscak*). The same can be seen as shown in the above graph (Fig.4. 1).
- Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
- Deploying PUC certified vehicles to reduce their emissions.
- Proper tuning of vehicles to keep the gas emissions under check.
- Monitoring to ensure compliance with emission limits would be carried out during operation.

4.4 NOISE

The proposed mining activity is manual in nature. No drilling & blasting is envisaged for the mining activity. Hence the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals.

Anticipated Impacts:

- Mental disturbance, stress & impaired hearing.
- Decrease in speech reception & communication.
- Distraction and diminished concentration affecting job performance efficiency

The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms. The summary of the permissible exposures in cases of continuous noise as per above rules is given below:

Damage Risk Criteria for Hearing Loss OSHA Regulations

Maximum allowable duration per day in hour	Sound pressure dB(A)	Remarks
(1)	(2)	(3)
8.0	90	1. For any period of exposure falling in between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale. 2. Noexp excess of 115 dB(A) is permissible.
6.0	92	
4.0	95	
3.0	97	
2.0	100	
1 1/2	102	
1	105	
3/4	107	
1/2	110	
1/4	115	

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

a. Mitigation measures

The following measures have been envisaged to reduce the impact from the transportation of minerals:

i. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

ii. In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.

iii. No such machinery is used for mining which will create noise to have ill effects.

iv. Awareness will be imparted to the workers about the permissible noise levels & maximum exposure to those levels

4.5 BIOLOGICAL ENVIRONMENT

Mining which leads to the removal of channel substrate, re-suspension of streambed sediment and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities.

Sand mining generates additional traffic, which negatively impairs the environment.

Anticipated Impacts:

- Excessive and unscientific riverbed sand mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology.
- Access roads crossing the riparian areas will have impact on the species disturbing the ecosystem.
- Mining may drive away the wild life from their habitat, and significantly affect wildlife and nearby residents.
- Diminution of the quality and quantity of habitat essential for aquatic and riparian species.
- Reduction in the yield of agriculture due to deposition of dust on the leaves, etc. of the crops.
- Fragmentation of wildlife habitat and blocking of migratory paths may lead to local decline of species, or genetic.
- Mining on the streambed, braided flow or subsurface inter-sand flow may hinder the movement of fishes between pools.

Mitigation measures

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated, however, the following mitigation measures will be taken to further minimize it:

1. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species.
2. As the mining site has no vegetation, no clearance of vegetation will be done.
3. Prior to closure of mining operations / during the rainy season the eroded bank will be restored / reclaimed to minimize negative impacts on aquatic habitats.
4. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.
5. Mining will be carried out on the dry part of the lease area to avoid disturbance to the aquatic habitat and movement of fish species.
6. No discard of food, polythene waste etc will be allowed in the lease area which would distract/attract the wildlife.
7. No night time mining will be allowed which may catch the attention of wild life.
8. If wildlife are noticed crossing the area, they will not be disturbed at all.
9. Workers will be made aware of the importance o the wildlife and signage will be displayed at the sensitive areas to caution the workers & other passerby.
10. Access roads will not encroach into the riparian zones and if any riparian vegetation cleared off for the mining activity will be restored at the end of closure of mine.

4.6 TRAFFIC ANALYSIS

Transportation Route:

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 three evacuation routes has been proposed, distributing the traffic load to reduce the traffic congestion.

The lease area is connected to NH-123 by an unmetalled road of about 320m then by a metalled road near village Dumet.

The evacuation route map depicting the routes is shown below

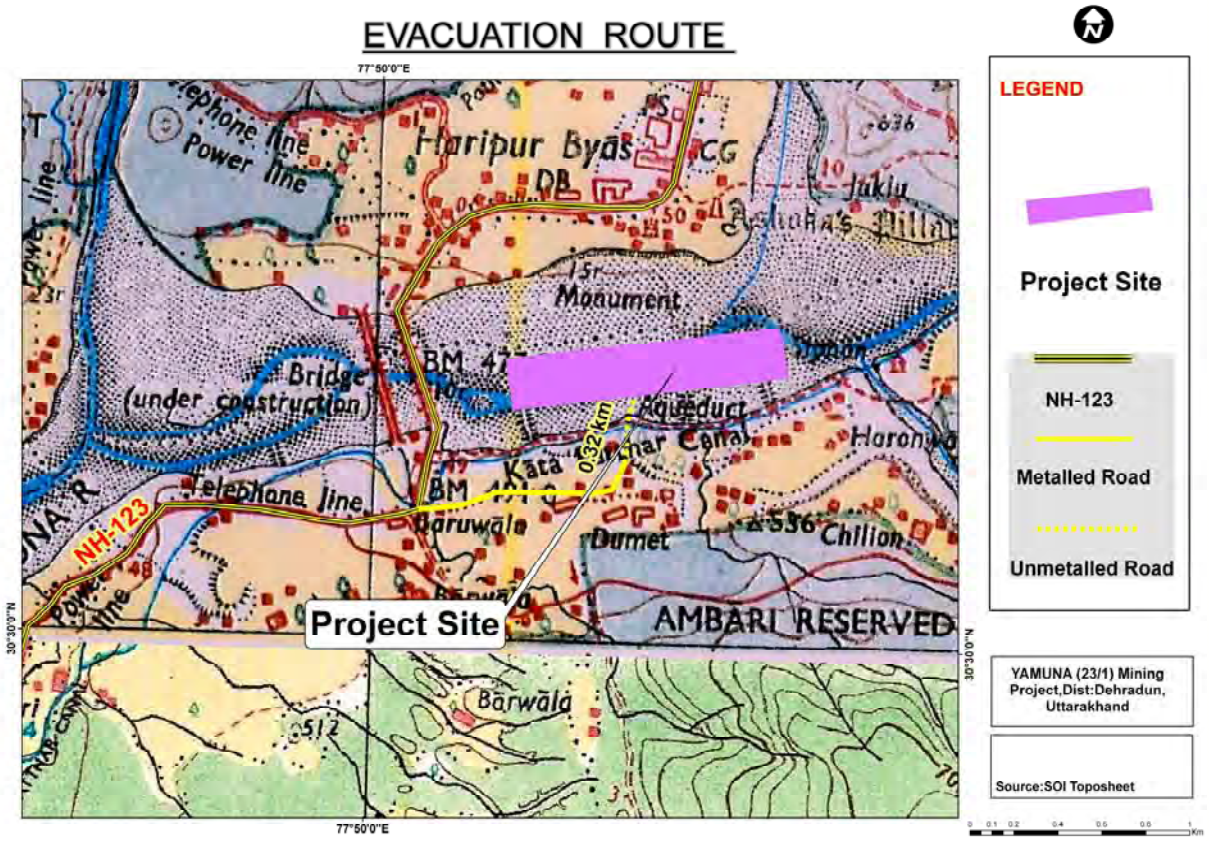


Fig. 4.2: Map Showing Evacuation Route

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity.

During Mine operation

Proposed Capacity of mine/annum : 2,80,000 TPA
No. of working days : 225 days
Proposed Capacity of mine/day : 1244 TPD
Truck Capacity : 10 tonnes
No. of trucks deployed/day : 125
Increase in PCU/ day : 375
Considering both loaded & empty trucks

Increase in PCU/day will be 750 PCU's

Table 4.4 (i): Existing Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Near Village Dumet	60	2000	0.06	A
NH-123Intersection	1400	15,000	0.09	A

V= Volume of Vehicles in PCU's/day & C= Capacity of Road in PCU's/day

The existing Level of Service (LOS) is "A" i.e. excellent.

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

Reference: ENVIS Technical Report, IISc, Bangalore.

Table 4.4 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
Near Village Nawabgarh	810	2000	0.40	B
NH-123 Intersection	2150	15,000	0.14	A

Source: Capacity as per IRC: 64-1990

Results

From the traffic study it is observed that the level of services will go down from "A" that is Excellent to "B" which is Very Good in case of village intersection due to additional traffic load on the evacuation route where as it will remain same i.e. "A" in case of NH intersection.

Therefore, the additional load on the carrying capacity of the concerned roads is likely to have some affects, for which traffic management have been proposed and given below.

Traffic Management:

1. Roads will be repaired regularly and maintained in good conditions
2. A supervisor will be appointed to regulate the traffic movement near the site.
3. Speed breakers will be constructed accident prone areas to calm the traffic and its speed.
4. Signage will be erected at the sensitive & precarious places to caution or provide information to road users.
5. A Committee has been formed for traffic study. The letter regarding the same is attached as **Annexure –XVI.**

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CHAPTER-V

ANALYSIS OF ALTERNATIVES

(TECHNOLOGY & SITE)

5.0 INTRODUCTION

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.

5.1 ALTERNATIVE FOR MINE LEASE

During monsoon season, when rivers reach high stage, Yamuna 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 will be mined for the purpose of preventing land cutting during heavy rainfall and floods.

Sand, Bajri and Boulder (minor mineral) deposits are site specific. It is present in Yamuna river bed (30.035 Ha.). The mining of the material will be done by opencast manual method in riverbed. 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.

5.2 ALTERNATIVE FOR TECHNOLOGY AND OTHER PARAMETERS

Some alternatives considered during EIA study are discussed below:

S. No.	Particular	Alternative Option 1	Alternative Option 2	Remarks
1	Technology	Open-cast Manual mining	Open-cast Mechanical	Open-cast Manual Mining is preferred.

			mining	**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 labour 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	Groundwater/ Surface water 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	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. **Benefits** • Less distance; less fuel used Minimum or negligible number of trees will be cut in best opted haul road route.

5.3 SUMMARY

We have analyzed all the option for alternatives of the proposed mine site. This project is sand, bajri and boulder specific project and existing land use of mine lease classified as River Body which will continue to be so even after the current mining project is over, hence no alternate site is suggested for this project.

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CHAPTER-VI

ENVIRONMENTAL MONITORING PROGRAMME

INDEX

6.0 INTRODUCTION

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding areas are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program.

Environmental Monitoring Program will be implemented once the project activity commences. Environmental monitoring program includes (i) environmental surveillance, (ii) analysis & interpretation of data, (iii) preparation of reports to support environmental management system and (iv) organizational set up responsible for the implementation of the programme.

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges 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 socio-economic interaction, through local liaison activities or even assessment of complaints.

The preventive approach to environment management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc.

The key aims of environment monitoring are:

1. To ensure that results/conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.
2. To verify the evaluations made during the planning process, in particular with risk and impact assessments and standard & target setting and to measure operational and process efficiency.
3. Monitoring will also be required to meet compliance with statutory and corporate requirements.
4. Finally, monitoring results provide the basis for auditing i.e. to identify unexpected changes.

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air Quality Monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Parameters	**Technique**	**Technical Protocol**	**Minimum Detectable Limit**
$PM_{2.5}$	Gravimetric method	**CPCB Guideline Vol. I May' 2011**	**5 (µg/m³)**
PM_{10}	Gravimetric method	**IS 5182 (Part-XXIII)**	**5 (µg/m³)**
Sulphur Dioxide	Improved West and Gaeke	**IS-5182 (Part-II)**	**5 (µg/m³)**
Nitrogen Dioxide	Modified Jacob & Hochheiser	**IS-5182 (Part-VI)**	**6 (µg/m³)**

Water Quality monitoring

Water quality monitoring involves periodical assessment of quality of surface water and the ground water near the mining project.

- Surface water samples will be analyzed for all the parameters as per EPA, 1986
- Ground water samples will be analyzed for all the parameters as per IS- 10500.

Soil Quality monitoring

The soil quality monitoring is carried out to assess the soil characteristic. The soil quality will be analyzed as per CPCB norms.

Noise Level Monitoring

Noise level monitoring will be done for achieving the following objectives:

a) To compare sound levels with the values specified in noise regulations
b) To determine the need and extent of noise control of various noise generating sources

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 at the nearest village for studying the impact due to higher noise levels for taking necessary control measures at the source.

Socio-economic Survey

Socio economic condition will be monitored to assess the demographic particulars of the area including the impacts on the social & economical condition on the residents nearby.

Plantation monitoring programme

Plantation monitoring will be done to ensure survival & growth rate of plantations.

6.3 MONITORING SCHEDULE

The schedule has been shown below for the parameters proposed for monitoring.

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a week in each season except monsoon
2	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation monitoring	Once in a season

6.4 MONITORING SCHEDULE - IMPLEMENTATION

An implementation programme has been prepared as it serves no purpose if it is not implemented in letter and spirit.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas:

a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

b) Collection of soil samples at strategic locations once every two years and analysis thereof with regard to deleterious constituents, if any.

c) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells and to assess if mining has got any impact on it or not.

d) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done twice a year for first two years and thereafter once a year.

e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

An Environmental Management Cell (EMC) is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet periodically to assess the progress and analyze the data collected during the month.

6.5 BUDGET ALLOCATION FOR MONITORING

The EMC will be responsible to carry on the monitoring. Budget allotment has also been proposed for the same:

S. No.	Description	Cost to be incurred (in lakhs/annum)
1	Air Quality	0.5
2	Water Quality (Surface & Groundwater)	0.5
3	Soil Quality	0.3
4	Noise Level	0.3
5	Socio-economic Condition	0.4
6	Plantation	0.2
TOTAL		**2.2**

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site to furnish the data

to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions.

The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

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CHAPTER-VII

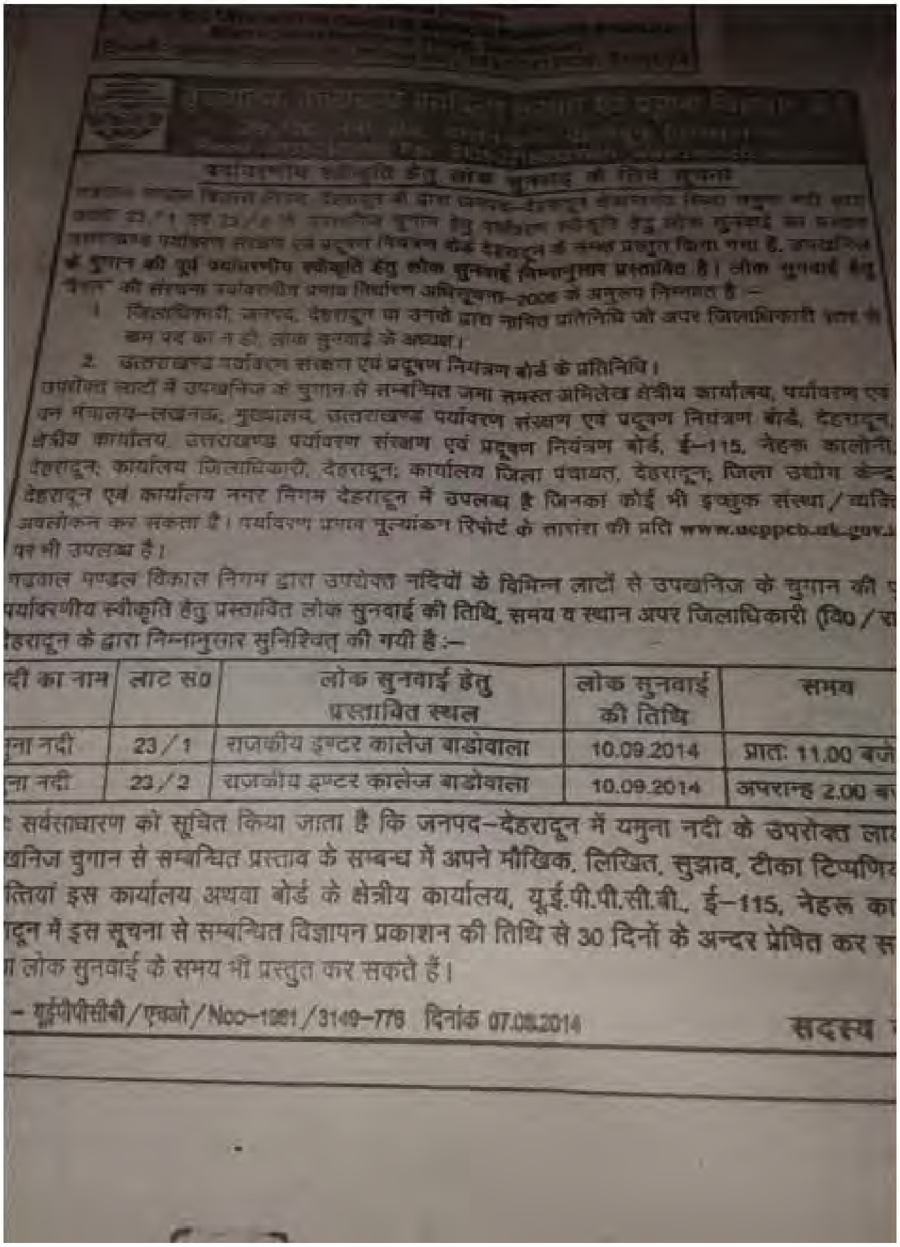
ADDITIONAL STUDIES

INDEX

7.0 PUBLIC CONSULTATION

The public consultation for this project was held on 10th September, 2014. The Public hearing Notice is shown below which was published on 14-05-2014 in the regional newspapers, Sahara & Hindustan Times.

The records of the proceedings are attached at **Annexure XI (A)** and the action plan along with budget allocation is attached as **Annexure XI (B).**



7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

RISK is to expose someone or something to danger, harm or loss. The different steps of risk assessment procedure are as given below:

Step I: Hazard Identification

The purpose of hazard identification is to identify and develop a list of hazards for each job in the organization that are reasonably likely to expose people to injury, illness or disease if not effectively controlled. Workers can then be informed of these hazards and controls put in place to protect workers prior to them being exposed to the actual hazard.

Step II: Risk Assessment

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures.

Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

Step III: Risk Control

Risk control is the process used to identify, develop, implement and continually review all practicable measures for eliminating or reducing the likelihood of an injury, illness or diseases in the workplace.

Step IV: Implementation of risk controls

All hazards that have been assessed should be dealt in order of priority in one or more of the following hierarchy of controls

The most effective methods of control are:

i. Elimination of hazards
ii. Substitute something safer
iii. Use engineering/design controls
iv. Use administrative controls such as safe work procedures
v. Protect the workers i.e. by ensuring competence through supervision and training, etc.

Each measure must have a designated person assigned for the implementation of controls. This ensures that all required safety measures will be completed.

Step V: Monitor and Review

Hazard identification, risk assessment and control are an on-going process. Therefore regularly review the effectiveness of your hazard assessment and control measures. Make sure that you undertake a hazard and risk assessment when there is change to the workplace including when work systems, tools, machinery or equipment changes. Provide additional supervision when the new employees with reduced skill levels or knowledge are introduced to the workplace.

A) RISK ANALYSIS

The risk assessment portion of the process involves three levels of site evaluation:

a) Initial Site Evaluation,
b) Detailed Site Evaluation,
c) Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions

- The level of the travelling public's exposure to those conditions. The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups. The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

Risk analysis is done for:

- Forecasting any unwanted situation
- Estimating damage potential of such situation
- Decision making to control such situation
- Evaluating effectiveness of control measures

Table 7.1 (i) Risk Likelihood Table for Guidance

Step 1: Assess the Likelihood				**Step 2: Assess the Consequences**		
L1	Happens every time we operate	Almost Certain	Common or repeating occurrence	**C1**	Fatality	Catastrophic
L2	Happens regularly (often)	Likely	Known to have occurred 'has happened'	**C2**	Permanent disability	Major
L3	Has happened (occasionally)	Possible	Could occur or 'heard of it happening'	**C3**	Medical/hospital or lost time	Moderate
L4	Happens irregularly (almost never)	Unlikely	Not likely to occur	**C4**	First aid or no lost time	Minor
L5	Improbable (never)	Rare	Practically impossible	**C5**	No injury	Insignificant

A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence [Table 7.1 (ii)]

Table7. 1 (ii) Qualitative Risk Assessment

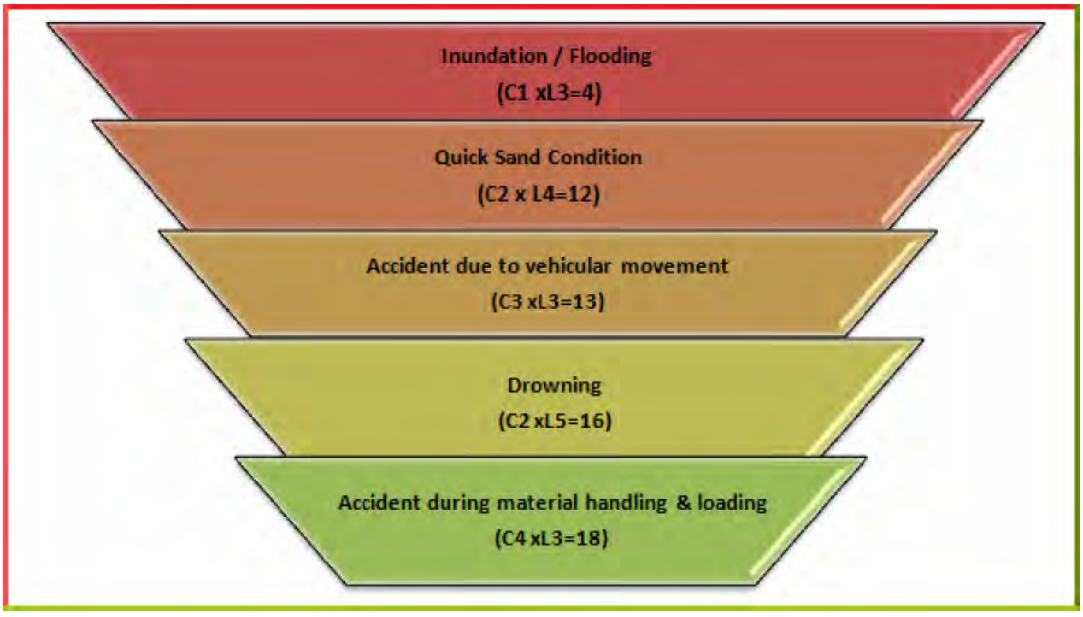
Risk Rank LikelihoodxConsequence	L1 Almost certain	L2 Likely	L3 Possible	L4 Unlikely	L5 Rare
C1 Catastrophic	1	2	4	7	11
C2 Major	3	5	8	12	16
C3 Moderate	6	9	13	17	20

RISK RATING:

HIGH RISK 1-6	MEDIUM RISK 7-15	LOW RISK 16-25

C4 Minor	10	14	18	21	23
C5 Insignificant	15	19	22	24	25

7.2 RISK ASSESSMENT



There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from river bed. The key risk (hazard x probability) event **rating** associated with sand bed mining and to assess its consequences of such events occurring and the likelihood based on above Table-2 are as:-

The Risk rating of such hazards is as follows:

7.2.1 INUNDATION/FLOODING

The risk rating assigned to this activity is assigned as "4" i.e., it is possible and will have catastrophic with major consequences, if work started without assessment of the river bed condition especially during monsoon season.

Inundation or flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

Measures to prevent consequences of Inundation/Flooding

Inundation of flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

1. During monsoon months and heavy rains the mining operations are ceased.
2. There should be mechanism/warning system of heavy rains and discharges from the upstream dams.

7.2.2 Quick Sand Condition

The risk rating assigned to this activity is assigned as "12" i.e., it is an unlikely event with major consequences as frequency of this risk is less likely to occur.

Two things may create the conditions to form quicksand. Underground water may seep-up and saturate the sand, thereby reducing the friction between the sand grains and giving the sand a liquid nature. Or, sand or another soil may be sifted by the force of an earthquake so that friction is lessened and the earth becomes unsteady.

This creates danger condition to the trucks plying near the river bed and banks for transportation of minerals.

Measures to Prevent Quick Sand Condition

1. The only way to avoid quick sand condition is by avoiding mineral lifting below water table.
2. Mining will be done in layers rather than going for maximum depth at one time.

7.2.3 ACCIDENT DUE TO VEHICULAR MOVEMENT

The risk rating assigned to this activity is assigned as "13" i.e., it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, bodily injury. The possibilities of road accidents are due to reckless or untrained driver or overloading of trucks or in case pathway is not compacted suitably, etc.

Measures to Prevent Accidents during Transportation

1. All transportation within the main working should be carried out directly under the supervision and control of the management.
2. The Vehicles will be maintained/repaired and checked thoroughly by the competent person.
3. A statutory provision of constant education, training etc. will go a long way in reducing the incidents of such accidents.
4. Overloading will not be permitted and will be covered with tarpaulin.
5. The maximum permissible speed limit will be ensured.
6. The truck drivers will have valid driving license.

7.2.4 DROWNING

The risk rating assigned to this activity is assigned as "16" i.e., it is a rare accident but will have major consequences, if occurred. This may occur due to flash floods etc due to which the workers at the site may get seriously injured or drowned.

Measure to Prevent Drowning

1. The mining will be done under strict supervision and only in the dry part of the river.
2. Mining will be completely stopped in monsoon season to avoid such accidents.
3. Deep water areas will be identified and "No Go Zones" will be clearly marked and made aware to the mine workers.

7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING

The risk rating assigned to this activity is assigned as "18" i.e. it is possible event with minor consequences", as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, abrasion, etc. may be due to river bank collapse, over thrown boulders/pebbles, injuries due to carelessness use of hand tools, etc.

Measures to Prevent Accidents during material handling & loading

1. The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
2. The loading should be done from one side of the truck only to avoid over throw of materials.
3. The workers should be provided with gloves and safety shoes during loading.

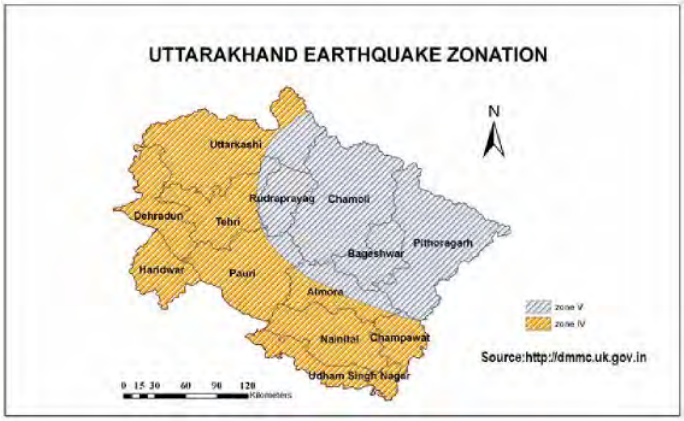
All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered **As Low As Reasonably Practicable** (**ALARP**) conditions which are adequately safe and healthy

7.3 DISASTERS & ITS MANAGEMENT

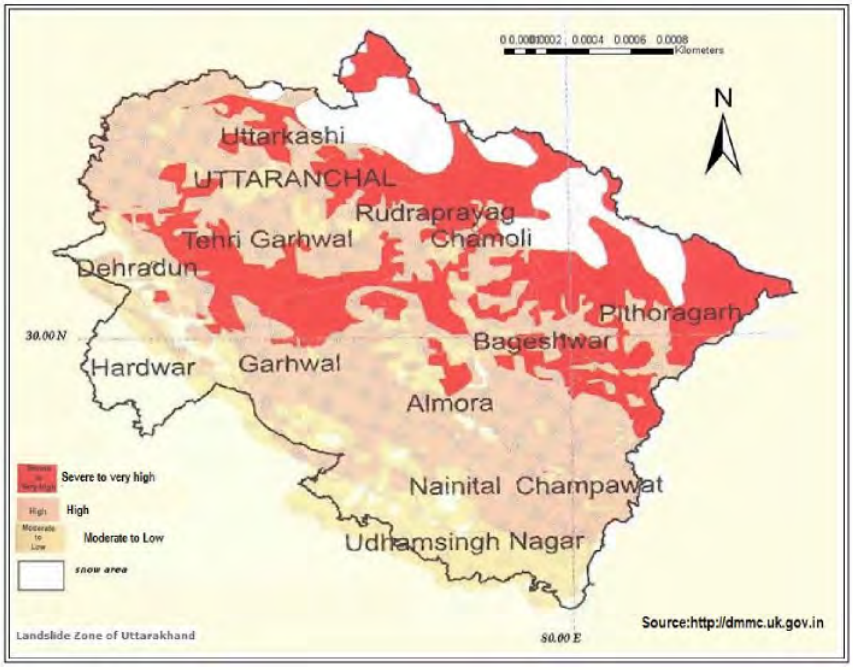
7.3.1 Anticipated Disasters

1. **Floods**: The area is not highly prone to floods but however cloudbursts may cause floods & flashflood near the proposed site. Precautionary measures will be taken and in disaster management, it will be considered to avoid the impending effects on the workers at the site if the disaster happens to occur.

2. **Earth Quake:** The lease area falls in seismic zone IV which is prone to earthquakes.



3. **Land slide:** The area lies in low landslide zone as per the mapping shown here.



7.3.2 Disaster Management

At present Disaster Mitigation & Management Centre is working as autonomous institute under aegis of Department of Disaster Management Government of Uttarakhand and Disaster Mitigation and Management Centre(DMMC)is the apex center in the field of Disaster Mitigation & Management in Uttarakhand, to protection of the community and the environment from the over whelming obliteration caused by disasters. (source: dmmc.uk.giv.in)

- ✓ District Level Cell and State Level Cell are to take timely precautionary measures to avoid effects of impending disasters.
- ✓ The State Level Cell will be in continuous touch with State Govt. to pass on message like heavy rainfall etc. as received from IMD and take precautionary action to prevent any consequential disaster.
- ✓ A Nodal Officer at State Level Cell will be made in charge for the timely dissemination of the information & monitoring to the District Level Cells.
- ✓ "Disaster Warning System" as developed will be strictly implemented. ✓ Identification of nearby hospitals with route & contact number for emergency assistance.
- ✓ Evacuation plan for the workers at site including contract labours will be developed in nearby shelters.
- ✓ "Emergency Helpline Number" will be displayed at all levels.
- ✓ Disaster Management Plan prepared by The State Disaster Management Authority Uttarakhand will be followed and the contact numbers of the person responsible who will execute the work during disaster is attached as **Annexure XV**.

7.4 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES

INTRODUCTION

Socio-Economic Impact Assessment (SEIA) refers to systematic analysis of various social and economic characteristics of human being living in a given geographical area during a given period. The geographical area is often called Study Area or Impact Area. SEIA is carried out separately but

concurrently with Environment Impact (EI). The study area consists of core area where the project is located and a buffer area encircling the project area with a radius of 10 kilometers from the periphery of the core area. For every new project or existing project under expansion or tied for modernization or change in product mix, Socio-economic Impact Assessment is mandatory. The Socio-economic impact assessment focuses the effect of the project on social and economic well-being of the community. The impact may be direct or indirect. Further, the impact may be positive or negative.

OBJECTIVES OF SEIA

The prime objective of the current study is to assess the impact of the proposed Sand, *Bajri* & Boulder mining Project on socio-economic characteristics of people living in the neighborhoods. Further, it is to be established whether the impending impact would be direct or indirect. Furthermore, it is to be examined whether the said impact would be positive or negative. Lastly, it is to be comprehended if the impact is positive how long it would sustain or if it is negative how soon the same could be eased.

SCOPE

The Scope of the study is as follows:

a) To collect baseline data of the study area
b) To comprehend socio-economic status of the people living in the study area.
c) To assess probable impact of the project on social and economic aspects in the study area.
d) To measure the impact of the project on Quality of life of the people living in the study area.
e) To ensure sustainability of positive impact.
f) To suggest mitigation measures and agency responsible for taking action in case of adverse impact.

SOCIO-ECONOMIC IMPACT OF THE PROJECT

Impact on Demographic Composition

The proposed *Project* will hardly make any difference in the demographic composition of the study area as the additional employment it envisages to create will be met locally to the maximum extent. Hence, the chances of in-migration of people from outside the study area are remote. Accordingly, there will be no variation in the total population of the study area including that of sex ratio, when the mine starts operating

Employment Opportunities

The proposed *Project* will provide employment to local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that 158 people will get direct employment in this mining project for a period of nine months in a year. Besides the above the project is expected to generate indirect employment to the extent of 40 persons in the informal sector. It is a positive impact of the project since it is providing employment opportunities to the local people. The project will not affect the vulnerable groups of people.

Increased Supply of minerals in the market

Sand and *bajri* has many uses. Mixed with cement and lime it is used in masonry construction. It is a critical component of concrete mixture. Both Government departments and private developers have taken up construction of roads, bridges and buildings in a big way. Hence, the demand for sand, *bajri* and boulder after crushing is ever increasing with the growth of the infrastructure development in our country. The requirement for the building materials is always high and there is already an acute shortage of sand in the market and the construction industry is the main sufferer. With the commencement of the proposed mining project the supply of minerals will increase and the gap between demand and supply will decrease to some extent, if not fully.

Impact on Agriculture

The proposed activity is to take place in the bed of the River Yamuna. There will be no negative impact on agriculture as no cultivation is taking place on the proposed mining area. Since, scientific mining will be adopted in the proposed mining project the area will not face flood due to mining, which destroy standing crops and land & property. Removal of obstruction to river flow by mining will also channelize the river away from banks and flood intensity will be reduced. This is a positive impact of the proposed mining project.

Impact on Road Development

Movement of trucks and other vehicles to and fro the mining site is expected to increase, when mining will start. The existing roads connecting the quarry with the national highway are connected by metalled and unmetalled roads. Hence, there is need for road maintenance and repairing regularly in the mining area. Further, there are risks of accidents during loading of extracted minerals into trucks and transportation to markets for sells. However, accidents can be avoided by taking due care and precautions.

Income to Government

The proposed mining activity will benefit the State in the form of royalty, dead rent, fees and earnings from taxes.

Impact on Law & Order

As most of the workers to be employed in the proposed mining project are local residents no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day¨s work. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area. However, to meet any untoward incident one police post shall be set up close to the mining site.

Impact on Health

There are no chances of occurring diseases, due to manual mining of sand, *bajri* and boulder. Sand is non-toxic. However, sand mining

activities require precautions since it create respiratory problems among mine workers. Excessive inhalation of sand is a serious health concern. To avoid respiratory problem from sand necessary protection shall be taken.

Few safety measures are outlined below:

a) ***Safe Working Environment***: The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.

b) Provision of First Aid: The first aid treatment reflects the hazards associated with the mining of *Sand, Bajri & Boulder*. The first-aiders will be well trained in handling patients working in the above Mining Project.

c) Regular Health Examination For all mine workers regular health examination will be made compulsory. It will cover treatment of serious back injury; existing asthma or respiratory diseases, existing skin diseases, lung function test (pre and post ventolin), Audiograms, Chest X- ray etc.

d) No work for Temporal Disabilities The workers having temporary disability will be asked to stop doing the job till he/she recovers from disabilities.

e) Health Education Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.

f) Tie-up with the Nearest Hospital for Medical Assistance To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be made to reserve few beds in the above hospitals for the workers of the mining project. This will ensure timely medical aid to the affected persons.

g) Supply of Mask and Gloves The workers in the *Sand, Bajri & Boulder* mining project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.

h) Administration of Anti-venom Injections Provision of Anti-venom therapy will be made available for administration to the workers in case of snake, spider and insect bites, while working in the mine.

i) Special Telephone Number A special telephone number will be made available to the workers in case of emergency so that they can dial the same formedical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.

j) Special Group Insurance Scheme All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

CONCLUSION

The commissioning of Sand, *Bajri* & Boulder Mining Project on River Yamuna Lot No. 23/1 near village Dumate, Tehsil: Vikasnagar & District: Dehradun will provide employment to local people who are in search of the same. The granting of environment clearance to M/S Garhwal Mandal Vikas Nigam Ltd will make mining of Sand, *Bajri* & Boulder legally valid and it will generate revenue for the state. With the implementation of the Sand, *Bajri* & Boulder Mining Project the occupational pattern of the people in the area will change making more people engaged in mining, industrial and business activities rather in agriculture only. It is expected that mineral resource, employment and other community facilities will improve to a great extent with the opening of the Sand, *Bajri* & Boulder Mining Project and associated industrial and business activities.

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CHAPTER-VIII
PROJECT BENEFITS
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8.0 GENERAL

The execution of the project, bring overall improvement in the locality, neighborhood and the State by bringing industry, roads, employment and hence improving living standard and economic growth.

8.1 PHYSICAL BENIFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.

b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.

c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.

a. **Creation of community assets** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc., as a part of corporate social responsibility.

8.2 SOCIAL BENEFITS

a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.

b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.

c) **Increased Health related activities**: Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs)
1	Assistance to set up a temporary health center during the lease tenure.	**0.6**
2	Provide free health checkups & medicines to the nearby villagers of the project site.	**0.4**
3	Awareness campaigns regarding health issues in the nearby villages.	**0.5**
4	Health checkups & medicines to workers	**3.16**
Total		**4.66**

d) Educational attainments: Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.

e) Strengthening of existing community facilities through the Community Development Programme.

8.3 ENVIRONMENTAL BENEFITS

a. Controlling river channel
b. Protecting of river banks
c. Reducing submergence of adjoining agricultural lands due to flooding.
d. Reducing aggradation of river level.
e. Protection of crops being cultivated along the river bank.
f. A check on illegal mining activity.

8.4 CORPORATE SOCIAL RESPONSIBILITY

5% (**Rs. 85,000**) of the project cost will be allotted for the Corporate Social Responsibility. The following has been proposed considering the needs & demand of the people:

Education	**Social Cause**	**Health care & Family welfare**	**Environment**
Distribution of school bags, books and uniform to the children in nearby villages	Common vocational training centre shall be set up.	Free medical camps for the villagers	Awareness programs for the workers to sensitize them about the importance of biological environment
Scholarship for girl candidates	Distribution of blankets to the needy people	Awareness programs will be arranged for healthcare	Distribution of free saplings to encourage villagers for plantation
Rs.40,000	Rs.20,000	Rs.15,000	Rs.10,000

In addition to this, an amount equal to 2% of the auction money will be allotted for Corporate Social Responsibility. The money will be distributed among the activities as per the need of the villagers in consultation with village sarpanch/ panchayat.

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CHAPTER-IX

ENVIRONMENTAL COST BENEFIT ANALYSIS

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9.0 PROJECT COST

After making exhaustive study, it is considered desirable that the mining project may be implemented. Project cost for the proposed Sand, Bajri and Boulder mining namely Lot No. 23/1 over an area of 30.035 Ha. falling in Village- Dumate, Tehsil- Vikasnagar, District-Dehradun (Uttarakhand) is Rs. 17,15,000.

Table 9.1: Project Cost and Benefit

Major Heads	**Total**
Production Capacity	2,80,000 Tonne Per Annum
Production Cost of Mineral	Rs 195/- Per Ton
Sale Value of Mineral	Rs 202/- Per Ton
Profit	Rs.7.00 per Ton
Estimated Profit per Annum	19,60,000/- Per Annum approx.

9.1 ENVIRONMENT COST ANALYSIS AND PROJECT IMPLEMENTATION

The Environment cost for this proposed mining includes Environmental Management Plan, Environmental and Social Responsibility, Occupational Health and Safety which is likely to come Rs. 8.26 Lakhs per annum. The detailed cost for Environmental Expenses is given below in the Table**.**

Table 9.2: Project Cost and Benefit

S. No.	**Major Heads**	**Expenses per annum(Lakhs)**
1	Environmental Management Plan	2.75
2	Environmental and Social Responsibility	0.85
3	Occupational Health and Safety	4.66
	Total	8.26

The estimated capital cost and financial viability of the present scheme has been worked out on the assumption that the above scheme shall be completed after five years i.e. end of lease period.

From the above financial analysis, it is clear that this stone mining project is financial and technically viable. The estimated profit will be 19,60,000 - 8, 26,000 = 11,34,000 per annum.

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CHAPTER-X

ENVIRONMENTAL MANAGEMENT PLAN

INDEX

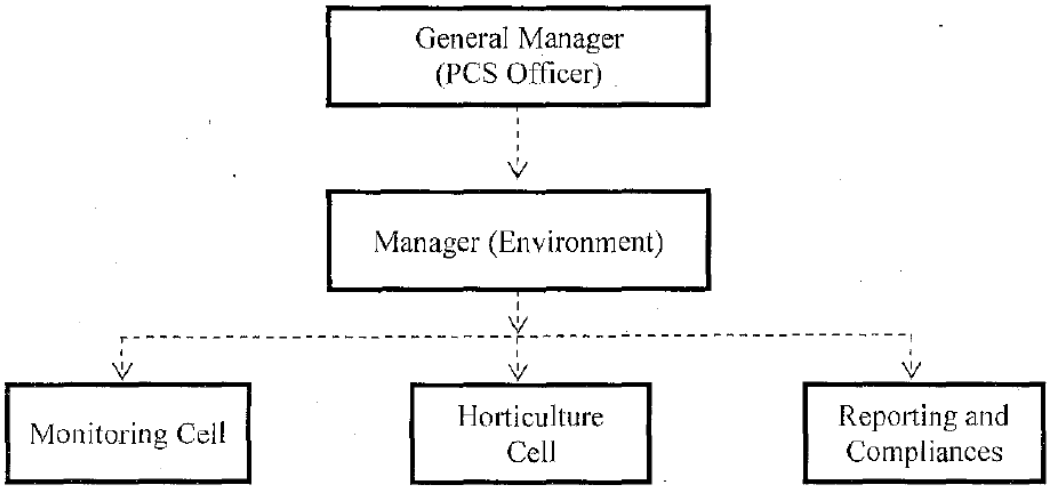
10.0 INTRODUCTION

To mitigate the adverse impact which is likely to be caused due to the mining operation and overall scientific development of local habitat, Environmental Management Plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigative measures have been discussed in **Chapter IV** (Page no.84-96) of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

The mitigation measures which reduce the impact have already been identified earlier in this report in **Chapter IV** (Page no.84-96). To minimize the adverse impact, certain additional EMP measures are enumerated below for implementation.

10.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

It is imperative to establish an effective organization to implement, maintain, monitor and control the environmental management system. A separate Environmental Management Cell (EMC) will be formed to look after the environment related matter of the mine. The structure of EMC is as follows:



The EMC will perform the following activities:

- EMC will oversee that environmental control measures are implemented as per the plan.
- EMC will ensure ambient Field monitoring like air monitoring, meteorological monitoring and noise monitoring in coordination with outside agencies.
- Coordinating the environment related activities within the organization as well as with outside agencies.
- Reporting the status report to the statutory authorities.
- Systematically document and record keeping w.r.t. environmental issues.
- Plantation and their maintenance
- Collection statistics of health of workers and population of surrounding villages.
- Environmental compliance to the regulatory authorities.
- Communication with the concerned department on the environmental issue.
- Monitoring the progress of implementation of environmental management programme.

10.2 ENVIRONMENTAL MANAGEMENT PLAN (EMP) AND IMPLEMEMNTATION

Environmental Management Plan involves functions that determines the objectives, adoption of appropriate mitigation measures, protection of ecosystems, enhancement of the quality of life for those affected, and minimization of environmental costs (Barrow, 1999).

Environmental Management Plan (EMP) has been formulated with an objective to mitigate the adverse impacts of any proposed project. This includes an environmental policy on protection of environment and public safety.

1. Extraction will be done from river bed leaving safety zone from bank & stream:

- Mining will be done in scientific and systematic manner.
- Mineral will be mined out leaving sufficient safety barrier of 15 percent of width of the river for bank stability.
- A maximum of 10m from the stream will also be left to avoid interface of mining activity with surface water.

2. The maximum working depth will remain above ground water table of the area:

Excavation above the water table will be done i.e. up to a maximum depth of 1 .5m from the surface, which will provide a depression that would get filled in with sediments gradually in the monsoons. Further it will not disturb the ground water quality of the area as there will be no intersection with the water table.

3. Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts:

- Provision of dust filters / mask to workers working at dust prone and affected areas.
- Conducting periodical medical checkup of all workers for occupation related health problems.
- Awareness program for workers to make them aware of way of working and various precautions to be taken while at work.

4. Ensuring wildlife protection & arranging awareness campaigns for the same.

- No wildlife will be disturbed or chased away
- To avoid disturbance to the movement of the wild animals through the transport route near the project area, sign boards will be placed detailing the dangers caused and the location of corridors.

5. Minimize activities that release fine sediment to the river:

No washing, crushing, screening, stockpiling, or plant operations will be done at or near the streams. These and similar activities have the potential to release fine sediments into the stream, making aquatic habitat conditions harmful to local aquatic species.

6. Check on traffic load due to transportation & maintenance of evacuation route:

- To the extent possible, evacuation route will not be through residential areas so as to reduce the effect of dust emission and noise pollution from vehicular movement.
- Alternate evacuation route by using the existing roads will be proposed to avoid traffic congestion.
- A Monitoring Committee including Local Panchayat member may be established to control traffic on evacuation route.

7. Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:

- The haul road will be kept wide, leveled, compacted and water will be sprayed regularly to suppress fugitive dust.
- Evacuation routes will be repaired & maintained regularly.
- Utmost care will be taken to prevent spillage of minerals from the trucks by checking overloading and covering it by tarpaulin sheets
- It will be ensured that all transportation vehicles will carry a valid PUC certificate.

8. Establishment of reclamation program with plantation of local/native & fast growing species:

- Plantation will be done along the road sides / near civic amenities in consultation with the local authority/ Govt. bodies.
- It has also been proposed to plant along the river banks with plant species which will hold the soil and check on erosion of the banks. Eg. *Vetiveria zizanioides, Saccharum spontaneum, Pennisetum pupureum, etc.*

- For plantation purpose, native/local plant species are proposed along the road sides/civic amenities.

9. *Establishment of restoration plan during the closure of mine at the onset of monsoon season:*

- Restoration of banks will be done.
- Ramps & temporary rest shelters will be removed prior to the closure of mine.
- Restructuring/reconstruction of the natural bunds if damaged, so that over flow of water can be controlled and flooding can be avoided
- Maintenance of check dams & retention walls which will prevent erosion of banks during monsoon.

10. Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters:

Being a project on the river bed and though mining will not be done during monsoon, yet disaster may be caused due to earth quake, release of water from upstream dams or dam burst.

- District Level Cell and State Level Cell along with a nodal officer will be set up. The State Level Cell will be in continuous touch with State Govt. to pass on message so as to take precautionary action to prevent any consequential disaster.
- "Disaster Warning System" as developed will be strictly implemented.
- Identification of nearby hospitals with route & contact number for emergency assistance.
- Evacuation plan for the workers at site including contract labours will be developed in nearby shelters.
- "Emergency Helpline Number" will be displayed at all levels.

11. *Establishment of effective Monitoring Program monitored by Environment Management Cell:*

A monitoring program will be provided illustrating any impacts to river stability, riparian vegetation, ground & surface water, air, noise, soil quality and post project sedimentation studies by expert bodies. Monitoring schedule and budget allocation has been detailed **Chapter-V** (Page no.101-102).

The monitoring program will also assess & scrutinize the EMP proposed & its implementation by the Environmental Management Cell (EMC).

Other precautionary measures like no cooking, no uprooting or chopping of plants/trees, no throwing of wastes into the stream will also be checked upon by the EMC.

10.4 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMC is very essential for successful implementation of EMP. Costs will be both Capital and Recurring cost as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this.

Table 10.1 Cost of EMP

Sl. No	Description	Measures	Capital Cost (Rs. In lakhs)	Recurring Cost(in lakhs/annum)
1	Health Facilities	Medical Camps and Awareness program	2.23	4.46
2	Wildlife Protection	Importance of Wildlife(Awareness) • Sign boards, information boards	- 0.5	0.05 0.1

3	Mineral transportation and Handling	• Repairing and maintenance of Roads • Water Sprinkling	0.5 -	0.3 1.2
4	Restoration and Reclamation	• Plantation • Maintenance of Check dams /Retention wall • Restoration of banks	1.0 - -	0.5 0.5 0.3
Total			**4.23**	**7.41**

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CHAPTER-XI

EXECUTIVE SUMMARY

INDEX

11.0 INTRODUCTION

As per MoEF&CC, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project was categorized as **Category 'A'** project due to the presence of Interstate Boundary between Uttarakhand and Himachal Pradesh and also Doon Valley an eco-sensitive zone lies within the 10 km radius of the lease area

The project is being proposed by Garhwal Mandal Vikas Nigam (GMVN) Limited. The proponent has applied for environmental clearance in the name of River Yamuna Lot No. 23/1 Sand, Bajri & Boulder Mining Project from the bed of River Yamuna over an area of 30.035 ha.

The project proposal was submitted to Ministry of Environment, Forest and Climate Change, New Delhi for its appraisal. Based on which, presentation for Terms of Reference (TOR) was held during June 26th-28th, 2013. Based on the data provided and presentation done, the Ministry of Environment, Forest and Climate Change, New Delhi has issued the Terms of Reference vide letter No. J-11015/125/2013-IA.II (M) dated 16th September, 2013.

There are four other leases lies within the 500m radius of the proposed Sand, Bajri and Boulder Mining Project, District Dehradun, Uttarakhand and the cumulative area of all the five mines is 38.28 ha.

As per the EIA Notification dated 1st July, 2016, a cluster shall be formed when the distance between the peripheries of one lease is less than 500 meters from the periphery of other lease in a homogeneous mineral area which shall be applicable to the mine leases or quarry licenses granted on and after 9th September, 2013. (Ref: Clause (B) (i), Page No-4 in EIA Notification dated 1st July, 2016) or The leases not operative for three years or more and leases which have got environmental clearance as on 15th January, 2016 shall not be counted for calculating the area of cluster but shall be included in the Environment Management Plan and the Regional Environmental Management Plan." (Ref: Note

5, Page No-5 in EIA Notification dated 1st July, 2016)

Therefore as per the EIA Notification dated 15th January, 2016 and 1st July, 2016, the project still comes under A Category without cluster situation due to the presence of Doon Valley.

It has been proposed to mine around 2.80 lakh Tonnes per annum of minerals. The estimated project cost for the proposed project is Rs. 17.15 Lakhs.

The public hearing for the proposed project was done on 10.9.2014. The details of proceedings are attached **Annexure-XI-A & B.**

11.1 LOCATION

The proposed mining lease area falls in Survey of India Toposheet 53F14.

The lease area is located near village: Dumate, Tehsil: Vikasnagar & District: Dehradun, Uttarakhand.

The mine lease co-ordinates are listed below:

Coordinates	Latitude:	30°30'42.15"N to 30°30'40.55"N
	Longitude :	77°50'22.59"E to 77°51'10.91"E

11.2 MINING

This is an open-cast mining project. The operation will be entirely manual with use of hand tools like shovel, pan, sieves, pick axes, etc.

Mining will be done in layers, leaving a safety distance from the banks i.e. 15% of the width of the river will be left for bank stability from both the banks.

The deposit will be worked from the surface of the bed upto 1.5 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table. Mining will be done only during the day time and completely stopped during the monsoon season.

11.3 RESERVE (AVAILABLE QUANTUM) AND PRODUCTION (EXTRACTABLE QUANTUM)

The already existing quantity at the river bed in the lease area due to fresh depositions has been considered to be the quantum of mineral available (**Reserve**) which may be mined out. In order to calculate this quantity, the lease area has been considered with an ultimate depth of 1.5 meter from the surface (excluding the boulder available on the surface). For the reserve tonnage estimation, the reserve quantity is multiplied with the bulk density of 2 tonnes per cum (for mixed sand and *bajri*).

The reserve for the site has been estimated to 5, 40,778.48 tonnes.

Production: Approx. 2.8 lakh tonnes will be excavated annually. The amount of sand & *bajri* in the total extractable quantum is assumed to be around 80%, which is likely to be replenished due to sediment inflow, gradually during the monsoon seasons.

11.4 SITE FACILITIES AND UTILITIES

Water Supply

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total of 3.4 KLD water will be required for the proposed project.

Temporary Rest Shelter:

A temporary rest shelter will be provided for the workers near to the site for rest. In addition, First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any and Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

11.5 BASE LINE DATA

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Ecology and Biodiversity.

Table 11.1 Baseline Environmental Status

Attribute	Baseline status

Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM_{10} amongst all the 5 AQ monitoring stations were found to be 59.9 $\mu g/m^3$ at AQ3 and 87.6 $\mu g/m^3$ at AQ4, respectively. As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80 $\mu g/m^3$ for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the Five locations monitored.
Water Quality	The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by IS: 10500. From surface water analysis results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating their suitability for outdoor bathing.
Soil Quality	Samples collected from identified locations indicate the soil is Sandy loamy type which has low water retention potential .The pH value ranging from 7.14 to 7.78, which shows that the soil is alkaline in nature.
Ecology and Biodiversity	10 km buffer of lease area comprises of Doon Valley and some Reserve forests.

11.6 ENVIRONMENTAL MANAGEMENT PLAN (EMP) & ITS IMPLEMENTATION

- Extraction will be done from the river bed leaving safety zone from bank & stream.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the river.
- Check on traffic load due to transportation & maintenance of evacuation route.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

11.7 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Table for Cost of EMP

Sl. No	Description	Measures	Capital Cost (Rs. In lakhs)	Recurring Cost(in lakhs/annum)
1	Health Facilities	Medical Camps and Awareness program	2.23	4.46
2	Wildlife Protection	Importance of Wildlife(Awareness) • Sign boards, information boards	- 0.5	0.05 0.1
3	Mineral transportation and Handling	• Repairing and maintenance of Roads • Water Sprinkling	0.5 -	0.3 1.2
4	Restoration and Reclamation	• Plantation • Maintenance of Check dams /Retention wall • Restoration of banks	1.0 - -	0.5 0.5 0.3
Total			**4.23**	**7.41**

11.8 BENEFITS OF MINING

PHYSICAL BENEFITS: Road Transport, Market, Enhancement of green cover & Creation of community assets.

SOCIAL BENEFITS: Increase in Employment Potential, Contribution to the Exchequer, Increased Health related activities, Educational attainments & Strengthening of existing community facilities.

ENVIRONMENTAL BENEFITS:

a. Controlling river channel
b. Protecting of river banks
c. Reducing submergence of adjoining agricultural lands due to flooding.
d. Reducing aggradation of river level.
e. Protection of crops being cultivated along the river bank.
f. A check on illegal mining activity.

CORPORATE SOCIAL RESPONSIBILITY

2 to 5 percentage (0.85 lakh) of the project cost will be allotted for the Corporate Social Responsibility for activities related to education, social causes, healthcare & environmental.

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CHAPTER-XII

DISCLOSURE OF CONSULTANT ENGAGED

The EIA/EMP Report for **Mauza River Yamuna Lot No. 23/1 Sand, *Bajri* & Boulder Mining Project** has been prepared by Grass Roots Research & Creation India (P) Ltd.

Name of the Consultant	**Grass Roots Research & Creation India (P) Ltd.**	**ISO 9001: 2008 (QMS), 14001:2004 (EMS) & OHSAS 18001: 2007 Certified Co. Accredited by QCI/NABET.**
Address	**F:374- 375, Sector: 63, Noida, India**	

Name of the Laboratory	**GRC India Training and Analytical Laboratory**	**NABL Accredited Laboratory, Recognized by MoEF&CC under Environment (Protection) Act, 1986. A unit of GRC India (P) Ltd.**
Address	**F- 375, Sector: 63, Noida, India**	

The EIA/EMP report has been prepared under the guidance of the following Coordinator & Functional Area Experts:

EIA Coordinator	**Mr. K D Choudhury**
FAE- AP	Mr. K D Choudhury
FAE- NV	Mr. K D Choudhury
FAE- EB	Dr. P R Chaudhari
FAE- WP	Dr. P R Chaudhari
FAE- SE	Mr. Vineet Pandey
FAE- Soil	Dr. S. R. Maley
FAE- Geology	Dr. Tapan Mazumder
FAE- Hydrology	Dr. Tapan Mazumder
FAE- RH	Dr. Ravindra Kode
FAE- Land Use	Mr. P Radhakrishnamoorthy
FAE- SHW	Mr. Dhiraj Kr. Singh
FAE- AQM	Prof. B Padmanabha Murty

The following team was involved under the guidance of experts for preparation of the report:

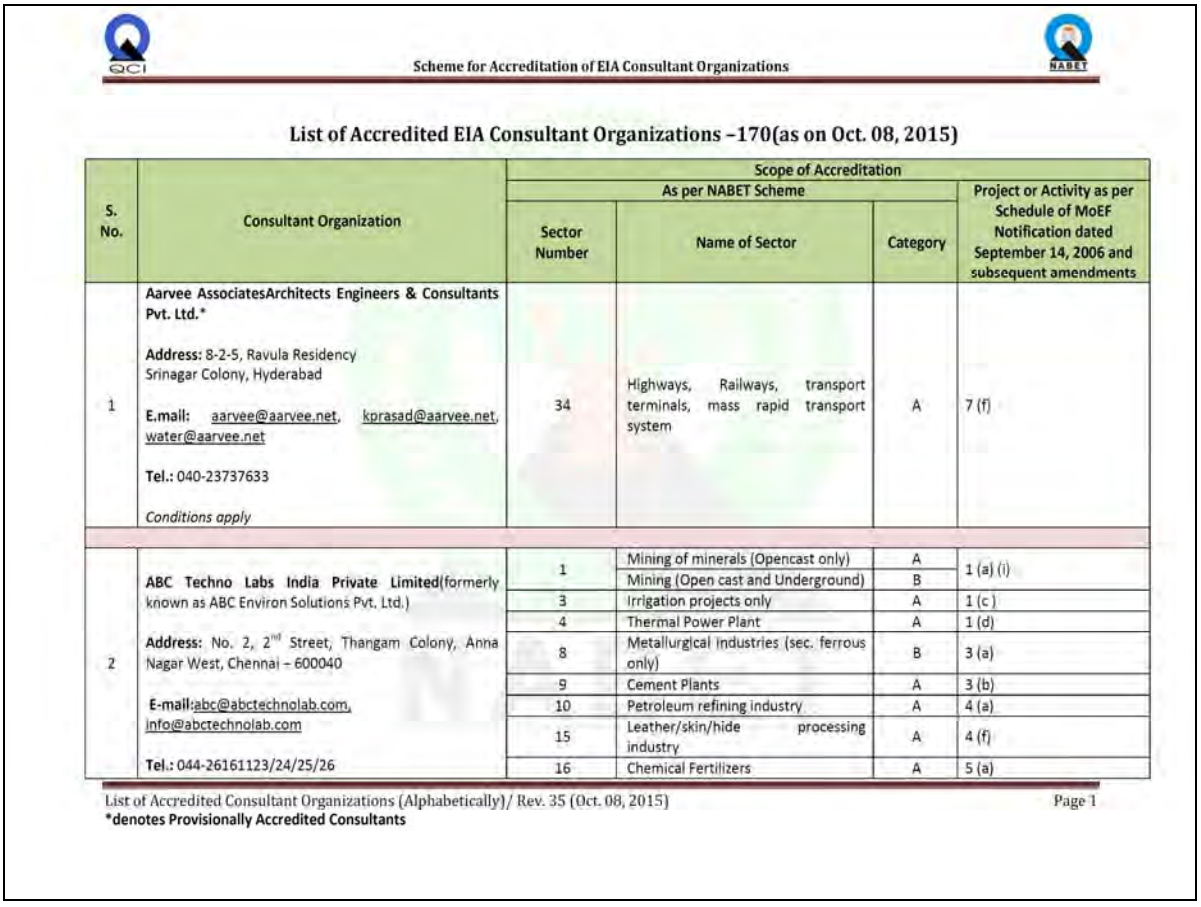
Personnel involved in Preparation of EIA/EMP report as Team Member	Mr. Shahbaz Malik (Project Associate)
	Mr. B.K. Jha

Accreditation from Quality Council of India, QCI NABET

Grass Roots Research & Creation India (P) Ltd. has got the Initial accreditation from QCI NABET and has undergone Surveillance Assessment as well. The result of continued accreditation is published on the QCI website as SAAC 69th and subsequent Minutes of Meeting in the year 2013-14.

As per the recently published QCI NABET 'List of Accredited Consultant Organizations/Rev. 35/ Oct. 08, 2015', listed in as accredited consultant, Category 'A' Sl. No. 76. The list of accredited consultants is published on QCI NABET and MoEF&CC websites as well.

For reference, a snapshot of the list where GRC India's name is listed is pasted below:



Scheme for Accreditation of EIA Consultant Organizations

List of Accredited EIA Consultant Organizations –170(as on Oct. 08, 2015)

S. No.	Consultant Organization	Scope of Accreditation			
		As per NABET Scheme			Project or Activity as per Schedule of MoEF Notification dated September 14, 2006 and subsequent amendments
		Sector Number	Name of Sector	Category	
1	**Aarvee AssociatesArchitects Engineers & Consultants Pvt. Ltd.*** **Address:** 8-2-5, Ravula Residency Srinagar Colony, Hyderabad **E.mail:** aarvee@aarvee.net, kprasad@aarvee.net, water@aarvee.net **Tel.:** 040-23737633 *Conditions apply*	34	Highways, Railways, transport terminals, mass rapid transport system	A	7 (f)
2	**ABC Techno Labs India Private Limited**(formerly known as ABC Environ Solutions Pvt. Ltd.) **Address:** No. 2, 2nd Street, Thangam Colony, Anna Nagar West, Chennai – 600040 **E-mail:**abc@abctechnolab.com, info@abctechnolab.com **Tel.:** 044-26161123/24/25/26	1	Mining of minerals (Opencast only)	A	1 (a) (i)
			Mining (Open cast and Underground)	B	
		3	Irrigation projects only	A	1 (c)
		4	Thermal Power Plant	A	1 (d)
		8	Metallurgical industries (sec. ferrous only)	B	3 (a)
		9	Cement Plants	A	3 (b)
		10	Petroleum refining industry	A	4 (a)
		15	Leather/skin/hide processing industry	A	4 (f)
		16	Chemical Fertilizers	A	5 (a)

List of Accredited Consultant Organizations (Alphabetically)/ Rev. 35 (Oct. 08, 2015) Page 1

*denotes Provisionally Accredited Consultants

Scheme for Accreditation of EIA Consultant Organizations

S. No.	Consultant Organization	Scope of Accreditation			
		As per NABET Scheme			Project or Activity as per Schedule of MoEF Notification dated September 14, 2006 and subsequent amendments
		Sector Number	Name of Sector	Category	
	Address: Plot no. A- 288, Road No. 16-Z, Thane Industrial Area, MIDC (Wagle Estate), Thane (West)-400604 **E-mail:**srihari.athavale@goldfinchengg.com; info@goldfinchengg.com **Tel.:** 022-25801529, 9821570673 *Conditions apply*	21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A	5 (f)
		36	Common effluent treatment plants (CETPs)	B	7 (h)
		38	Building and large construction projects including shopping malls, multiplexes, commercial complexes, housing estates, hospitals, institutions	B	8 (a)
76	**Grass Roots Research and Creation India (P) Ltd.** **Address:** F- 375, Sec – 63, Noida – 201301 **e. mail:** md@grc-india.com, info@grc-india.com **Tel.:** 0120 – 4044630, 4044660 09811554031, 09818184005 *Conditions apply*	1	Mining of minerals including Open cast/ Underground mining	A	1 (a) (i)
		3	River valley, hydel, Drainage and irrigation projects	A	1 (c)
		4	Thermal power plants	A	1 (d)
		6	Coal Washeries	A	2 (a)
		8	Metallurgical industries(ferrous and non-ferrous) - both primary & secondary	A	3 (a)
		31	Industrial estates/parks/ complexes/	B	7 (c)

List of Accredited Consultant Organizations (Alphabetically)/ Rev. 35 (Oct. 08, 2015) Page 62

***denotes Provisionally Accredited Consultants**

पिता रिटायर्ड प्रोफेसर श्रीराम ने कहा कि मसूरी में देश- श से सैलानी आते हैं, लेकिन बेहतर स्वास्थ्य सुविधाएं नहीं बताया कि बेटी का परिवार खनऊ में है, लिहाजा वह यहां हीं आ सकती। लेकिन, बेटा डिकल की पढ़ाई के बाद मसूरी में ही क्लीनिक खोल यहां बेहतर चिकित्सा सेवा देगा।

शिक्षा निदेशालयों, आर्म्ड फोर्सेज मेडिकल कॉलेज (एएफएमसी) और संबंधित संस्थानों व विश्वविद्यालय पर उपलब्ध होगा। *ब्यूरो*

संबंधित सामग्री पेज 11 पर भी

MADHYANCHAL VIDYUT VITARAN NIGAM LIMITED
4-A, GOKHALE MARG, LUCKNOW
226001, Phone: 2208737, Fax: 2208769 - CORRIGENDUM
Specification No. MEDC Plan/2013 which was scheduled on 30-05-2014 is hereby details given below. Date of offer : 16.06.2014, 12:00 for opening to technical and offer : 16.06.2014
Superintending Engineer
MVVNL 4-A, Gokhale Marg, 483, Date 06-06-2014, MV 0522-2208737 "SAVE NATIONAL INTEREST"

परीक्षा संपन्न

यूजी व्यवसायिक पाठ्यक्रमों में के बीच प्रवेश परीक्षाएं चार केंद्रों पर टर प्रो. डीएस नेगी ने बताया कि परीक्षा कराया था, जिनमें से 4519 छात्र परीक्षा और श्रीनगर परिसर के अलावा एमकेपी गई। 60 विषयों के लिए आयोजित इस क जारी कर दिया जाएगा। बताया जा रहा काफी कठिन होगा, क्योंकि सीटों की छात्रों की संख्या काफी है। *ब्यूरो*

हिन्दुस्तान पेट्रोलियम कॉर्पोरेशन लिमिटेड

(भारत सरकार का उपक्रम)

सूचना

एतद् द्वारा सूचित किया जाता है कि निम्नलिखित आरजीजीएलवी तथा आईएमभी जोकरानी के लिए डॉ दिनाक 12.06.2014 को लोनी एलपीजी बॉटलिंग प्लांट, गाव टीला शाहबाजपुर, पोस्ट लोनी, जिला गाजियाबाद, यू.पी. – 201102 में आयोजित किया जाएगा :–

स्थान	जिला	समय
गुलावठी	बुलन्दशहर	प्रात:10.00
नवाबगंज	बरेली	प्रात:11.30
केला खेरा	उधमसिंह नगर	दोप:12.30
टांडा मल्लू	नैनीताल	दोप:01.30
बारा–बरी, किसामा, गोदिया	उधमसिंह नगर	दोप:01.45
बिजौली	हरिद्वार	दोप:02.00
सौदान गौहरूदपुर	सम्भल	दोप:02.15
सिमरिया, खमरिया, आजमपुर, तिलमास, सिरोली अगवपुर, गौरा लोकनाथपुर, मुस्तकिल	बरेली	दोप:02.45

इस हेतु योग्य पाए गये आवेदकों से अनुरोध है कि वे किसी सरकारी विभाग द्वारा जारी किये गये एक फोटो पहचान पत्र के साथ व्यक्तिगत रूप से निर्दिष्ट तिथि, स्थान और समय पर उपरोक्तानुसार उपस्थित रहें।

''उपयोग न होने पर रेगुलेटर बन्द कर दें''

पत्रांक 134

सूचित किया जाता है कि कृषि संग्रह प्रक्रिया, तोलन आदि का कि कृषि वर्ष 2013-2014 के 2014-2015 के लिये लाईसें लाईसेंसधारी/व्यापारी अपना लाई कार्यालय में दिनांक 15.06.201
1. लाईसेंस प्रार्थना पत्र प्रपत्र 20
2. फर्म द्वारा कृशि वर्ष 2013-2
3. फर्म पर देय बकाया मण्डी शु
4. फर्म के गोदामों की स्थिति, चौ
5. फर्म स्वामी/साझीदार के वर्तम
6. आवेदक फर्म स्वामी/साझीदार
7. थोक व्यापारी, थोक व्यापारी ए हजार) तथा नवीनीकरण कराने अन्तर्गत राष्ट्रीय बचत पत्र के रू अनिवार्य होगा।
8. तुलाई एवं माप में प्रयुक्त हाने छाया प्रति संलग्न करनी अनिवार्य अतः लाईसेंसधारी/व्यापारी उपरो 30.06.2014 के बाद उपयुक्त करता पाया जाता है, तो उसके वि

(अनिल कुमार), सचिव
कृषि उत्पादन मण्डी समिति,

विवेकानन्द पर्वतीय कृषि अनुसंधान संस्थान

(भारतीय कृषि अनुसंधान परिषद्)
अल्मोड़ा – 263601 (उत्तराखण्ड)

प्रवेश साक्षात्कार (WALK-IN-INTERVIEW)

इस संस्थान में RKVY project में शोध सहायक (1 पद), वरिष्ठ शोधकर्ता (2 पद) तथा DUS project में वरिष्ठ शोधकर्ता (1 पद) के पूर्णतः अस्थाई एवं समय बद्ध (Time Bound) पदों को संविदा के आधार पर भरा जाना प्रस्तावित है। पात्र एवं इच्छुक अभ्यर्थी विवेकानन्द पर्वतीय कृषि अनुसंधान संस्थान (भा0कृ0अनु0प0), अल्मोड़ा में दिनांक 19.06.2014 को प्रातः 10:00 बजे चयन समिति के सम्मुख साक्षात्कार हेतु उपस्थित होवें।

उक्त पदों हेतु शैक्षिक योग्यताएं, परिलब्धियां, आयुसीमा व अन्य शर्तें संस्थान की वेबसाइट **www.vpkas.nic.in** में उपलब्ध है।

प्रशासनिक अधिकारी

मुख्यालय, उत्तराखण्ड पर्यावरण संरक्षण एवं प्रदूषण नियंत्रण बोर्ड

29/20, नेगी रोड, डालनवाला, देहरादून (उत्तराखण्ड)
Phone : 0135-2658086, Fax : 0135-2718092 Web : ueppcb.uk.gov.in

संशोधित ज्ञापन

सर्वसाधारण को सूचित किया जाता है कि गढ़वाल मण्डल विकास निगम देहरादून द्वारा विभिन्न नदियों के नीचे दिये गये लाटो में उपखनिज चुगान हेतु लोक सुनवाई की विज्ञप्ति प्रकाशित की गई थी। उक्त लोक सुनवाई की प्रस्तावित तिथियों में निम्न संशोधन किया जाता है।

क्र० सं०	नदी का नाम एवं लाट संख्या	पूर्व में प्रकाशित समाचार पत्र तथा तिथि	पूर्व में प्रस्तावित तिथि	संशोधित तिथि
1	यमुना नदी लाट 23/1, 23/2	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	16.06.2014	07.07.2014
2	यमुना नदी लाट 21/2, 21/3	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	17.06.2014	08.07.2014
3	यमुना नदी लाट 21/1, 23/3	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	18.06.2014	10.07.2014

पूर्व में प्रकाशित लोक सुनवाई स्थल एवं समय यथावत रहेगा।

पत्रांक – यूईपीपीसीबी/एचओ/Gen–345/1775–451 दिनांक 07.06.2014 सदस्य सचिव

JOINT ADMISSION COUNSELLING FOR B.TECH. ADMISSIONS (JAC-2014)

This Academic Year 2014-15, admissions for B.Tech Programme in Delhi Technological University (DTU), Indraprastha Institute of Information Technology (IIITD) and Indira Gandhi Delhi Technical University for Women (IGDTUW) established by Government of NCT of Delhi would be conducted through centralized counseling. This is the first announcement for the Admission to all B.Tech Programme offered by these Universities/ Institute. Prospective applicants may download the information brochure and fill single online application for DTU, IIITD and IGDTUW for Admission to B.Tech Programmes. The JAC-2014 www.jacdelhi.nic.inportal for Admission to B.Tech Programme will be activated around mid-June. The tentative dates are:-

1.	Opening of Registration, Fee submission and Choice filling.	01.07.2014	Tuesday
2.	Closing of Registration and Fee submission	10.07.2014	Thursday
3.	Closing of Choice filling	12.07.2014	Saturday

Joint Admission Committee -2014

राष्ट्रीय मुक्त

(मानव संसाधन विकास मंत्रा
ए–24–25, इंस्टीट्यूशनल एरिया
(सीबीएसई/सीआईएससीई के सम

परीक्ष

पाठ्यक्रम का नाम	माध्यमिक (कक्षा X)
प्रवेश तिथियाँ	31.
योग्यता मानदड़	31 जुलाई, 2014 क आठवीं उत्तीर्ण या स फॉर्म में दिए ग

अधिक जानकारी के लिए, एनआईओएस के निम्नलिखित नजदी

- इलाहाबाद (0532–2548154)
- बेंगलूरू (080–23464222)
- भोपाल (0755–2661842, 2660669)
- भुवनेश्वर (0674–2302688)
- चण्डीगढ़ (0172–2744915)
- चैन्नई (044–28442237)
- देहरादून (0135–2623929)
- दिल्ली (0120-2404914-15, 2404787)
- धर्मशाला (01892-222251)
- गाँधीनगर (079–23220410)
- गुवाहाटी
- हैदराबाद
- जयपुर
- कोच्ची
- कोलकाता
- पटना
- पुणे
- विशाखा
- रांची
- रायपुर

24x7 एनआईओएस ऑन लाइन प्रवेश

माध्यमिक (X) तथा उच्चतर माध्यमिक (XII) (स्ट्रीम - I)

विस्तृत विवरण, जैसे विषय, शुल्क, योग्यताएं, केन्द्रों के पते, विवरणिका तथा आवेदन फॉर्म (एलएससी) के टॉल फ्री नं. 1800-180-9393

- स्ट्रीम – II के अंतर्गत ऑनलाइन प्रवेश: असफल
- स्ट्रीम – III एवं IV के अंतर्गत ऑनलाइन प्रवेश: अ

तब परीक्षा प्रणाली के द्वारा परीक्षा देना चाहते है।

विश्व की सर्व

मध्यांचल विद्युत वितरण निगम लिमिटेड

प्रधान कार्यालय, 4–ए, गोखले मार्ग, लखनऊ, अल्पकालिक निविदा सूचना

अधोहस्ताक्षरी द्वारा निर्धारित समय में आपूर्ति में सक्षम प्रतिष्ठित निविदाकर्ताओं से निम्न सामग्री की आपूर्ति हेतु अल्पकालीन मुहरबन्द निविदायें आमंत्रित की जाती हैं। निविदाकर्ता द्वारा न्यूनतम 20 प्रतिशत प्रत्येक सामग्री की मात्रा हेतु प्रस्ताव देना होगा एवं उसी अनुपात में धरोहर धनराशि जमा करना होगा। निविदा विशिष्टि सं. मेडको/ 1050/2014, क्र.सं.-1- सामग्री का विवरण- 33 के.वी. लाइटेनिंग अरेस्टर, इकाई- नग- मात्रा- 450, धरोहर राशि (रु.)- 23,000.00, निविदा प्राप्त करने की अन्तिम तिथि एवं समय- 23-06-2014, 13.00 बजे, निविदा के प्रथम भाग खोलने की तिथि एवं समय- 23-06-2014, 15.00 बजे। निविदा विशिष्टि सं. मेडको/ 1051/2014, क्र.सं.-2- सामग्री का विवरण- 33 के.वी. कन्ट्रोल पैनल सिंगल फीडर, इकाई- नग- मात्रा- 70, धरोहर राशि (रु.)- 42,000.00, निविदा प्राप्त करने की अन्तिम तिथि एवं समय- 23-06-2014, 13.00 बजे, निविदा के प्रथम भाग खोलने की तिथि एवं समय- 23-06-2014, 15.30 बजे। समस्त निविदा शर्तें जैसे विशिष्टि की सामान्य शर्तों, तकनीकी विशिष्टि एवं अन्य अद्यतन संशोधन सहित मध्यांचल विद्युत वितरण निगम लि0/ उ0प्र0 पावर कारपोरेशन लि0 के एवं मानकों के अनुरूप होंगे। निविदा के खित अभिलेख जमा करने होंगेः- (क) की तिथि से पूर्व की पाँच वर्षों तक की ाइन रिपोर्ट, लैब टैस्ट रिपोर्ट जैसा लागू

8/6/14

होने देना है।

~~TOI~~ H.T-Delhi 8/6/14

PFC CONSULTING LTD.

(A wholly owned subsidiary of Power Finance Corporation Ltd.)
"Urjanidhi", First Floor, 1, Barakhamba Lane, Connaught Place, New Delhi - 110001

Empanelment of Consulting Organisations

PFC Consulting Limited (PFCCL) intends to empanel/re-empanel Consulting Organizations in various areas. Interested organizations may access website **www.pfcclindia.com** and look for requisite details under the head "Notices & Tenders". (Individuals need not apply against this notice). The last date of receipt of application is 1st July, 2014.

मुख्यालय, उत्तराखण्ड पर्यावरण संरक्षण एवं प्रदूषण नियंत्रण बोर्ड

29/20, नेमी रोड, डालनवाला, देहरादून (उत्तराखण्ड)
Phone : 0135-2658086, Fax : 0135-2718092 Web : ueppcb.uk.gov.in

संशोधित ज्ञापन

सर्वसाधारण को सूचित किया जाता है कि गढ़वाल मण्डल विकास निगम देहरादून द्वारा विभिन्न नदियों के नीचे दिये गये लाटो में उपखनिज चुगान हेतु लोक सुनवाई की विज्ञप्ति प्रकाशित की गई थी। उक्त लोक सुनवाई की प्रस्तावित तिथियों में निम्न संशोधन किया जाता है।

क्र० सं०	नदी का नाम एवं लाट संख्या	पूर्व में प्रकाशित समाचार पत्र तथा तिथि	पूर्व में प्रस्तावित तिथि	संशोधित तिथि
1	यमुना नदी लाट 23/1, 23/2	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	16.06.2014	07.07.2014
2	यमुना नदी लाट 21/2, 21/3	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	17.06.2014	08.07.2014
3	यमुना नदी लाट 21/1, 23/3	अमर उजाला/हिन्दुस्तान टाईम्स 14.05.2014	18.06.2014	10.07.2014

पूर्व में प्रकाशित लोक सुनवाई स्थल एवं समय यथावत रहेगा।

पत्रांक – यूईपीपीसीबी/एचओ/Gen–345/1775–451 दिनांक 07.06.2014 सदस्य सचिव

IRRIGATION & WATER RESOURCES DEPARTMENT HARYANA

EMERGENT TENDER NOTICE

Sr. No.	Name of Work	Estimated Amount	Last date of receipt of tender
1	Supply of material for erection & commissioning of 3 Cs./ 2 Cs. Electric & Diesel pumping sets.	4.50 Lacs	16/06/2014

For further detail visit website **www.hid.gov.in**

Sd/-
Executive Engineer,
W/S Mechanical Division,
Jhajjar.

19764

CHHATTISGARH STATE POWER GENERATION CO. LTD.

(A Govt.of Chhattisgarh Undertaking)
OFFICE OF THE SUPERINTENDING ENGINEER (Purchase & Works)
KTPS,KORBA (EAST) DIST : KORBA (C.G.)-495677 PHONE-/FAX-(07759)226278/ 226103

CORRIGENDUM NOTICE

The due date of opening of the following T-128/14 tender is revised from previously published notice as follows:

TENDER Specn No.	DESCRIPTION	Previous Due Date of opening	Revised Due Date of Opening
T-128/ 2014	Work contract for O&M of Dry Fly ash Handling system and HCSD system of KTPS, CSPGCL,Korba East	05.07.14	25.06.14

All other terms and conditions shall be as per previous published notice.

"SAVE ELECTRICITY"

SUPERINTENDING ENGINEER (P&W)
CSPGCL. KORBA EAST BANK

PSPCL Punjab State Power Corporation Limited

Regd. Off. : PSEB H.O., The Mall, Patiala-147001

BIDDING DOCUMENT FOR EXECUTION OF R-APDRP (PART-B) SCHEME ON TURNKEY BASIS IN BALANCE SIX (6) TOWNS OF STATE OF PUNJAB (SPECIFICATION NO. 38/ CE/RE & APDRP/2014-15)

Downloading of specification/Tender Documents from PSPCL website : Start Date : 06.06.2014 Closing Date : 07.07.2014 up to 5:00 PM

TARIFF BASED COMPETITIVE BIDDING FOR PURCHASE OF POWER
REQUEST FOR QUALIFICATION (RFQ) NOTIFICATION

MP Power Management Company Limited
Invitation from Developers/Generators for supply of power on long-term basis

No. 07-11/IPC/Case-1/721 JBP, Dtd. 7.6.201

MPPMCL invites proposals from Developers/Generators fo supply of 400 MW power for coal based projects for 25 years. The Developer shall have to commence supply from December, 2015. RFQ document and their details are available on www.mppmcl.com. Sale of RFQ document will start from 08.06.2014 and submission of response to RFQ is on 24.07.2014.

General Manager (IPC)

राष्ट्रीय प्रौद्योगिकी संस्थ
हमीरपुर [हि.प्र] 17700
National Institute of Techno
Hamirpur [H.P.] 177005

[Under Govt. of India, Ministry of HRD, New De

TENDER NOTICE NO. SPC/07/2014

Sealed Tenders are invited for the purchase of equipmer the departments of Mechanical Engg./Civil Engg. & T CORE (EED) Centre of this institute. Interested parties submit their Technical & Financial Bids separately in a se envelope before **5.00 PM on 30.06.2014** to Faculty Incha (Purchase), Store Purchase Cell. For detailed specificati terms & conditions, please visit our website **www.nith.ac.**

S
REGISTR

HEALTH DEPARTMENT, HARYANA
Swasthya Bhawan
Sector-6, Panchkula

TENDER NOTICE

Tender No. NIT/ HEALTH/PPP/1 Date: 06.06.2014

Corrigendum and Addendum Notice for Development, Operation and Maintenance of Radiology Imaging Diagnostic Centres in Selected District Hospitals and Government Medical College of Haryana on Pubic Private Partnership Basis.

Health Department, Govt. of Haryana, has decided to provide Radiological Services (CT Scan and MRI in Selected District Hospitals and Government Medical College of Haryana on Public Private Partnership Basis. The RFP Document has already been published in various newspapers and can also be downloaded from **www.haryanahealth.nic.in, www.hshrc.org** and **www.nrhmharyana.org** website.

The pre bid for this project was held on 08.05.2014 at 02.30 p.m. at Conference hall, 1st Floor, State Institute of Health and Family Welfare, Sector-6 Panchkula, General Hospital Panchkula Campus.

In Response to the pre bid meeting and queries received, the corrigendum and addendum to the RFP has been released and is available on **www.haryanahealth.nic.in, www.hshrc.org** and **www.nrhmharyana.org** website.

Sd/-
Director General Health Services, Haryana
Sector-6, Panchkula

19779

राजस्थान आवासन मण्डल

क्रमांक : अति.मु.अ./राआम/जोधपुर/2014-15/379 दिनांक : 06.06.2

निविदा सूचना संख्या 03/2014-15

राजस्थान आवासन मण्डल की ओर से आवासीय योजना, विवेक विहार योजना, कुटी भगतासनी फेज द्वितीय जोधपुर में विभिन्न "ए कार्यों के लिए उपयुक्त श्रेणी में राजस्थान आवासन मण्डल में पंजीकृत संवेदकों एवं अन्य विभागों में "एए" एवं "ए" श्रेणी में पंजी संवेदकों से निर्धारित निविदा प्रपत्र में ई-प्रोक्युरमेंट प्रक्रिया हेतु ऑनलाईन निविदायें आमंत्रित की जाती है।

GMVN

GARHWAL MANDAL VIKAS NIGAM LTD.

74/1 RAJPUR ROAD, DEHRADUN

E-Mail: gmvnl@gmvnl.com
gmvn@sancharnet.in

Ph :- 0135-2746817,2749308
Fax :- 2746847

Ref. 437 / खनन

Date: 11.9.2014

To,

The Chief Wildlife Warden,
Government of Uttarakhand,
Wild life Institute 5, Chandrabhani,
Mohabewala, Dehradun-248001

Subject: Authentication of the data for proposed sites- River Yamuna Lot no. 23/1, 23/2 at District: Dehradun, State: Uttarakhand by Garhwal Mandal Vikas Nigam for river bed mining in the allotted area.

This is for your kind information that the above mentioned project for mining of Sand, *Bajri* and Boulder lies in **Dehradun** district, State **Uttarakhand** has been applied for Environmental Clearance, for which relevant information of the study area is required to be authenticated:

- ✓ List of Flora & Fauna present in the study area (Enclosed).

Kindly authenticate the above information at your earliest for the finalization and submission of EIA/EMP report to the regulatory bodies for obtaining Environmental Clearance.

Thanking you.

Yours truly,

Managing Director

Priyank
Recd
प्रमुख वन संरक्षक (व०जी०)/
मुख्य वन्य जीव प्रतिपालक
उत्तराखण्ड

गढ़वाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपक्रम)
पंजीकृत कार्यालय–74/1 राजपुर रोड़, देहरादून।
उत्तराखण्ड। पिन कोड–248001
CIN U31101UR1976SGC 004259
E-Mail: gmvn@sancharnet.in , gmvn@gmvnl.com Phone 2744408, 2746817, 2749308
Fax-0135-2748479

पत्रांक 709/खनन–कर्न्जवेशन प्लॉन दिनांक 20 फरवरी 2018

सेवा में,

प्रभागीय वनाधिकारी,
देहरादून वन प्रभाग,
देहरादून।

विषय– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आवंटित राजस्व चुगान लॉटों के कर्न्जवेशन प्लॉन को प्रमाणित/स्वीकृत करने विषयक।

सन्दर्भ– मुख्य वन संरक्षक (वन्य जीव)/मुख्य वन्यजीव प्रतिपालक, उत्तराखण्ड को सम्बोधित तथा इस निगम को पृष्ठांकित आपका पत्र संख्या–350/121 देहरादून दिनांक 11 अगस्त 2017।

महोदय,

उपरोक्त विषयक सन्दर्भित पत्र (प्रति संलग्न) का सन्दर्भ ग्रहण करने का कष्ट करे। अवगत कराना है कि गढवाल मण्डल विकास निगम द्वारा तैयार किये गये कर्न्जवेशन प्लॉन में आपके द्वारा इंगित की गयी कमियों का निराकरण करते हुये पुनः इस पत्र के साथ संलग्न कर आपको प्रेषित किया जा रहा है।

अतः आपसे अनुरोध है कि उंक्त कर्न्जवेशन प्लॉन को प्रमाणित कर यथाशीघ्र मुख्य वन संरक्षक (वन्य जीव)/मुख्य वन्यजीव प्रतिपालक, उत्तराखण्ड को प्रेषित करने का कष्ट करें, ताकि यथाशीघ्र पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार द्वारा निगम के पक्ष में राजस्व लॉटों की लम्बित पर्यावरणीय स्वीकृतियॉ निर्गत की जा सकें।

संलग्नक–संशोधित कर्न्जवेशन प्लॉन की प्रति।

भवदीय

(बी0एल0राणा)
महा प्रबन्धक खनन

प्रतिलिपि–मुख्य वन संरक्षक (वन्य जीव)/मुख्य वन्यजीव प्रतिपालक, उत्तराखण्ड को सादर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

(बी0एल0राणा)
महा प्रबन्धक खनन

Received
23/02/18

गढ़वाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपक्रम)
पंजीकृत कार्यालय–74/1 राजपुर रोड़, देहरादून।
उत्तराखण्ड। पिन कोड–248001
CIN U31101UR1976SGC 004259
E-Mail: gmvn@sancharnet.in , gmvn@gmvnl.com Phone 2744408, 2746817, 2749308 Fax-0135-2748479

पत्रांक /VP/ खनन

दिनांक मई 2017

प्रभागीय वनाधिकारी,
देहरादून वन प्रभाग,
देहरादून।

विषयः– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आवंटित राजस्व चुगान लॉटो के **Conservation Plans** को प्रमाणित/स्वीकृत करने विषयक।

सन्दर्भ :–प्रमुख वन संरक्षक (वन्यजीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड का पत्र सं0 2866/12–1 दिनांक 03/05/2017।

महोदय,

कृपया उपरोक्त विषयक सन्दर्भित पत्र का अवलोकन करने का कष्ट करें। इस सम्बन्ध में आपसे अनुरोध है कि वांछित सूचना यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें। उल्लेखनीय है कि वांछित सूचना के अभाव में पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली में इस निगम को आवंटित उपखनिज लॉटो की पर्यावरणीय स्वीकृति लम्बित है।

अतः आपसे पुनः अनुरोध है कि कृपया वांछित सूचनाएं यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें।

भवदीय

(बी0एल0राणा)
महाप्रबन्धक, खनन

प्रतिलिपिः– वन संरक्षक (वन्य जीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड को उनके पत्र सं0 2866/12–1 दिनांक 03/05/2017 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु सादर प्रेषित।

(बी0एल0राणा)
महाप्रबन्धक, खनन

गढ़वाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपक्रम)
पंजीकृत कार्यालय–74/1 राजपुर रोड़, देहरादून।
उत्तराखण्ड। पिन कोड–248001
CIN U31101UR1976SGC 004259
E-Mail: gmvn@sancharnet.in ; gmvn@gmvnl.com Phone 2744408, 2746817, 2749308 Fax-0135-2748479

पत्रांक 119/खनन

दिनांक मई 2017

सेवा में,

प्रभागीय वनाधिकारी,
टिहरी वन प्रभाग,
नई टिहरी।

विषयः– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आवंटित राजस्व चुगान लॉटो के **Conservation Plans** को प्रमाणित/स्वीकृत करने विषयक।

सन्दर्भ :–प्रमुख वन संरक्षक (वन्यजीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड का पत्र सं0 2863/12–1 दिनांक 03/05/2017।

महोदय,

कृपया उपरोक्त विषयक सन्दर्भित पत्र का अवलोकन करने का कष्ट करें। इस सम्बन्ध में आपसे अनुरोध है कि वांछित सूचना यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें। उल्लेखनीय है कि वांछित सूचना के अभाव में पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली में इस निगम को आवंटित उपखनिज लॉटो की पर्यावरणीय स्वीकृति लम्बित है।

अतः आपसे पुनः अनुरोध है कि कृपया वांछित सूचनाएं यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें।

भवदीय

(बी0एल0राणा)
महाप्रबन्धक, खनन

प्रतिलिपिः– वन संरक्षक (वन्य जीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड को उनके पत्र सं0 2863/12–1 दिनांक 03/05/2017 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु सादर प्रेषित।

(बी0एल0राणा)
महाप्रबन्धक, खनन

गढ़वाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपकम)
पंजीकृत कार्यालय–74/1 राजपुर रोड़, देहरादून।
उत्तराखण्ड। पिन कोड–248001
CIN U31101UR1976SGC 004259
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पत्रांक 118/खनन

दिनांक मई 2017
09/05/17

सेवा में,

प्रभागीय वनाधिकारी,
हरिद्वार वन प्रभाग,
हरिद्वार।

विषयः– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आवंटित राजस्व चुगान लॉटो के **Conservation Plans** को प्रमाणित/स्वीकृत करने विषयक।

सन्दर्भ :–प्रमुख वन संरक्षक (वन्यजीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड का पत्र सं0 2865/12–1 दिनांक 03/05/2017।

महोदय,

कृपया उपरोक्त विषयक सन्दर्भित पत्र का अवलोकन करने का कष्ट करें। इस सम्बन्ध में आपसे अनुरोध है कि वांछित सूचना यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें। उल्लेखनीय है कि वांछित सूचना के अभाव में पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली में इस निगम को आवंटित उपखनिज लॉटो की पर्यावरणीय स्वीकृति लम्बित है।

अतः आपसे पुनः अनुरोध है कि कृपया वांछित सूचनाएं यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें।

भवदीय

(बी0एल0राणा)
महाप्रबन्धक, खनन

प्रतिलिपिः– वन संरक्षक (वन्य जीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड को उनके पत्र सं0 2865/12–1 दिनांक 03/05/2017 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु सादर प्रेषित।

(बी0एल0राणा)
महाप्रबन्धक, खनन

गढ़वाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपकम)
पंजीकृत कार्यालय–74/1 राजपुर रोड़, देहरादून।
उत्तराखण्ड। पिन कोड–248001
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पत्रांक/२०/खनन

दिनांक ~~मई~~ 2017
02 ~~05~~

सेवा में,

प्रभागीय वनाधिकारी,
पौड़ी वन प्रभाग,
पौड़ी।

विषयः– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आवंटित राजस्व चुगान लॉटो के **Conservation Plans** को प्रमाणित/स्वीकृत करने विषयक।

सन्दर्भ :–प्रमुख वन संरक्षक (वन्यजीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड का पत्र सं0 2864/12–1 दिनांक 03/05/2017।

महोदय,

कृपया उपरोक्त विषयक सन्दर्भित पत्र का अवलोकन करने का कष्ट करें। इस सम्बन्ध में आपसे अनुरोध है कि वांछित सूचना यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें। उल्लेखनीय है कि वांछित सूचना के अभाव में पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार, नई दिल्ली में इस निगम को आवंटित उपखनिज लॉटो की पर्यावरणीय स्वीकृति लम्बित है।

अतः आपसे पुनः अनुरोध है कि कृपया वांछित सूचनाएं यथा शीघ्र उपलब्ध कराने का कष्ट करेंगें।

भवदीय,

(बी0एल0राणा)
महाप्रबन्धक, खनन

प्रतिलिपिः– वन संरक्षक (वन्य जीव)/मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड को उनके पत्र सं0 2864/12–1 दिनांक 03/05/2017 के क्रम में सूचनार्थ एवं आवश्यक कार्यवाही हेतु सादर प्रेषित।

(बी0एल0राणा)
महाप्रबन्धक, खनन

92
15/5/17

CORBETT RAJAJI GANGOTRI NATIONAL PARK

57
16/5/17

कार्यालय प्रमुख वन संरक्षक (वन्यजीव)/मुख्य वन्यजीव प्रतिपालक, उत्तराखण्ड

85 राजपुर रोड, देहरादून, फोन नं० 0135-2742884 फैक्स नं० 0135-2745691 ईमेल-cwlwua@yahoo.co.in

पत्रांक 2866/12-1 देहरादून दिनांक 03 मई 2017

सेवा में,

प्रभागीय वनाधिकारी,
देहरादून वन प्रभाग,
देहरादून।

विषयः- गढ़वाल मण्डल विकास निगम लि० को जनपद देहरादून क्षेत्रान्तर्गत आंवटित राजस्व चुगान लॉटो के कन्जर्वेशन प्लॉन को प्रमाणित/स्वीकृत करने विषयगत।

सन्दर्भः- इस कार्यालय का पत्रांक 2252/12-1 दिनांक 28 फरवरी 2017

महोदय

उपर्युक्त संदर्भित पत्र का अवलोकन करने का कष्ट करें। विषयांकित प्रकरण पर आपसे आख्या मांगी गयी थी जो आज दिनांक तक अप्राप्त है। अतः आपको पुनः निर्देशित किया जाता है कि संदर्भित पत्र के साथ संलग्न कन्जर्वेशन प्लान पर अपनी आख्या अतिशीघ्र इस कार्यालय में प्रेषित करने का कष्ट करें।

n (mining)

भवदीय

(डी०वी०एस० खाती)
प्रमुख वन संरक्षक (वन्यजीव)/
मुख्य वन्यजीव प्रतिपालक,
उत्तराखण्ड

I/c (Mining)

DIS/5

पत्रांक 2866/तद्दिनांकित।

Jm (Mining)

प्रतिलिपिः- प्रबन्ध निदेशक, गढ़वाल मण्डल विकास निगम, लि० देहरादून को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

17.5.17

(डी०वी०एस० खाती)
प्रमुख वन संरक्षक (वन्यजीव)/
मुख्य वन्यजीव प्रतिपालक,
उत्तराखण्ड

17.5.17

7983 A to AC

गढवाल मण्डल विकास निगम लि0
(उत्तराखण्ड सरकार का उपक्रम)
पंजीकृत कार्यालय–74/1 राजपुर रोड, देहरादून।
उत्तराखण्ड। पिन कोड–248001
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E-Mail: gmvn@sancharnet.in , gmvn@gmvnl.com ;Phone 2740896, 2749308,2748478
WebSite: WWW.gmvnl.in Fax No. 0135-2748479

संख्या 691/खनन /कन्जर्वेशन प्लान दिनांक 16 फरवरी 2017

सेवा मे,

मुख्य वन्य जीव प्रतिपालक, उत्तराखण्ड,
85 राजपुर रोड, देहरादून

विषय– गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आंवंटित राजस्व चुगान लॉटों के कन्जर्वेशन प्लॉन को प्रमाणित/स्वीकृत करने विषयक।

महोदय

कृपया उपर्युक्त विषयक अवगत कराना है कि पर्यावरण प्रभाव मूल्यांकन (EIA) नोटिफिकेशन 2006 के अनुसार पर्यावरण, वन एवं जलवायु परिवर्तन मत्रालय, भारत सरकार द्वारा निर्गत **STANDARD TERMS OF REFERENCE [TOR] FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING CLEARENCE UNDER EIA NOTIFICATION, 2006** के अन्तर्गत गढवाल मण्डल विकास निगम लि0 को जनपद देहरादून क्षेत्रान्तर्गत आंवंटित राजस्व चुगान लॉटों की पर्यावरणीय स्वीकृति प्रदान करने हेतु कन्जर्वेशन प्लॉन की मॉग की गयी है। सुलभ सन्दर्भ हेतु सुसंगत अंश की छायाप्रति संलग्न है।

इस निगम द्वारा कन्सल्टैन्ट फर्म मैसर्स ग्रास रूट्स रिसर्च एण्ड कियेशन्स इण्डिया प्रा0 लि0 नोएडा के माध्यम से जनपद देहरादून का अनुसूची–। एवं अनुसूची–।। में वर्णित प्रजातियों से सम्बन्धित कन्जर्वेशन प्लॉन तैयार कर इस पत्र के साथ संलग्न करते हुये इस आशय से प्रेषित किया जा रहा है कि कृपया उक्त कन्जर्वेशन प्लॉन को प्रमाणित/स्वीकृत कर उपलब्ध कराने का कष्ट करेगें, ताकि इस सम्बन्ध मे अग्रेत्तर कार्यवाही की जा सके।

संलग्न–यथोपरि।

भवदीय

16/2/17
(अतुल कुमार गुप्ता)
प्रबन्ध निदेशक

Received
16-02-17

CONSERVATION PLAN OF SCHEDULE-I & II SPECIES FOUND IN DEHRADUN DISTRICTS OF UTTARAKHAND, INDIA

(Present Conservation Plan has been prepared with respect to River bed mining Projects in Uttarakhand)

Prepared by

GRASS ROOTS RESEARCH & CREATION INDIA (P) LTD.

(An ISO 9001:2008 Certified Co.: Accredited by QCI / NABET: Approved by MoEF, GoI)

&

GRC INDIA TRAINING & ANALYTICAL LABORATORY

(Accredited by NABL, Recognized by MoEF, GoI)

A unit of GRC India

2016

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1. Introduction

Biodiversity conservation plan is developed with the aim to reduce adverse impact on the natural habitat of various wild animals. Day by day issues related to the threats to natural terrestrial and aquatic ecosystems arises due to high anthropogenic activities and loss of natural habitat due to climate change.

Today, when wildlife habitats are under severe pressure and a large number of species of wild fauna have become endangered, the effective conservation of wild animals is of great significance. Because every one of us depends on plants and animals for all vital components of our welfare. Presence or absence of an animal or plant in a region is determined by ecological and historical factors. Animals and plants are living indicators of the characteristics of their environment; their ranges mark the places where environmental conditions are the same or similar. To interpret the range of a species properly, it is necessary to know, in detail, the conditions required for the species to live and thrive (Hundal, 2004).

Conservation is the practice of protecting wild plant and animal species and their habitats. The goal of wildlife conservation is to ensure that nature will be around for future generations to enjoy and also to recognize the importance of wildlife and wilderness for humans and other species alike (CARE, 2012).

A conservation plan is needed for the conservation of critical habitats of wildlife and endangered and Schedule-I & II species along with their scientific management strategy. During the mining and construction activities, natural resources (Land, Biodiversity, Forest, animals and Humans) are likely to exert tremendous pressure due to various activities in the respective region while the present management plan will ensure mitigation of such impacts.

1.1. History of Wildlife Conservation in Uttarakhand

Uttarakhand state is situated at 30°15' N and 79°15' E in the northern part of India. It has eminent history in wildlife conservation as the first national park in India was declared in 1935 which is famous as Jim Corbett National Park and situated in Uttarakhand. The park is declared protected to conserve wildlife and nature. Since Independence, there has been a steady rise in the number of National Parks and Wildlife Sanctuaries, especially after the enactment of the Wildlife Protection Act in 1972. There are currently about 7-Wildlife Sanctuary and 7-National parks have been declared in Uttarakhand (WII).

The Northwestern Himalayan region forms an important zoogeographical region in the Himalayas. Uttarakhand is also a part of the northwestern Himalaya segment which is the home of a

variety of plant species and wildlife taxa, including two endangered species of big cats-Snow Leopard (*Panthera uncia*) in its great or higher Himalayan landscapes, Bengal Tiger (*Panthera tigris tigris*) of Rajaji and Corbett National Parks in its outer or sub-Himalayan foot hill habitat; one endangered deer species- Himalayan musk deer (*Moschus chrysogaster*) and two high altitude pheasant species - Himalayan monal (*Lophophorous impejanus*), Western tragopan (*Tragopan melanocephalus*) in the sub alpine western Himalayan forests (Sahoo, 2007).

1.2. Brief Description of the Study Area

Dehradun is the capital city of the State of Uttarakhand in northern India. Dehradun is located in the Doon Valley in the foothills of the Himalayas nestled between two of India's mightiest rivers - the Ganges on the east and the Yamuna on the west. The Dehradun district has various types of physical geography from Himalayan mountains to Plains. There district contains Rajaji National Park which is home to several elephants. The Doon valley has the Terai and Bhabar forests within it as well as the Shiwalik hills and Lesser Himalayan Range containing hill stations such as Mussoorie and Chakrata. The district is bordered by the Himalayas in the north, the Sivalik Hills to the south, the river Ganges to the east, and the Yamuna River to the west.

Fig. 1: Location Map of Dehradun district of Uttarakhand

1.3. Drainage

Dehradun district of Uttarakhand drained into the River Ganga, through River Yamuna and its tributaries. Yamuna River enters into the Dehradun district at the point called Khat Bhondar which is about 20km east of Deoban. 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.

Dehradun district of Uttarakhand has rich in terms of flowing rivers and streams where several sand, bajri & boulder mining projects are executed and proposed on dry bed of different river systems.

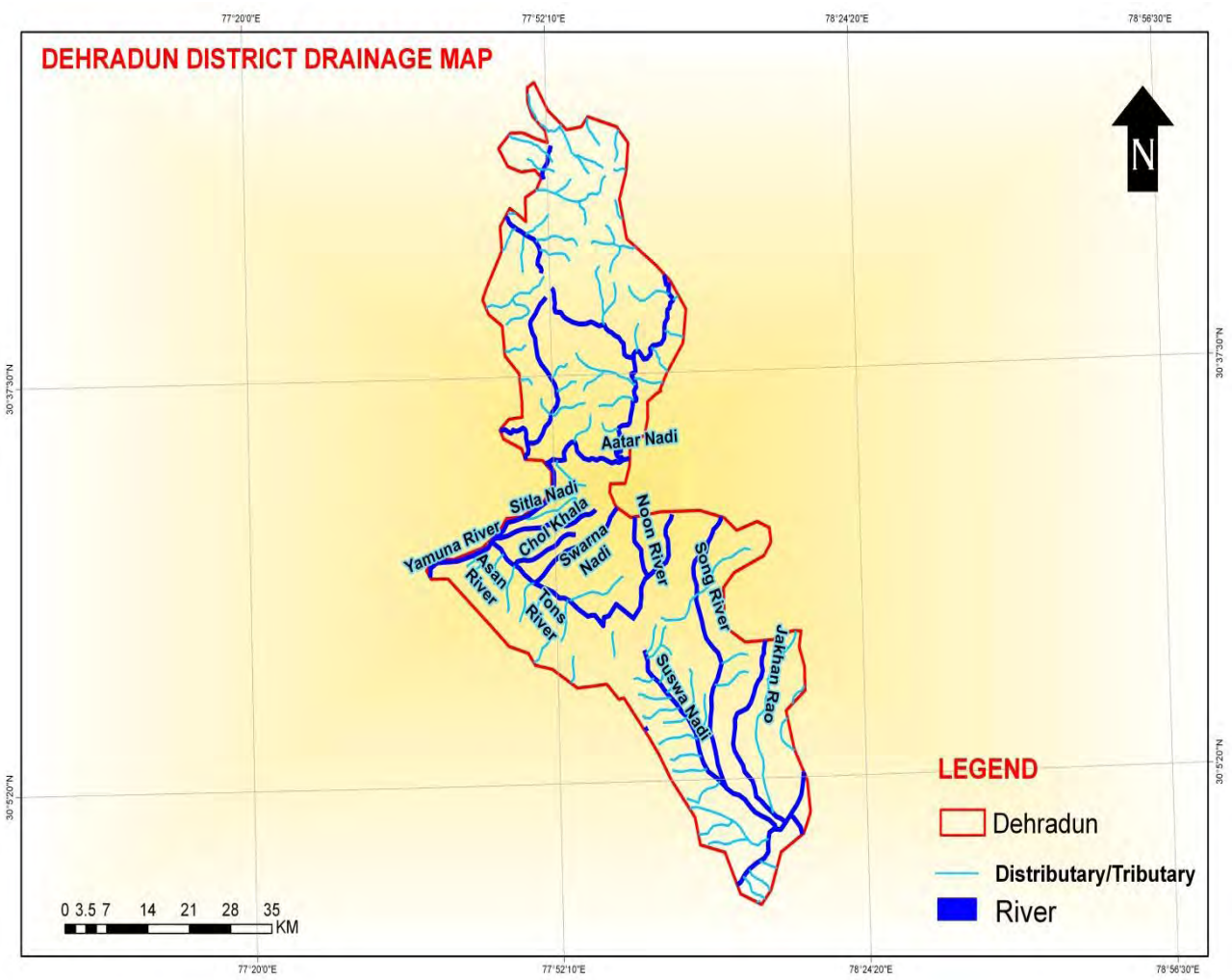


Fig. 2: Drainage Map of Dehradun district, Uttarakhand

1.4. Climate and Temperature

The Climate of the district is generally temperate. It varies greatly from tropical to severe cold depending upon the altitude of the area. The district being hilly, temperature variations due to difference in elevation are considerable. In the hilly regions, the summer is pleasant, but in the Doon, the heat is often intense, although

not to such degree as in the plains of the adjoining district. The temperature drops below freezing point not only at high altitude but even at places like Dehradun during the winters, when the higher peaks are also under snow.

Temperature plays an important role to separate Uttarakhand as well as Dehradun district from rest part of the country. During the summers, the temperature ranges between 16°C to 36°C whereas; in winters temperature varies between 4°C to 24°C in Dehradun district.

1.5. Rainfall

The Dehradun district receives an average annual rainfall between 1950 to 2072 mm. Most of the annual rainfall in the district is received during the months from June to September (July and August being rainiest).

2. Ecological Profile of the Study Area

The district Dehradun falls under the temperate climatic condition. The district has maximum tree covered hilly terrain followed by forest and agricultural land out of its total geographical area. The major crops of the area are Rice, Wheat, Barley, Corn, Mandua, Hangora etc. The climatic and soil conditions allow growing sub-tropical and temperate fruits, vegetables and ornamentals. The various fruits grown in the state include mango, citrus, litchi, guava and jackfruit etc.

Dehradun is distinguished from most other district in the state by the existence of very large forests chiefly stocked with Sal. Forest products play an important role in the economy of the district. Besides, supplying fuel, fodder, bamboos and medicinal herbs, they also yield a variety of products like honey, lac, gum, resin, catechu, wax, horns and hides. Different types of forests and varying species of shrubs, climbing plants and grasses, depending upon the aspect, altitude and soil condition are found in the district. Sal forest and coniferous forests are predominant in the western part of tehsil Dehradun. A mixture of miscellaneous species is found in the lower parts. Sal is the predominant species mixed with other associates viz. bakli, sain, haldu, jhingan etc. Besides the above many other types of forests occur in small belts in the plain of the district.

2.1. Flora of the Study Area

The forest of Dehradun district is comprises of sub-tropical deciduous vegetation due to medium & high temperature, and humidity. Total forest area in the district is 1607 Sq. km (State of Forest Report, 2011). Details of forest status of Dehradun district is given in Table 1.

Table 1: Forest Cover Area in Dehradun District, Uttarakhand (Area in Sq.km)

District	Geographic Area	Very Dense Forest	Mod. Dense Forest	Open Forest	Total	Proportion of Forest Cover to District Geographic Area (%)	Proportion of Forest Cover to State Geographic Area (%)	Proportion of Forest Cover to Sate Total Forest Cover (%)
Dehradun	3088	584	695	328	1607	52.04	3	6.56
Source: State of Forest Report, 2011.								

Forests of Dehradun district are enriched with different kinds of vegetation (Grasses, Herbs, Shrubs and Trees). Some common vegetation found in the study area is listed in the Table 2.

Table 2: Common Vegetation Found in Forest and other areas in Dehradun District, Uttarakhand

S.No.	Scientific Name	Local name	Family
Trees			
1	*Aegle marmelos*	Bel	Rutaceae
2	*Albizzia lebbeck*	Bhandir or Siris	Leguminosae
3	*Alnus nepalensis*	Utis	Betulaceae
4	*Bauhinia variegate*	Kachnar	Leguminosae
5	*Bombax ceiba*	Semal	Malvaceae
6	*Citrus limon*	Nimu	Rutaceae
7	*Dalbergia sissoo*	Shisham	Fabaceae
8	*Emblica officinalis*	Amla	Euphorbiaceae
9	*Ficus auriculata*	Timal	Moraceae
10	*Ficus bengalensis*	Bargad	Moraceae
11	*Ficus palmate*	Bedu	Moraceae
12	*Ficus religiosa*	Pipal	Moraceae
13	*Grevillea robusta*	Silver oak	Proteaceae
14	*Mallotus philippinensis*	Ruin	Euphorbiaceae
15	*Mangifera indica*	Aam	Anacardiaceae
16	*Melia azedarach*	Dhenk	Meliaceae
17	*Musa paradisiacal*	Kela	Musaceae
18	*Pinus roxburghii*	Chil	Pinaceae
19	*Prunus armeniaca*	Chuli	Rosaceae
20	*Punica granatum*	Aanar	Punicaceae
21	*Sapindus mukorossi*	Ritha	Sapindaceae
22	*Syzygium cumini*	Jamun	Myrtaceae
23	*Toona serrata*	Kakuru	Meliaceae
Shrubs			
1	*Adhatoda vasica*	Basinga	Acanthaceae
2	*Berberis aristata*	Karmshal	Berberidaceae
3	*Calotropis gigantea*	Aak	Asclepiadaceae
4	*Colebrookea oppositifolia*	Bindu	Lamiaceae
5	*Coriaria nepalensis*	Makhoi	Coriariaceae
6	*Debregeasia hypoleuca*	Sihanru	Urticaceae
7	*Eupatorium adenophorum*	Kala bansa	Asteraceae
8	*Lantana camara*	Lantana	Verbenaceae
9	*Opuntia dillenii*	Nagphani	Cactaceae
10	*Plectranthus coesta*	Chichiri	Lamiaceae
11	*Princepia utilis*	Bhekal	Rosaceae
12	*Pyracantha crenulata*	Ghingaru	Rosaceae
13	*Ricinus communis*	Arandi	Euphorbiaceae

14	*Rosa brunonii*	Kunja	Rosaceae
15	*Rubus ellipticus*	Hinsar	Rosaceae
16	*Rumex hastatus*	Bhilmora	Polygonaceae
17	*Urtica parviflora*	Kandali	Urticaceae
18	*Zanthoxylum alatum*	Timbur	Rutaceae
19	*Ziziphus mauritiana*	Ber	Rhamnaceae
Herbs			
1	*Achyranthes aspera*	Puthkanda	Amarantaceae
2	*Artemisia capillaris*	Pati	Asteraceae
3	*Bidens bipinnata*	Kuru	Asteraceae
4	*Bergenia ligulata*	Silphara	Saxifragaceae
5	*Chenopodium album*	Bathwa	Chenopodiaceous
6	*Datura suaveolens*	Datura	Solanaceae
7	*Euphorbia hirta*	Dudhi	Euphorbiaceae
8	*Galinsoga parviflora*	Marchya	Asteraceae
9	*Hedychium spicatum*	Banhaldu	Zingiberaceae
10	*Oxalis corniculata*	AmritSak	Oxalidaceae
11	*Polygonum chinense*	Janglipalak	Polygonaceae
12	*Sonchus asper*	Dudhi	Asteraceae
13	*Thalictrum foliolosum*	Mamiri	Ranunculaceae
14	*Tridex procumbens*	Ground weed	Amarantaceae
Climbers			
1	*Bauhinia vahlii*	Malo	Leguminosae
2	*Clematis connata*	Kanguli	Ranunculaceae
3	*Ipomea purpurea*	Besharam	Convolvulaceae
Grasses			
1	*Apluda mutica*	Tachula	Gramineae
2	*Cynodon dactylon*	Dhub	Gramineae
3	*Chrysopogon fulvus*	Godia	Gramineae
4	*Parthenium hysterophorus*	Congress grass	Compositae
Ferns			
1	*Pteris* sp.	Fern	Pteridaceae
2	*Adiantum* sp.	Fern	Pteridaceae
Source: GRC Survey Data and Data of Department of Forest, Uttarakhand			

2.2. Fauna of the Study Area

Well known famous ***Rajaji National Park*** is one of the major habitations of the flora and fauna in the Dehradun. The Royal Bengal Tigers and Elephants are also found here. Besides these, ***Mussoorie Wildlife Sanctuary*** also situated in the district which support variety of animals. The wildlife fauna mainly found in the open forests, Wildlife Sanctuary and National Parks situated within Dehradun, district is given in Table 3.

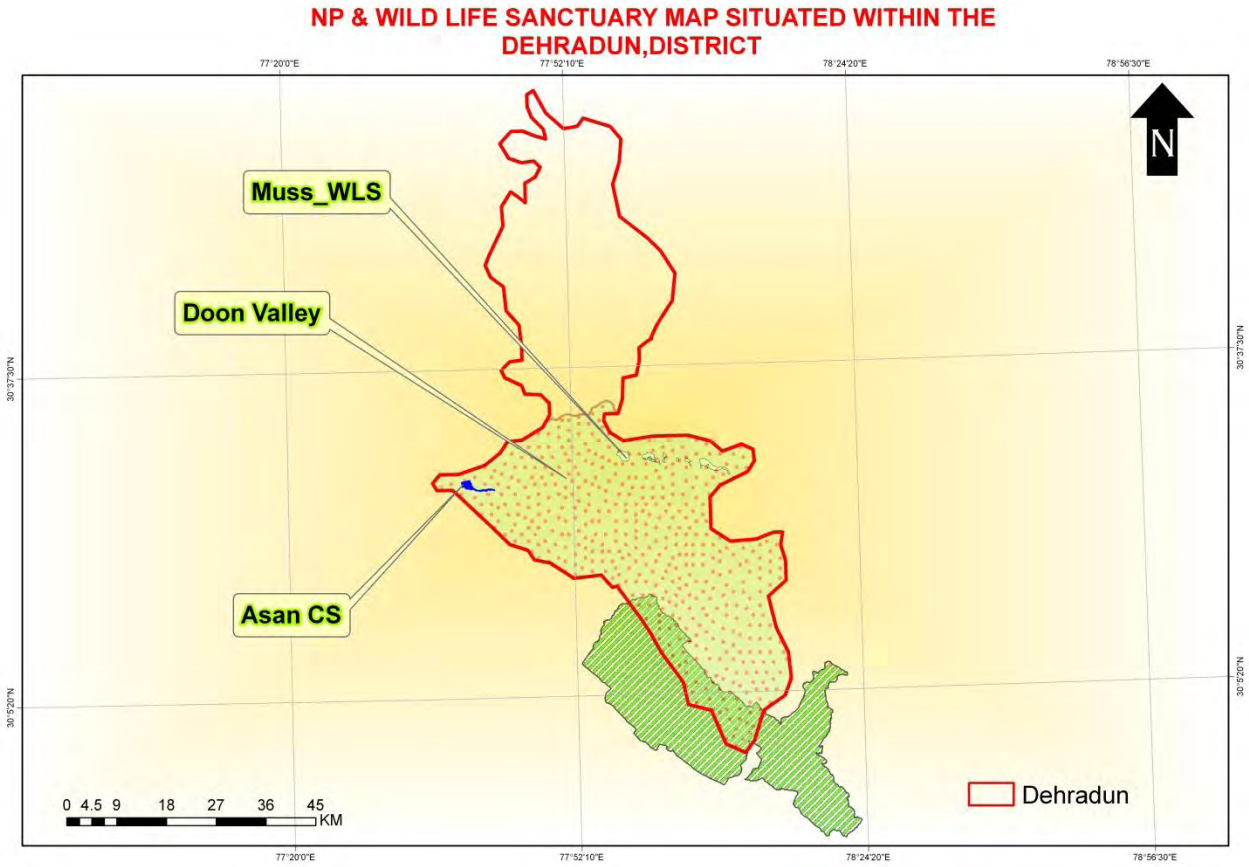


Fig. 3: Eco-sensitive Zone in Dehradun district of Uttarakhand

Table 3: Fauna Commonly Found in Dehradun District, Uttarakhand

Sl. No	English Name	Scientific Name	Schedule Status (WPA-1972)	IUCN Status
Mammal				
1	Asian Elephant	*Elephas maximus*	I	EN
2	Bandicoot Rat	*Bandicota indica*	V	LC
3	Barking deer	*Muntiacus muntjac*	III	LC
4	Bengal tiger	*Panthera tigris tigris*	I	EN
5	Common Mongoose	*Herpestes edwardsi*	II	NA
6	Fulvous Fruit Bat	*Rousettus leschenaulti*	V	LC
7	Golden Jackal	*Canis aureus*	II	LC
8	Goral	Naemorhedus goral	II	NT
9	Grey Musk Shrew	*Suncus murinus*	-	LC
10	Himalayan black bear	*Ursus thibetanus*	-	VU
11	Indian Bush Rat	*Golunda ellioti*	V	LC
12	Indian Fox/ Bengal Fox	*Vulpes bengalensis*		LC
13	Indian Field Mouse	*Mus booduga*	V	LC
14	Indian Flying Fox Bat	*Pteropus giganteus*	V	LC
15	Indian Giant Squirrel	*Ratufa indica*	II	LC
16	Indian Grey Mongoose	*Herpestes edwardsii*	IV	LC
17	Indian Hare	*Lepus nigricollis*	IV	LC
18	Indian langur	*Semnopithecus*	-	-

19	Indian Leopard	*Panthera pardus fusca*	I	NT
20	Indian Pangolin	*Manis crassicaudata*	I	EN
21	Indian porcupine	*Hystrix indica*	IV	LC
22	Indian Wild Boar	*Sus scrofa*	III	LC
23	Jungle cat	*Felis chaus*	II	LC
24	Rhesus Macaque	*Macaca mulatta*	II	LC
25	Sambar	*Cervus unicolor*	III	VU
26	Sloth Bear	*Melursus ursinus*	I	VU
27	Swamp Dear/ Barasingha	*Rucervus duvaucelii*	I	VU
28	Three-striped Palm Squirrel	*Funambulus palmarum*	II	LC
29	Wild boar	*Sus scrofa*	III	LC
Reptiles (Snakes) and Lizards				
1	Common Krait	*Bungarus caeruleus*	IV	NA
2	Banded Krait	*Bungarus fasciatus*	IV	NA
4	Indian Cobra	*Naja naja*	II	LC
5	Indian Python	*Python molurus*	I	NT
6	King Cobra	*Ophiophagus Hannah*	II	VU
7	Rat Snake/Oriental Rat Snake	*Ptyas mucosus*	II	NA
8	Russell Viper	*Daboia russelii*	II	DD
9	Rock Lizard	*Agama buberculatus*	-	DD
10	Chameleon	*Chamelion calcarata*	II	DD
11	Indian House Gecko	*Hemidactylus flaviviridus*	-	DD
12	Monitor Lizard	*Varanus bengalensis*	I	LC
Avian Fauna				
1	Alexandrine Parakeet	*Psittacula eupatria*	IV	LC
2	Ashy Drongo	*Dicrurus leucophaeus*	IV	LC
3	Ashy Wood swallow	*Artamus fuscus*	IV	LC
4	Asian House Martin	*Delichon dasypus*	IV	LC
5	Asian Paradise-flycatcher	*Terpsiphone paradisi*	IV	LC
6	Asian Pied Starling	*Sturnus contra*	IV	LC
7	Black Drongo	*Dicrurus macrocercus*	IV	LC
8	Booted Warbler	*Iduna caligata*	IV	LC
9	Clamorous Reed Warbler	*Acrocephalus stentoreus*	IV	LC
10	Common Babbler	*Turdoides caudata*	IV	LC
11	Common Cuckoo	*Cuculus canorus*	IV	LC
12	Common Hoopoe	*Upupa epops*	IV	LC
13	Common Kingfisher	*Alcedo atthis*	IV	LC
14	Common Myna	*Acridotheres tristis*	IV	LC
15	Common Quail	*Coturnix coturnix*	IV	LC
16	Common Rose finch	*Carpodacus erythrinus*	IV	LC
17	Coppersmith Barbet	*Megalaima haemacephala*	IV	LC
18	Crimson Sunbird	*Aethopyga siparaja*	IV	LC
19	Great Barbet	*Megalaima virens*	IV	LC
20	Greater Coucal	*Centropus sinensis*	IV	LC
21	Grey Bushchat	*Saxicola ferreus*	IV	LC
22	House Crow	*Corvus splendens*	IV	LC
23	House Sparrow	*Passer domesticus*	IV	LC

24	House Swift	*Apus nipalensis*	IV	LC
25	Indian Cuckoo	*Cuculus micropterus*	IV	LC
26	Indian Peafowl	*Pavo Cristatus*	I	LC
27	Indian Grey Hornbill	*Ocyceros birostris*	I	LC
28	Jungle Babbler	*Turdoides striata*	IV	LC
29	Jungle Bush Quail	*Perdicula asiatica*	IV	LC
30	Jungle Crow	*Corvus macrorhynchos*	IV	LC
31	Jungle Myna	*Acridotheres fuscus*	IV	LC
32	Oriental Magpie-Robin	*Copsychus saularis*	IV	LC
33	Oriental Turtle Dove	*Streptopelia orientalis*	IV	LC
34	Plum-headed Parakeet	*Psittacula cyanocephala*	IV	LC
35	Purple Sunbird	*Cinnyris asiaticus*	IV	LC
36	Red Jungle fowl	*Gallus gallus*	IV	LC
37	Red-rumped Swallow	*Cecropis daurica*	IV	LC
38	Red-vented Bulbul	*Pycnonotus cafer*	IV	LC
39	Rock Pigeon	*Columba livia*	IV	LC
40	Rose-ringed Parakeet	*Psittacula krameri*	IV	LC
41	Rufous Treepie	*Dendrocitta vagabunda*	IV	LC
42	Scarlet Minivet	*Pericrocotus flammeus*	IV	LC
43	Spotted Owlet	*Athene brama*	IV	LC
44	Spot-winged Starling	*Saroglossa spiloptera*	IV	LC
45	Streak-throated Swallow	*Petrochelidon fluvicola*	IV	LC
46	White Wagtail	*Motacilla alba*	IV	LC
Source: GRC Survey Data and Data of Department of Forest, Uttarakhand				
LC: Least Concern; **NE:** Not Evaluated; **EN:** Endangered; **NT:** Near Threatened; and **VU:** Vulnerable.				

3. Conservation Plan of Schedule I & II Species

Biological profile of Dehradun district of Uttarakhand revealed the presence of 10 schedules-I and 10 schedules II species which are listed in Table 4.

Table 4: List of Schedule- I & II Species Present in Buffer Zone

Sl. No	English Name	Scientific Name	Schedule Status (WPA-1972)	IUCN Status
Mammal				
1	Asian Elephant	*Elephas maximus*	I	EN
2	Bengal tiger	*Panthera tigris tigris*	I	EN
3	Indian Leopard	*Panthera pardus fusca*	I	NT
4	Indian Pangolin	*Manis crassicaudata*	I	EN
5	Sloth Bear	*Melursus ursinus*	I	VU
6	Swamp Dear/ Barasingha	*Rucervus duvaucelii*	I	VU
7	Common Mongoose	*Herpestes edwardsi*	II	NA
8	Golden Jackal	*Canis aureus*	II	LC
9	Indian Giant Squirrel	*Ratufa indica*	II	LC
10	Jungle cat	*Felis chaus*	II	LC
11	Rhesus Macaque	*Macaca mulatta*	II	LC
Reptiles (Snakes) and Lizards				

12	Indian Python	*Python molurus*	I	NT
13	Indian Cobra	*Naja naja*	II	LC
14	King Cobra	*Ophiophagus Hannah*	II	VU
15	Rat Snake/Oriental Rat Snake	*Ptyas mucosus*	II	NA
16	Russell Viper	*Daboia russelii*	II	DD
17	Chameleon	*Chamelion calcarata*	II	DD
18	Monitor Lizard	*Varanus bengalensis*	I	LC
Avian Fauna				
19	Indian Peafowl	*Pavo Cristatus*	I	LC
20	Indian Grey Hornbill	*Ocyceros birostris*	I	LC
Source: GRC Survey Data and Data of Department of Forest, Uttarakhand				
LC: Least Concern; **NE:** Not Evaluated; **EN:** Endangered; **NT:** Near Threatened; and **VU:** Vulnerable.				

Biological importance of all these species along with their conservation and management plan and environmental mitigation are as follows:

○ CONSERVATION PLAN OF MAMMALS

3.1. *Elephas maximus* (Asian Elephant)

Source: https://farm9.staticflickr.com

i. Taxonomical Classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Proboscidea
Family	Elephantidae
Genus	*Elephas*
Species	*E. maximus*

ii. Conservation Status of *Elephas maximus* in India

Since 1986, Elephas maximus has been listed as Endangered by IUCN as the population has declined by at least 50% over the last three generations, estimated to be 60–75 years. It has been listed in Schedule-I of Indian Wildlife Protection Act, 1972. Moreover, Elephas maximus is listed on CITES Appendix I. Asian elephants are quintessential flagship species.

iii. Habitat

Asian Elephant s inhabit grasslands, tropical evergreen forests, semi-evergreen forests, moist deciduous forests, dry deciduous forests and dry thorn forests, in addition to cultivated and secondary forests and scrublands. They prefer areas near water bodies, having ample food and shade trees. They like mud bath and dust bath. In the Eastern Himalaya in northeast India, they regularly move up above 3,000 m in summer at a few sites. In Uttarakhand, Asian Elephant are mainly found in Rajaji National Park.

iv.Food and Feeding

Asian Elephants (*Elephas maximus*) are classified as mega herbivore animals as they consume up to 150 kg of plant matter per day. They are generalist feeders, and both grazers and browsers. In southern India, elephants are observed to be feed on 112 different plant species, most commonly of the order Malvales, and the legume, palm, sedge and true grass families. They graze on the tall grasses, but the portion consumed varies with season. They feed on the bark of white thorn and other flowering plants, and consume the fruits of wood apple, tamarind, kumbhi and date palm. They drink 68 to 98 liter of water (even up to 152 L) daily. To supplement the diet, elephants will dig up the earth and places dislodged pieces of soil in mouth to obtain salts and minerals.

v. Ecological Threats and Conservation Plan

i. Direct Population Threats

Direct population threats include all reasons and actions which directly reduce the numbers of elephants in wild other than the natural death of the animal. This is mainly due to reduction in their habitat range, forest degradation, scarcity of food and water in their habitat etc. Some time they loss their life due to the health issues on account of impact of climate changes.

- **Conservation Plan**

The Wild Life (Protection) Act of 1972 provides us with the statutory framework for wildlife conservation, and declared that hunting of Elephant is a deadly crime against wildlife in India. While, forestation will be done surrounding the mine area for enhancement of habitat, protecting the loss of Elephant diversity due to habitat loss.

ii. Elephant-Human Conflicts

All riverbed mining project are situated/ proposed on the dry river bed in various streams/ rivers and area does not have elephant corridor as they are protected only in Rajaji National Park. But, Elephants may enter in the nearby mining lease area of Rajaji National Park. There may be chances of elephant human conflict leading to destruction of property and crop and as a result some elephants may be killed. The long-term future of elephants outside protected areas is therefore inextricably linked to

mitigating such human-elephant conflicts, and this is one of the largest conservation challenges in India today.

Conflicts generally arises when elephant enters in croplands and human settlements, which indirectly reflect the condition of adjacent forested areas; *i.e.* its ability to support elephant. The availability of insufficient food material in wild leads elephant to enter in human world. Cropland as source of food invites the animal which causes a serious conflict with humans.

Moreover, elephants migrate seasonally to follow the availability of water and preferred foods. Their migration patterns often extend not only beyond park or reserve boundaries, but States boundaries as well. Because elephants move great distances, it is difficult to confine them to small parks. Even with fences, farms adjacent to the park boundary are likely to be raided, especially during seasons when favored foods are at the optimal stage of growth. Inevitably, the sharpest conflict and greatest losses seem to occur to these park-bordering villages.

- **Conservation Plan**

Plantation of suitable species and also conserve other dietary forest products of Elephant is the only effective way to reduce the conflicts. Trees of *Imperata cylindrica, Hymenachne amplexicaulis, Enhydra fluctuans, Azadirachta indica, Bauhinia tomentosa, Dalbergia sissoo, Dendrocalamus strictus, Shorea robusta, Artocarpus heterophyllus* and *Ficus sp.* will be planted within Elephant's habitat. Corridors of Elephant will be identified and also preserved in the area. The plant species preferred by Elephants will be conserved to insure sufficient plant availability, which will also reduce the conflict with humans. Biological fences will be used to protect the livestock from the elephants attack. The awareness among the farmers will be generated through the formal educational programmes.

iii. Poaching

Elephant poachers are known in different areas of India. However, the percentage of poaching in Uttarakhand is very lowest. Poaching is done for ivory which is having demand in India and other countries. Any poaching activities of Asian Elephants have not been observed by local people recently in Dehradun district of Uttarakhand.

- **Conservation Plan**

According to the Wild Life Protection Act (1972) Poaching of Elephant is a deadly crime. During formal interview and discussion with local it was noted that study area is not prone to poaching or any other wildlife violence related to Elephants or any other species. But, precaution will be always taken while dealing with wildlife. The contact information of concern wildlife and forest department

will be provided to every worker or at the field office. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

iv. Habitat Threats

Loss of forested areas outside parks and reserves poses a major threat to Asian Elephants because it causes population fragmentation, thereby leaving small, nonviable populations within the parks. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and mining of minerals also possess threats to the habitat of species. Habitat loss, degradation, fragmentation, conversion, and resource exploitation due to human activities result in alterations of the extent and spatial configuration of habitats available for elephant.

- **Habitat Improvement**

Elephants are generalists and they occur in grassland, tropical evergreen forest, semi-evergreen forest, moist deciduous forest, dry deciduous forested and dry thorn forest, in addition to cultivated and secondary forests and scrublands. As per their physiology and energy requirements, they need to consume large quantities of food per day. Elephants are generalist feeders, consuming a large number of plant species. Grasses, shrubs, tree leaves, aquatic plants and occasionally fruits make up the components of their diet.

For habitat improvement, the degraded forest areas nearby the mine will be improved by afforestation with large trees and suitable forage plants. Similarly the ponds or water holes in the forest will be maintained in good condition along with grasslands near the ponds. The river in the area will be maintained in pollution–free status by controlling the sewage discharges in it.

Habitat of the species will be improved by planting suitable species in surrounding areas, including species part of diet and shelter, e.g. *Imperata cylindrica, Hymenachne amplexicaulis, Enhydra fluctuans, Ficus racemosa, Ficus religiosa, Azadirachta indica, Bauhinia tomentosa, Dalbergia sissoo, Dendrocalamus strictus, Shorea robusta* and *Artocarpus heterophyllus* etc.

3.2. Bengal tiger *(Panthera tigris*)

Source: www.wikimedia.org

i. Taxonomical classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	Panthera
Species	P. tigris

ii. Conservation Status

Panthera tigris has been listed as Endangered by IUCN as the population has declined. It has been listed in Schedule-I of Indian Wildlife Protection Act (1972). The Indian Wildlife Protection Act (1972) enables government agencies to take strict measures so as to ensure the conservation of the *Panthera tigris*.

iii. Habitat

The Tigers prefers denser vegetation, for which its camouflage coloring is ideally suited, and where a single predator is not at a disadvantage compared with the multiple felines in a pride. A further habitat requirement is the placement of suitably secluded den locations, which may consist of caves, large hollow trees, or dense vegetation. They can occupy a wide range of habitat types, but will usually require sufficient cover, proximity to water, and an abundance of prey. In Uttarakhand, Tigers are mainly found in Rajaji National Park and Jim Corbet National Park.

iv. Food and Feeding

Tigers prefer to hunt at night, when their ungulate preys are most active. They use a stealthy approach, taking advantage of every rock, tree and bush as cover and rarely chase prey far. Tigers are silent, taking cautious steps and keeping low to the ground so they are not sighted or heard by the prey. They typically kill by ambushing prey, throwing the prey off balance with their mass as they leap onto it. The majority of the tiger diet consists of various large ungulate species, including Sambar, Chital, Hog deer, Barasingha, Barking deer, Sika deer, Eurasian elk, Roe deer, Musk deer, Nilgai, Black buck, Gaur, Banteng, Water buffalo and Wild pigs. Domestic ungulates are also taken, including cattle, Water buffalo, Horses and Goats. In rare cases tigers attack on various other animals in different habitats. A very few tigers begin to hunt humans (Homo sapiens). Tigers can eat 18 to 40 kg of meat when they successfully take large prey, they do not typically eat every day.

v. Ecological Threats and Conservation Plan

❖ **Direct Population Treats**

Direct population threats include all reasons and actions which directly reduce the numbers of tigers in the wild other than the natural death of the animal. Loss of forest areas a major threat to tigers

in India. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products and mining of minerals also possesses threats to the habitat of species. During 19th and 20th century tiger were killed in large numbers as they have been one of the Big Five game animals of Asia.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting is a deadly crime against wildlife. While, forestation will be done surrounding the mine area for enhancement of habitat, protecting the loss of Tiger diversity due to habitat loss.

❖ **Conflicts of Tigers with Human & Farmers**

The intensity of tiger and human conflicts has significantly increased over the years. Increasing number of human death due to man-eating tigers certainly possesses a serious concern to the local people and similar trend of losing problem tigers indicates a serious threat to tiger survival. Tigers are known for their aggressiveness, both towards humans and towards other large mammals. They seem to avoid human contact, when possible, but may encounter humans when they are enticed into croplands or when people enter the forest. Tigers seem to have a low tolerance toward people when they inadvertently meet. There are lots of described incidents of mauling of humans by Tigers.

- **Conservation Plan**

Conflict arises mainly due to scarcity of habitat and food for Tigers in the forest and it enters residential area in search of food resulting in animal-human conflicts. This may be reduced by (1) Plantation to enhance the habitat, (2) Public awareness of importance of animal in the local ecology and (3) Compensation to the victims of attack by Tigers.

❖ **Poaching**

Poaching of Tigers for the traditional Chinese medicine industry started in northern India in the mid-1980's. In India, mostly poaching is done by tribals who know their forests well. It was studied that their body parts are important in local areas as well as outside India. A significant immediate threat to wild Tiger populations is the illegal trade in poached skins and body parts between India, Nepal and China. Illegal trade in Tiger body parts (skin, bones, and claws) continues to threaten the survival of the species in the wild.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and Poaching is a deadly crime against wildlife. Few poachers are caught or punished. One solution that would fit just about any circumstance though, would be to administer stiffer laws and harsher sentences for those caught poaching.

During formal interview and discussion with local it was noted that study area is not prone to poaching or any other wildlife violence related to leopard or any other species. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

Moreover, workers will be trained and educated about the importance of leopard for ecology and ultimately for humans; an internal attraction towards the species will be tried to develop. More importantly, worker will make aware of wildlife crime and also subsequent penalties and punishment.

❖ **Habitat Threats / Loss**

Loss of suitable habitat like forests and lack of water resource in respective area are a major cause of the declining the population density of Tigers in India. Due to the continuous decaling of forest results lack of other animals on which Tigers feeds.

• **Habitat Improvement Plan**

Tiger lives in a variety of dry and wet forests, and also in some grassland, where boulders, rocks and scattered shrubs and trees provide shelter. Habitat of the species will be improved by planting suitable species in surrounding areas. The prey species preferred by Tiger will be conserved to insure sufficient prey availability, which will also reduce the conflict with humans.

3.3. *Panthera pardus* (Leopard or Panther)

Photo Source: http://imgc.allpostersimages.com

i. Classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Felidae
Genus	*Panthera*
Species	*P. pardus*

ii. Conservation Status

The Leopard is classified as Near Threatened as per the IUCN red list of threatened species and species is mentioned under the Schedule-I of Wildlife Protection Act, (1972). *Panthera pardus* is listed in CITES Appendix I.

iii. Habitat

On the Indian subcontinent, topographical barriers to the dispersal of this subspecies are the Indus River in the west, and the Himalayas in the north. In the east, the lower course of the Brahmaputra and the Ganges Delta form natural barriers to the distribution of the Indochinese leopard. Indian leopards are distributed all over India, in Nepal, Bhutan, Bangladesh and parts of Pakistan. They inhabit tropical rain forests, dry deciduous forests, temperate forests and northern coniferous forests but do not occur in the mangrove forests of the Sundarbans. In Uttarakhand, Leopard is mainly found in Jim Corbet National Park and Rajaji National Park.

iv. Food and Feeding

The diet of the Leopard is highly varied, including both large and small prey. It often consists mainly of small and medium-sized mammals (5 to 45 kg), but may range from large beetles to ungulates (hoofed mammals) several times their size. Leopards are probably the most accomplished stalkers and climbers of the big cats. Their varied diet includes wildebeest, impalas, reed-bucks, Thomson's gazelles, jackals, baboons and storks. They routinely drag carcasses bigger than themselves into trees to avoid losing prey to other carnivores. Mostly they prefer hunting at night. Like other felids (i.e., members of the cat family), Leopards commonly kill their prey with a bite to the throat, although smaller prey may be dispatched with a bite to the nape or back of the head.

v. Ecological Threats and Conservation Plan

❖ **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the numbers of Leopard in wild other than the natural death of the animal. This is mainly due to reduction in their habitat range, forest degradation, scarcity of food and water in their habitat etc. In India, leopards are feared for their attacks on people.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting is a deadly crime against wildlife while, forestation will be done surrounding the mine area for enhancement of habitat, protecting the loss of Leopard diversity due to habitat loss.

❖ **Conflicts with Human/Farmers**

Leopard-human conflict is a serious problem in India and the subcontinent and is another cause of significant mortality of Leopards. India's Forest Department is entitled to set up traps only in cases of a leopard having attacked humans. Expansion of agriculturally used land, encroachment of humans and their livestock into protected areas are main factors contributing to habitat loss and decrease of wild prey. As a result, leopards approach human settlements, where they are tempted to prey on dogs, pigs

and goats- domestic livestock, which constitutes an important part of their diet, if they live on the periphery of human habitations.

- **Conservation Measures**

The prey species preferred by Leopard will be conserved to insure sufficient prey availability, which will also reduce the conflict with humans. Biological fences will be used to protect the livestock from the leopard attack. The awareness among the farmers will be generated through the formal educational programmes.

❖ **Poaching**

A significant immediate threat to wild leopard populations is the illegal trade in poached skins and body parts between India, Nepal and China. Illegal trade in Leopard body parts (skin, bones, and claws) continues to threaten the survival of the species in the wild. Buyers choose the skins from dealers or tanneries and smuggle them through a complex interlinking network to markets outside India, mainly in China.

- **Conservation Measures**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and Poaching is a deadly crime against wildlife. Few poachers are caught or punished. One solution that would fit just about any circumstance though, would be to administer stiffer laws and harsher sentences for those caught poaching.

During formal interview and discussion with local it was noted that study area is not prone to poaching or any other wildlife violence related to leopard or any other species. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

❖ **Habitat Threats**

Loss of forest areas outside parks and reserves poses a major threat to leopard because it causes population fragmentation, thereby leaving small, nonviable populations within the parks or their movements in human territories which raise conflicts. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and mining of minerals also possess threats to the habitat of species.

- **Habitat improvement**

Leopard lives in a variety of dry and wet forests, and also in some grassland, where boulders and scattered shrubs and trees provide shelter. The leopard has the widest habitat tolerance of any big cat in India. Habitat of the species will be improved by planting suitable species in surrounding areas. The prey species preferred by leopard will be conserved to insure sufficient prey availability, which will also reduce the conflict with humans.

3.4. *Manis crassicaudata* (Indian Pangolin)

Photo Source: www.google.com

i. Classification

Kingdom : Animalia
Phylum : Chordata
Class : Mammalia
Order : Pholidota
Family : Manidae
Genus : Manis
Species : *M. crassicaudata*

ii. Conservation Status

The Pangolin (*Manis crassicaudata*) present in Uttarakhand, classified as endangered on the IUCN red list of threatened species. Also, mentioned under the Schedule-I of Wildlife Protection Act, (1972) in India. Indian pangolin is endangered by hunting for its meat and for various body parts used in traditional medicine. Although these pangolins are protected by national legislation in many protected areas throughout their range, they are heavily exploited for their meat and their supposed magical or medicinal properties.

iii. Habitat

The Indian Pangolin (*Manis crassicaudata*) has been recorded from various forest types, including rainforest, plains, grasslands and secondary forests. It is well adapted to desert regions as it is believed to have a tolerance to dry areas, but prefers more barren, hilly regions. It prefers soft and semi-sandy soil conditions suitable for digging burrows. On the basis of behavior its burrows can be divided into two following categories:

- **Feeding burrows:** Feeding burrows are smaller than living burrows (though their sizes vary depending on the abundance of prey) and are created more frequently during the spring, when there is a greater availability of prey.
- **Living burrows:** Living burrows are wider, deeper, and more circular, and are occupied for a longer time than feeding burrows, as they are mainly used to sleep and rest during the day. After a few months, the pangolin abandons the burrow and digs a new one close to a food source. However, it is not uncommon for the pangolin to shift back to an old burrow.

The Indian Pangolin (*Manis crassicaudata*) does not climb trees, but it does value the presence of trees, herbs, and shrubs in its habitat because it is easier to dig burrows around them. Features that promote an abundance of ants and termites (grasses, bare grounds, bases of trees, shrubs, roots, leaf litter, fallen logs and elephant feces) are often present in pangolin habitats.

iv. Food and Feeding

The Indian pangolin is almost entirely insectivorous. The diet includes beetles, cockroaches, termites and possibly worms, among all, they mostly prefers termites. Hence, in order to maintain sufficient prey or food availability for the Pangolin, 'termitaries' (termite nest) present in the study area will be protected with involvement of workers as well as local people.

v. Threats and Conservation Action Plan for Pangolin

❖ **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Pangolin in wild other than the natural death. In India, poaching for the meat and for their various body parts as used in traditional medicine.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and Poaching is a deadly crime against wildlife. Few poachers are caught or punished. One solution that would fit just about any circumstance though, would be to administer stiffer laws and harsher sentences for those caught poaching of Pangolins.

❖ **Poaching**

There are instances of poaching and smuggling of Pangolin from Uttarakhand. The scales are used as an aphrodisiac, or made into rings or charms. The skins are used to manufacture leather goods, including boots and shoes. Other threats do include natural predators. At present time Pangolin populations in India appear to be significantly threatened by poaching. It was studied and concluded that their body parts are important in local areas as well as outside India. Poaching of Pangolin is not common in Uttarakhand. Many times Government successfully rescues and release trapped Pangolin into wild.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching of Pangolins or any other wild species. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Moreover, workers will be trained and educated about the importance of Pangolins for ecology and ultimately for humans; an internal attraction towards the species will be tried to develop.

❖ **Habitat Threats**

Loss of forested areas outside parks and reserves poses a major threat to Pangolin because it causes population fragmentation, thereby leaving small, nonviable populations within the parks. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amount of pesticides agricultural areas also possess threats to the habitat of Pangolin species.

- **Conservation Plan**

Pangolin (*Manis crassicaudata*) has been recorded from various forest types, including rainforest and plain to middle hill levels. The animal can also be found in grasslands and secondary forests which have been impacted by humans. There is little known about the current distribution and range of the Indian Pangolin. Habitat of Pangolin will be modified as part of conservation plan. Suitable species will be planted accordingly. They are insectivorous. Hence, in order to maintain sufficient prey or food availability for the Pangolin, 'termitaries' (termite nest) present in the study area will be protected with involvement of workers as well as local people.

3.5. *Melursus ursinus* (Sloth Bear)

Photo Source: www.google.com

i. Classification

Kingdom : Animalia
Phylum : Chordata
Class : Mammalia
Order : Carnivora
Family : Ursidae
Genus : *Melursus*
Species : *M. ursinus*

ii. Conservation Status

The sloth bear classified as vulnerable on the IUCN red list of threatened species and mentioned under the Schedule-I of Wildlife Protection Act (1972). Bears are endangered by hunting for their gall bladder and bile to which medicinal properties are attributed.

iii. Habitat

Sloth bears live in a variety of dry and wet forests, and also in some grassland, where boulders and scattered shrubs and trees provide shelter.

iv. Food and Feeding Habits

The dentition indicates that bears are more herbivores and there is a departure from carnivores. In fact, they are omnivorous. Their diet includes largely insects and grubs which can be dug out from the ground or from the underneath of bark of standing trees or fallen logs. They eat termite and bee nests by suction and creating a vacuum in the nest by keeping snout close to the mound. Also, they prefer to eat leaves, root, honey, flowers (Mahua & Semal) and fruits (Ber, Tendu, Jamun, Baheda and Amla etc.) in the season. Bears sometimes raid sugarcane and maize crop incase their habitats have food shortage.

v. 5. Threats and Conservation Plan for Sloth Bear

❖ **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of bears in wild other than the natural death of the animal. In India, poaching for the medicinal market and use as 'Dancing' bears reduces numbers in the wild.

❖ **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and Poaching is a deadly crime against wildlife. Few poachers are caught and punished in Uttarakhand.

❖ **Poaching**

At present time Sloth bears populations in India appear to be significantly threatened by poaching. Body parts of bears are less important in local areas; hence poached bears are typically exported. News of poaching of bears species is common in Jharkhand and Odisha. Many times Government successfully rescues and release trapped sloth bears into wild. Poaching of Sloth bears in Uttarakhand strictly prohibited.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any violence related to sloth bears. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Moreover, workers will be trained and educated about the importance of Sloth bear for ecology and ultimately for humans; an internal attraction towards the species will be tried to develop.

❖ **Habitat Threats**

Loss of forested areas outside parks and reserves poses a major threat to sloth bears because it causes population fragmentation, thereby leaving small, nonviable populations within the parks. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products and expansion of agricultural areas possess threats to the habitat of species.

- **Conservation Plan**

Sloth bears live in a variety of dry and wet forests, and also in some grassland, where boulders and scattered shrubs and trees provide shelter. Sloth bears are considered vulnerable animals and they are threatened by habitat loss. Habitat of the species will be improved by planting suitable species in surrounding areas. The water bodies in and around the forest areas will be maintained in good condition for use by wildlife.

Other than plant products, diet of Sloth bear chiefly includes termites, insects and honey. It will be instructed to workers as well as local residents not to destroy or damage termite structure and also extract honey in optimal quantity. Honey is the favorite of sloth bear. Inclusion of some important Asian bees forage plants **(Table 5)** in plantation programme will be favorable for sloth bear as well as to improve the animal and plant diversity of the area.

Table 5: Asian Bee Forage Plants to be Included in Plantation Programme

Plant Species	Family	Common Name
Aesculus turbinata	Hippocastanaceae	Japanese horse-chestnut
Astragalus sinicus	Leguminosae	Chinese milk vetch
Bombax ceiba	Bombaceae	Silk-cotton tree
Brassica campestris	Cruciferae	Rape
Brassica sp.	Cruciferae	Mustard
Castanea pubinervis	Fagaceae	Sweet chestnut
Ceiba pentandra	Bombaceae	Kapok
Cucumis sp.	Cucurbitaceae	Cucumber, Melon
Cucurbita moschata	Cucurbitaceae	Pumpkin
Diospyros kaki	Ebenaceae	Persimmon
Eucalyptus sp.	Myrtaceae	Eucalyptus
Eupatorium odoratum	Compositae	Snakeroot
Euphoria longan	Sapindaceae	Longan, Lamyai
Fagopyrum esculentum	Polygonaceae	Buckwheat
Helianthus annulus	Compositae	Sunflower
Hevea brasiliensis	Euphorbiaceae	Rubber
Malus pumice	Rosaceae	Apple
Melilotus alba	Leguminosae	Sweet clover
Prunus sp.	Rosaceae	Cherry, Apricot, Peach
Pyrus pyrifolia	Rosaceae	Pear
Salix sp.	Salicaceae	Willows
Styrax japonica	Styracaceae	Snowball
Tithonia diversifolia	Compositae	Mexican sunflower
Trifolium pretense	Leguminosae	Red clover
Zizyphus jujuba	Rhamnaceae	Chinese jujube
Source: Gaur *et al*. (2014).		

❖ Sloth Bear-Human Conflicts

Sloth bears are known for their aggressiveness, both towards humans and towards other large mammals. They seem to avoid human contact, when possible, but may encounter humans when they are entering into croplands or when people enter the forest. Sloth bears seem to have a low tolerance toward people when they inadvertently meet. There are lots of described incidents of mauling of humans by sloth bears.

- **Conservation Plan to Mitigate the Conflicts**

Conflict arises mainly due to scarcity of food for sloth bear in the forest and it enters residential area in search of food resulting in animal-human conflicts. This may be reduced by (1) Planting suitable food trees and (2) Public awareness of importance of animal in the local ecology.

3.6. *Rucervus duvaucelii* (Barasingha or Swamp Deer)

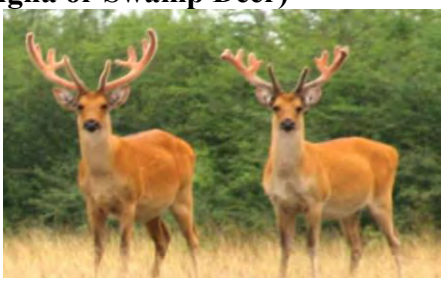


Photo Source: http://www.southtexasexotics.com

i. Classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Artiodactyla
Family	Cervidae
Genus	Rucervus
Species	R. *duvaucelii*

ii. Conservation Status

The Barasingha (Swamp deer) is classified as Vulnerable as per the IUCN red list of threatened species and also mentioned under the Schedule-I of Wildlife Protection Act, (1972) in India.

iii. Food and Feeding

Barasingha is predominantly a grazer, but at least some species also known to feed occasionally on aquatic plants during the monsoon and winter seasons. They largely feed on grasses and aquatic plants, foremost on *Saccharum* sp., *Imperata cylindrica*, *Narenga porphyrocoma*, *Phragmites karka*, *Oryza rufipogon*, *Hygroryza* sp. and *Hydrilla* sp.

iv. Habitat

Swamp Deer populations use variety of habitat for their survival. In Indian, they are found generally in open forest along with grass glades. True Swamp Deer, inhabiting flooded tall grassland. In Uttarakhand, they are found in Rajaji National Park and Jim Corbett National Park.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Swamp deer in wild, parks and grassland other than the natural death. This is mainly due to reduction in their habitat range (Forest and Grassland), scarcity of food and water in their habitat etc. However, Swamp deer is often found in areas where they share their habitats with larger carnivorous mammals such as Tigers, Leopards, Dogs and Bears which could be of threat to them.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Swamp deer is a deadly crime against wildlife. While, forestation and grassland development will be done surrounding the area for enhancement of habitat, protecting the loss of Swamp deer diversity due to habitat loss.

- **Poaching**

Poaching of Swamp deer for their meat and horns has declined their population in many parts of India. Whereas, Swamp deer is often hunted illegally by many communities for sale in local markets. On the other hand, poaching case of Swamp deer has not been observed in and around the Dehradun and other district.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and poaching of Swamp deer is a deadly crime against wildlife. During formal interview and discussion with local people living in the study area, it was observed that study area is not prone to poaching or any other wildlife violence related to Swamp deer and any other species. In present study area, public awareness programme will be conducted regarding the facts and laws of protection and conservation of Swamp deer. Any kind of illegal poaching and collection of horns noted in study area will be immediately informed to concern authority.

- **Conflicts with Human/Farmers**

During the cropping season in different parts of India, the Swamp deer can be a nuisance to agriculture as they damage crops. Swamp deer are herbivores and their diet includes seeds, fruits and flower buds. To counter drop damage by Swamp deer many time farmers used hunt them to protect their crop.

- **Conservation Plan**

The role of Swamp deer in cropland ecosystem is not very crucial. The awareness among the farmers will be generated through the formal educational programmes. On the other hand, in buffer

zone of present mining area, public awareness programme will be conducted regarding the facts and laws of protection and conservation of Swamp deer.

- **Habitat Threats/Loss**

Rapid habitat destruction and scarcity of suitable food are the major cause of the declining the numbers of Swamp deer in India. These animals are threatened mainly due to deforestation, the conversion of their habitat to agricultural land; and the burning of grassland. Due to shrinking habitat, they shared their habitat with several carnivores animals, which is a major cause to reduce their numbers frequently.

- **Habitat Improvement**

Swamp deer is capable of surviving both in natural habitat as well as artificial manmade ecosystems like croplands, grassland, community forests and Parks. The plantation of suitable species will be done in the buffer zone to modify their habitat. The species planted as part of greenbelt will be also selected as per the feeding habits of Swamp deer and will be included in plan. The grass species preferred by them will be conserved to insure sufficient food availability, which will also reduce the conflict with humans.

3.7. Herpestes *edwardsi* (Common Mongoose)

Photo Source: https://en.wikipedia.org

i. Classification

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Carnivora
Family	Herpestidae
Genus	*Herpestes*
Species	*H. edwardsii*

ii. Conservation Status

Common Mongoose are widely distributed in the wild across India and protected in many areas and by law in India. Indian Common Mongoose is mentioned in **Schedule-II** of Wildlife Protection Act (1972), indicates its conservation values. Illegal poaching for meat however continues and declines have been noted in different parts of India.

iii. Habitat

The Indian mongoose (*Herpestes edwardsii*) population use variety of habitat for their survival. In Indian, they are found generally in open forest along with grass glades and grassland. In Uttarakhand, they are commonly found along with in Rajaji National Park, Jim Corbett National Park and other forest areas. Generally, it is found in human-dominated landscapes.

iv. Food and Feeding

The Indian grey mongoose is mainly active during the day, feeding on a variety of prey, including insects, spiders, scorpions and other invertebrates, as well as frogs, lizards, rodents and snakes. It may also take vegetable matter such as fruit, and feeds on refuse and carrion. This species often kills and eats venomous snakes, being agile and quick enough to avoid being bitten. A small number of mongoose species, including the Indian grey mongoose, may be introduced to new areas in order to kill rats and snakes.

v. Major Threats

Although, this species as a whole is not thought to face any major threats, it may experience some localized ones. In some areas, the Indian grey mongoose is captured and sold as a pet or for its skin, and all mongoose species are in demand for the wildlife trade. The meat is eaten by some tribes, and the hair used to make brushes and good luck charms.

- **Conservation of Mongoose**

The Indian grey mongoose is listed on Appendix III of the Convention on International Trade in Endangered Species (CITES), meaning that there is some regulation of international trade in this species. This mongoose is legally protected in India, and in central India it is considered a sacred species and is not killed. The Indian grey mongoose also occurs in many protected areas. However, the IUCN recommend that further field surveys, ecological studies, habitat protection and monitoring of threats are needed in order to ensure that populations of this small carnivore remain secure. On the other hand some conservation measures will be follows:

- The natural habitat will be preserved and habitat improved works will be carried out by planting bushes and shrubs.
- The existing natural habitat in the area will be preserved.
- The people living in the surrounding area and employee of the company would be motivated towards the protection of the animal. Motivation will lead to timely information to the concerned authorities about any threat to wild life or any cases of pouching/hunting.

3.8. *Canis aureus* (Golden Jackal)

Source: https://commons.wikimedia.org/wiki/File:A_Golden_Jackal-Powalgarh,Uttarakhand,India.jpg

i. Classification

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Mammalia
Order	:	Carnivora
Family	:	Canidae
Genus	:	Canis
Species	:	*C. aureus*

ii. Conservation Status

Canis aureus is evaluated by IUCN and mentioned as least concern whereas; it is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India.

iii. Habitat

The Golden jackal is the most northerly of jackal species, and also the most widely distributed. Golden jackals prefer dry open country, arid short grasslands and steppe landscapes. In Uttarakhand, they are commonly found along with in Rajaji National Park, Jim Corbett National Park and other forest areas.

iv. Food and Feeding

Golden jackals consume 54% animal food and 46% plant food. They are opportunistic foragers with a very varied diet, which consists of young gazelles, rodents, (especially during winter), hares, ground birds and their eggs, reptiles, frogs, fish, insects and fruit. They take carrion on occasion.

vi. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Golden jackals in India.

• Conservation Plan

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Golden jackals is a deadly crime against wildlife. While, greenbelt and grassland development will be done in the surrounding areas of respective projects for enhancement of habitat and protecting the loss of Golden jackals diversity.

- **Conflicts with Human/Farmer**

In India, several Golden jackals are killed due to ignorance or out of fear when they enter habitation and capture goats or poultry. They raids crops such as corn, sugarcane and watermelon. Individuals have also attacked Caracul sheep with such frequency that sheep-herders have had to make their pastures jackal-proof by enclosing them.

• Conservation Plan

The workers are more prone to encounter the Jackals in study area. For maintaining the ecological integrity of forests and other habitats of Golden jackals, local villagers, farmers and workers will be educated through the awareness programme to play ecologically significant role conservation and protection of Golden jackals. Also, workers will be educated and facilitate to avoid the any encounter with the Jackals.

- **Poaching**

It has recently been hunted for its distinctive hood markings in the production of handbags. The jackals are rarely hunted by human while some tribal population poaches it for meat.

• Conservation Plan

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Jackals because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Jackals as well as their prey material.

• Conservation Action

For habitat improvement for Jackals, all possible activities will be carried out in the study area of respective projects. Their habitat will be improved in the study area by planting suitable species along with the development of grasslands in the respective area. Any existing stream and pond will be preserved. In order to maintain sufficient prey or food availability for the Jackals, study area will be protected with the involvement of workers as well as local people.

3.9. *Ratufa indica* (Indian Giant Squirrel)

Photo Source: http://natureconservation.in

i. Classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Mammalia
Order:	Rodentia
Family:	Sciuridae
Genus:	Ratufa
Species:	*R. indica*

ii. Conservation Status

Ratufa indica is evaluated by IUCN and mentioned as least concern due to its widespread range in areas with optimum food and shelter. This species is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India.

iii. Habitat

This is an arboreal and nocturnal species. In India, it is widespread in lowland and hill evergreen broad-leaved forest, up to about 1000 m, and probably also inhabits deciduous dipterocarp forest. Also, In addition to natural forest, it has been recorded from dry deciduous forests. It is found to occupy tree canopies and holes. In Uttarakhand, they are commonly found along with in Rajaji National Park, Jim Corbett National Park and other forest areas.

iv. Food and Feeding

Indian giant flying squirrels very selective in their diet. They feed mostly on fruits, flowers and leaves (including buds, petioles, young leaves, and mature leaves). Also, they prefer some plat species such as *Castanopsis cuspidata, Ficus superba* and *Glochidion acuminatum.*

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Indian giant flying squirrels in their respective habitats other than the natural death. Loss of forest areas due to climate change and deforestation are a major threat to them in India.

• Conservation Plan

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Indian giant flying squirrels is a deadly crime against

wildlife. While, forestation and grassland development will be done surrounding the mining area for enhancement of habitat and protecting the loss of Indian giant flying squirrels.

- **Conflicts with Human and Poaching**

In India, several Indian giant flying squirrels are killed due to ignorance or out of fear when they enter into the fruits garden. It has recently been hunted for its distinctive hood markings in the production of handbags, whereas, some tribal population poaches it for meat.

• Conservation Plan

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Both, local villagers and workers will be educated regarding maintaining the ecological integrity of forests and other habitats of Indian giant flying squirrels. Also, workers will be educated and facilitate to avoid the any encounter with the Indian giant flying squirrels.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Indian giant squirrels, because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Indian giant squirrels as well as their food material.

• Conservation Action

For habitat improvement for Indian giant squirrels, all possible activities will be carried out in the buffer of present mine area. Their habitat will be improved in the study area by planting suitable species along with the development of grasslands in the respective area. In order to maintain sufficient food availability for the Indian giant squirrels, study area will be protected with the involvement of workers as well as local people. The species planted as part of greenbelt will be also selected as per Indian giant squirrels requirement and will be included in plan to o insure sufficient food availability, which will also reduce the conflict with humans.

3.10. *Felis chaus* (Jungle cat)

Photo Source: https://farm9.staticflickr.com

i. Classification

Kingdom: Animalia
Phylum : Chordata
Class : Mammalia
Order : Carnivora
Family : Felidae
Genus : Felis
Species : *F. chaus*

ii. Conservation Status

Jungle cat (*Felis chaus*) is nocturnal, rare and elusive cat, which is mentioned as least concern on IUCN Red List (2010). In India, it is accorded the highest protection by being placed in Schedule II of the Indian Wildlife Protection Act (1972). Hunting Jungle cat is prohibited Uttarakhand as well as whole in India.

iii. Habitat

Jungle cats prefer habitats near water with dense vegetative cover but can be found in a variety of habitats including deserts (where they are found near oases or along riverbeds), grasslands, shrubby woodlands and dry deciduous forests, as well as cleared areas in moist forests. They are commonly found in tall grass, thick brush, riverside swamps, and reed beds. They also adapt well to cultivated land and can be found in many different types of agriculture and forest plantations.

iv. Food and Feeding

Jungle cats primarily prey on animals that weigh less than 1 kg and commonly consume rodents, lizards, snakes, frogs, birds, hare, fish, insects, livestock, and even fruit during the winter. Rodents are its primary prey item, however, which provides up to 70% of its daily energy intake.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the numbers of Jungle Cat in wild other than the natural death of the animal. This is mainly due to reduction in their habitat range, Wetland degradation, scarcity of food and water in their habitat etc.

However, Jungle Cat is often found in areas where they share their habitats with larger carnivorous mammals such as tigers and bears which could be of threat to them. Jungle Cat hunted mainly for their fur and skins for commercial purposes. Although commercial trade is much reduced, the species continues to be hunted throughout most of its range for fur, for food, and as pets. They are also widely viewed as poultry pests and killed in retribution.

• Conservation Plan

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting is a deadly crime against wildlife. While, some pond will be

created surrounding the mine area for enhancement of habitat, protecting the loss of Jungle cat diversity due to habitat loss.

- **Conflicts with Human**

People are the biggest threat to the Jungle Cat as they have not only destroyed much of their unique wetland homes with increasing levels of industrial and commercial activity but they have also been known to hunt them over the years for their meat and fur. Sometimes, cats approach villages and other human settlement for food and got hurt by peoples.

• Conservation Plan

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting is a deadly crime against wildlife. Hunting is prohibited in India. While, awareness programme will be conducted in surrounding areas regarding to the ecology and the importance of wildlife.

- **Poaching**

Despite now being a protected animal species, large seizures of Jungle Cat skins at local markets still occur which indicates that poachers are still decimating populations, particularly in certain areas. The poaching of fishing cat by people for their meat, skin and fur has obliterated populations in many areas, but poaching activities in present mine area have not been observed.

• Conservation Plan

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and Poaching is a deadly crime against wildlife. During formal interview and discussion with local it was noted that study area is not prone to poaching or any other wildlife violence related to Jungle cat or any other species. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

- **Habitat Threats/ Loss**

The main problem facing Jungle cats in the wild is the destruction of wetlands. A recent survey found that over 50% of Asian wetlands faced threat of draining, pollution, and human encroachment.

• Habitat improvement

A Jungle cat lives mostly near by the aquatic habitats and wet forests. They also prefer to live in some grassland, where boulders and scattered shrubs. Habitat of the species will be improved by digging some ponds and some fish species will be explored into it. Plantation of suitable species in surrounding the ponds and other areas will be done. The prey species preferred by Jungle cat will be conserved to insure sufficient prey availability, which will also reduce the conflict with humans.

3.11. *Macaca mulatta* (Rhesus Macaque)

Photo Source: http://thumbs.dreamstime.com

i. Classification

Kingdom : Animalia
Phylum : Chordata
Class : Mammalia
Order : Primates
Family : Cercopithecidae
Genus : *Macaca*
Species : ***M. mulatta***

ii. Conservation Status

The rhesus macaque (Macaca mulatta), is one of the best-known species of Old World monkeys. In India, it is placed in Schedule II of the Indian Wildlife Protection Act (1972). It is listed as Least Concern in the IUCN Red List of Threatened Species.

iii. Habitat

Rhesus macaques inhabit arid, open areas and also found in grasslands, woodlands and in mountainous regions up to 2,500 m (8,200 ft) in elevation. Rhesus macaques are noted for their tendency to move from rural to urban areas, coming to rely on handouts or refuse from humans.

iv. Food and Feeding

They have also been observed eating termites, grasshoppers, ants and beetles. When food is abundant, they are distributed in patches and forage throughout the day in their home ranges. They drink water when foraging and gather around streams and rivers. Rhesus macaques have specialized pouch-like cheeks, allowing them to temporarily hoard their food.

v. Ecological Threats and Conservation Plan

- **Direct Population Treats**

Loss of forest areas a major threat to Rhesus macaques in India. Furthermore, habitat degradation outside the parks, caused by overgrazing, overharvest of forest products and mining of minerals also possesses threats to the habitat of species.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting Rhesus macaques is a deadly crime against wildlife. While, plantation will be done surrounding the mine lease area for enhancement of the habitat.

- **Conflicts of Tigers with Human & Farmers**

The intensity of Rhesus macaques and human conflicts has significantly increased. Rhesus macaques are known for their aggressiveness sometimes. They seem to avoid human contact, when possible, but may encounter humans when they are enticed into croplands or when people enter the forest. On the other hand, it was also found that group of Macaques spoiled more crops than they actually eat; juveniles and infants in particular brought about damage during play on the agricultural ground.

- **Conservation Plan**

Conflict arises mainly due to scarcity of habitat and food for Rhesus macaques in the forest and it enters residential area in search of food resulting in animal-human conflicts. This may be reduced by (1) Plantation to enhance the habitat, (2) Public awareness of importance of animal in the local ecology.

- **Poaching**

Rhesus macaques were once seriously threatened by the rate of capture and export for use in biomedical research. In the 1960s, often 50,000 juvenile rhesus macaques were trapped and shipped from India per year, crippling the population growth of rhesus in India. There are still some rhesus macaques trapped and used for research within India, but the effect of the population is negligible compared to previous levels of usage.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and poaching of Rhesus macaques is a deadly crime against wildlife.

During formal interview and discussion with local it was noted that study area is not prone to poaching or any other wildlife violence related to Rhesus macaques or any other species. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Moreover, workers will make aware of wildlife crime and also subsequent penalties and punishment.

- **Habitat Threats / Loss**

Loss of suitable habitat like forests and lack of water resource in respective area are a major cause of the declining the population density of Rhesus macaques in India. Due to the continuous decaling of forest results lack of fruits and food materials on which Rhesus macaques feeds.

- **Habitat Improvement Plan**

Rhesus macaques live in a variety of dry and wet forests, and also in some grassland. Habitat of the species will be improved by planting suitable species in surrounding areas. The plant species preferred for shelter and food will be conserved to insure sufficient habitat and food availability, which will also reduce the conflict with humans.

CONSERVATION REPTILES AND LIZARDS

3.12. *Python molurus* (Indian Python)

Photo source: http://upload.wikimedia.org

2.1. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Reptilia
Order	**:**	Squamata
Family	**:**	Pythonidae
Genus	**:**	*Python*
Species	**:**	*P. molurus*

2.2. Conservation Status

The Indian Python is classified as Near Threatened on the IUCN Red List of Threatened Species; moreover this species is mentioned under the Schedule-I of Wildlife Protection Act (1972). This listing indicates that it may become threatened with extinction and is in need of frequent reassessment.

2.4.2. Habitat

Indian Python occurs in a wide range of habitats, including grasslands, swamps, marshes, rocky foothills and woodlands. They depend on a permanent source of water. Sometimes they can be found in abandoned mammal burrows, hollow trees, dense water reeds and mangrove thickets.

2.4.4. Food and Feeding

Indian Python mainly are carnivore animals and feed on mammals, birds and reptiles indiscriminately, but seem to prefer mammals. Live prey is constricted and killed by Python. After a heavy meal, an individual may fast for weeks. The python can swallow prey bigger than its diameter because the jaw bones are not connected. Moreover, prey cannot escape from its mouth because of the arrangement of the teeth (which are reversing saw-like).

2.5. Ecological Threats and Conservation Plan

2.5.1. Direct Population Threats

Direct population threats include all reasons and actions which directly reduce the number of Indian Python in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Indian Python in India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Pythons is a deadly crime against wildlife. For improvement of habitats, forestation and grassland development will be done surrounding the respective project area to ensure the enhancement of habitat and protecting the loss of Python diversity.

2.5.2. Conflicts with Human/Farmer

Several Indian Python are killed due to ignorance or out of fear when they enter habitation and capture goats or poultry. For some strange reasons, snakes have always been associated with fear in the minds of most people. The inborn fear regarding their toxic venom plays a key role in killing most snakes, irrespective of whether they are harmful or not. While humans on encountering any Python tried to kill the snake in dread of any damage to them.

- **Conservation Plan**

The workers are more prone to encounter the Python in study area. The most basic requirements are willingness and inclination to learn and differentiate the poisonous and the no venomous snakes. The minute the farmers or the workers, spot a snake; they should be in a position to distinguish between a triangular and a round headed snake and the patterns associated with the snake. Both local villagers and workers will be educated facilitate to avoid the any snake bite. Following precautionary measures will be taken:

- Adequate lighting in and around the living quarters.
- Fire wood stacks to be set up far away from the house.
- Workers need to be protected with footwear.
- Workers need to be provided with adequate lighting (torch lights) during night times.

2.5.3. Poaching

The beautiful and shiny skin of the Indian Python makes them target species for poachers. In some area the meat is eaten by locals as the fat is purported to have medicinal value. Also, Pythons are hunted extensively for their patterned skin, which is made into leather. The skin of Indian Python has high value in international market as used to manufacture leather goods, including boots and shoes.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence related of Indian Python. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Moreover, workers will be trained and educated about the importance of Indian Python for ecology and will be made aware of wildlife crime and also subsequent penalties and punishment.

2.5.4. Habitat threats/Loss

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Indian Python because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Indian Python as well as their prey material.

- **Habitat Improvement**

For habitat improvement of Indian Python all possible activities will be carried out in the study area. Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. Any existing stream and pond will be preserved and no discharge of any harmful effluent will be drained in the stream. If needed artificial wetlands will be created to improve the micro-habitat of species. If any Python is spotted within or nearby the lease area, it will be immediately informed to concern authority and suitable rescue plan will be adopted.

3.13. *Naja naja* (Indian Cobra)

Photo source : http://atozwallpaper.com

i. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Reptilia
Order	**:**	Squamata
Family	**:**	Elapidae
Genus	**:**	*Naja*
Species	**:**	*N. naja*

ii. Conservation Status

This species is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India. It is listed under the CITES treaty because it closely resembles other species that are threatened and in need of protection.

iii. Habitat

Indian Cobra's occurs in a wide range of habitats, including grasslands, rocky foothills and in wild forest and in cultivated areas. They depend on a permanent source of water. Sometimes they can be found in abandoned mammal burrows, hollow trees, dense water reeds and mangrove thickets.

iv. Food and Feeding

The Indian cobra feeds on rodents, lizards and frogs. It bites quickly, and then waits while its venom damages the nervous system of the prey, paralyzing and often killing it. Like all snakes, Indian Cobra swallows its prey whole. This species sometimes enters buildings in search of rodent prey.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Indian Cobra in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Indian Cobra's in India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Indian Cobra is a deadly crime against wildlife. Forestation and grassland development will be done in the study area for enhancement of habitat and protecting the loss of Cobra's diversity.

- **Conflicts with Human/Farmer**

Several Indian Cobra's are killed due to ignorance or out of fear when they enter habitation and capture goats or poultry. For some strange reasons, snakes have always been associated with fear in the minds of most people. The inborn fear regarding their toxic venom plays a key role in killing most snakes, irrespective of whether they are harmful or not.

- **Conservation Plan**

The workers are more prone to encounter the Indian Cobra in study area. The most basic requirements are willingness and inclination to learn and differentiate the poisonous and the no venomous snakes. Both, local villagers and workers will be educated regarding while conducting the awareness programme to play ecologically significant role in maintaining the ecological integrity of forests and other habitats of Indian Cobra. Following precautionary measures will be taken:

- Adequate lighting in and around the living quarters.
- Fire wood stacks to be set up far away from the house.
- Workers need to be protected with footwear.
- Workers need to be provided with adequate lighting (torch lights) during night times.

- **Poaching**

The beautiful and shiny skin of the Indian Cobra makes them target species for poachers. In some area the meat is eaten by locals as the fat is purported to have medicinal value. Also, Indian Cobra's are hunted extensively for their patterned skin, which is made into leather. The skin of Indian

Cobra has high value in international market as used to manufacture leather goods, including boots and shoes.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence related of Indian Cobra. But, precaution will be always taken while dealing with wildlife. And, workers will be trained and educated about the importance of Indian Cobra for ecology and ultimately for humans; an internal attraction towards the species will be tried to develop. More importantly, worker will be made aware of wildlife crime and also subsequent penalties and punishment.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Indian Cobra because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Indian Cobra as well as their prey material.

- **Conservation Action**

For habitat improvement of the Indian Cobra, all possible activities will be carried out in the present study area. Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. If needed artificial wetlands will be created to improve the micro-habitat of species.

3.14. *Ophio-phagus Hannah* (King Cobra)

Source: http://www.anipedia.net/serpientes/cobras/

i. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Reptilia
Order	**:**	Squamata
Family	**:**	Elapidae
Genus	**:**	*Ophiophagus*
Species	**:**	***O. hannah***

ii.Conservation Status

Although, the *Ophio-phagus Hannah* (King Cobra) is classified as vulnerable on the IUCN Red List of Threatened Species. This species is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India.

iii.Habitat

King Cobra occurs in a wide range of habitats, including grasslands, rocky foothills and in wild forest and in cultivated areas. They depend on a permanent source of water. Sometimes they can be found in abandoned mammal burrows, hollow trees, dense water reeds and mangrove thickets.

iv. Food and Feeding

The King Cobra feeds on rodents, lizards and frogs. It bites quickly, and then waits while its venom damages the nervous system of the prey, paralyzing and often killing it. Like all snakes, King Cobra swallows its prey whole. This species sometimes enters buildings in search of rodent prey.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of King Cobra in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to King Cobra in India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of King Cobra is a deadly crime against wildlife. Forestation and grassland development will be done in the study area for enhancement of habitat and protecting the loss of King Cobra's diversity.

- **Conflicts with Human/Farmer**

Several King Cobra's are killed due to ignorance or out of fear when they enter habitation and capture goats or poultry. For some strange reasons, snakes have always been associated with fear in the minds of most people. The inborn fear regarding their toxic venom plays a key role in killing most snakes, irrespective of whether they are harmful or not.

- **Conservation Plan**

The workers are more prone to encounter the King Cobra's in study area. The most basic requirements are willingness and inclination to learn and differentiate the poisonous and the no venomous snakes.. Both, local villagers and workers will be educated regarding while conducting the awareness programme to play ecologically significant role in maintaining the ecological integrity of forests and other habitats of King Cobra's. Also, workers will be educated and facilitate to avoid the any snake bite. Following precautionary measures will be taken:

- Adequate lighting in and around the living quarters.
- Fire wood stacks to be set up far away from the house.
- Workers need to be protected with footwear.
- Workers need to be provided with adequate lighting (torch lights) during night times.

- **Poaching**

The beautiful and shiny skin of the King Cobra makes them target species for poachers. In some area the meat is eaten by locals as the fat is purported to have medicinal value. Also, King Cobra are hunted extensively for their patterned skin, which is made into leather. The skin of King Cobra has high value in international market as used to manufacture leather goods, including boots and shoes.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or violence related of King Cobra. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Moreover, workers will be trained and educated about the importance of King Cobra for ecology and ultimately for humans; an internal attraction towards the species will be tried to develop.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to King Cobra because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of King Cobra as well as their prey material.

- **Conservation Action**

For habitat improvement of the King Cobra, all possible activities will be carried out in the present study area. Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. Time to time awareness camp will be conducted for workers and local people based on ecology and habitat protection of Wildlife.

3.15. *Ptyas mucosus* (Rat Snake/Oriental Rat Snake)

Photo source : http://www.indiansnakes.org

i. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Reptilia
Order	**:**	Squamata
Family	**:**	**Colubridae**
Genus	**:**	**Ptyas**
Species	**:**	***P. mucosa***

ii. Conservation Status

The Ptyas mucosa is not evaluated by IUCN, whereas; it is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India. It has recently been hunted for its distinctive hood markings in the production of handbags. It is listed under the CITES treaty because it closely resembles other species that are threatened and in need of protection.

iii. Habitat

Remain hidden in dark and silent places like rat holes, termite mounds, wood caves, under rocks or any narrow and dark place. Distributed in variety of forests including rainforest, scrub lands, semi-desert, dry, moist and mixed deciduous forests, grasslands, mangroves, wetlands etc. Lives in almost all kinds of habitat due to its tendency to survive in tough conditions; this includes urban areas, dense & open forest, hills & plains, agricultural lands etc. Prefers wet surroundings during summer (shows semi aquatic behavior few times), while dry during monsoon.

iv. Food and Feeding

Ptyas mucosa feeds on a variety of prey mostly on rodents and toads; also feeds upon birds, small mammals, other snakes, all kind of lizards and their eggs etc.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Ptyas mucosa in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Ptyas mucosa in India.

- **Conservation Plan**

Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Ptyas mucosa is a deadly crime against wildlife. While, forestation and grassland development will be done in the study area and surrounding the mining area for enhancement of habitat and protecting the loss of Ptyas mucosa diversity.

- **Conflicts with Human/Farmer**

In India, several Ptyas mucosa are killed due to ignorance or out of fear when they enter habitation and capture goats or poultry. For some strange reasons, snakes have always been associated

with fear in the minds of most people. The inborn fear regarding their toxic venom plays a key role in killing most snakes, irrespective of whether they are harmful or not.

- **Conservation Plan**

The workers are more prone to encounter the Ptyas mucosa in study area. The most basic requirements are willingness and inclination to learn and differentiate the poisonous and the no venomous snakes. Both, local villagers and workers will be educated regarding while conducting the awareness programme to play ecologically significant role in maintaining the ecological integrity of forests and other habitats of Ptyas mucosa.

- **Poaching**

The beautiful and shiny skin of the Ptyas mucosa makes them target species for poachers. In some area the meat is eaten by locals as the fat is purported to have medicinal value. Also, Ptyas mucosa is hunted extensively for their patterned skin, which is made into leather. The skin of Ptyas mucosa has high value in international market as used to manufacture leather goods, including boots and shoes.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence related of Ptyas mucosa. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. More importantly, worker will be made aware of wildlife crime and also subsequent penalties and punishment.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Ptyas mucosa because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Ptyas mucosa as well as their prey material.

- **Conservation Action**

Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. Any existing stream and pond will be preserved and no discharge of any harmful effluent will be drained in the stream. If needed artificial wetlands will be created to improve the micro-habitat of species. In order to maintain sufficient prey or food availability for the Ptyas mucosa, present in the study area will be protected with the involvement of workers as well as local people. Workers will be instructed not to disturb or damage any kind of wildlife.

3.16.*Daboia russelii* (Russell Viper)

Source : http://rahulalvares.com/2015/06/the-russells-viper/

i. Classification

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Reptilia
Order	:	Squamata
Family	:	Viperidae
Subfamily	:	Viperinae
Genus	:	*Daboia*
Species:		*D. russelii*

ii. Conservation Status

The Russell Viper is classified as least concern on the IUCN Red List of Threatened Species while, it is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India.

iii. Habitat

Russell Viper is not restricted to any particular habitat, but does tend to avoid dense forests. It is mostly found in open, grassy or bushy areas, but may also be found in second growth forests (scrub jungles), on forested plantations and farmland. It is most common in plains, and hills of suitable habitat. Also, this species is often found in highly urbanized areas and settlements in the countryside, the attraction being the rodents commensal with man.

iv. Food and Feeding

Russell viper feeds primarily on rodents, especially murid species. However, it will eat just about anything; including rats, mice, shrews, squirrels, lizards, land crabs, scorpions, and other arthropods. Juveniles are crepuscular, feeding on lizards and foraging actively. As they grow and become adults, they begin to specialize in rodents. Indeed, the presence of rodents and lizards is the main reason they are attracted to human habitation.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Russell viper in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Russell viper in India.

- **Conservation Plan**

Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Russell viper is a deadly crime against wildlife. While, forestation and grassland development will be done in the study area and surrounding the mining area for enhancement of habitat and protecting the loss of Russell viper diversity.

- **Conflicts with Human/Farmer**

In India, several Russell viper are killed due to ignorance or out of fear when they enter habitation/road & highways; and capture goats or poultry. For some strange reasons, snakes have always been associated with fear in the minds of most people. As far as Russell viper is concern they are lethargic and slow moving even in their native habitat.

- **Conservation Plan**

The workers are more prone to encounter the Russell viper in study area. Both, local villagers and workers will be educated regarding while conducting the awareness programme to play ecologically significant role in maintaining the ecological integrity of forests and other habitats of Russell viper. Also, workers will be educated and facilitate to avoid the any snake bite.

- **Poaching**

The beautiful and shiny skin of the Russell viper makes them target species for poachers. Sometimes, poacher caught them to use their fat for medicinal purposes. The skin of Russell viper has high value in international market as their patterned skin used to manufacture leather goods, including boots and shoes etc.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence related of Russell viper. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials. Besides this, workers will be trained and educated about the importance of Russell viper for ecology and ultimately for humans and worker will be made aware of wildlife crime.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland and forest is a major threat to Russell viper because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Russell viper as well as their prey material.

- **Conservation Action**

India has established several large areas to protect the habitat of several endangered wildlife species. Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. In order to maintain sufficient prey or food availability for the Russell viper, present in the study area will be protected with the involvement of workers as well as local people. If any Russell viper is spotted within or nearby the lease area, it will be immediately informed to concern authority and suitable rescue plan will be adopted. Workers will be instructed not to disturb or damage any kind of wildlife.

3.17. *Chamelion calcarata* (Chameleon)

Photo Source : http://www.indiansnakes.org

i. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Reptilia
Order	**:**	Squamata
Family	**:**	Chamaeleonidae
Genus	**:**	*Chamaeleo*
Species	**:**	***C. zeylanicus***

ii. Conservation Status

Although, the *Chameleon* is not evaluated by IUCN. This species is mentioned under the Schedule-II of Wildlife Protection Act (1972) in India. It has recently been hunted for its distinctive hood markings in the production of handbags. It is listed under the CITES treaty because it closely resembles other species that are threatened and in need of protection.

iii. Habitat

Distributed in variety of forests including rainforest, scrub lands, semi-desert, dry, moist and mixed deciduous forests, grasslands, mangroves, wetlands etc. Lives in almost all kinds of habitat due to its tendency to survive in tough conditions; this includes urban areas, dense & open forest, hills & plains, agricultural lands etc.

iv. Food and Feeding

Chameleon feeds on a variety of prey mostly on rodents and toads; other Chameleon, all kind of lizards and their eggs etc.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Chameleon in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to Chameleon in India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Chameleon is a deadly crime against wildlife. While, forestation and grassland development will be done surrounding the mining area for enhancement of habitat and protecting the loss of Chameleon diversity.

- **Conflicts with Human/Farmer**

In India, several Chameleon are killed due to ignorance or out of fear when they enter habitation. The inborn fear regarding their toxic venom plays a key role in killing most Chameleon, irrespective of whether they are harmful or not. As far as Chameleon is concern they are lethargic and slow moving even in their native habitat.

- **Conservation Plan**

The workers are more prone to encounter the Chameleon in study area. The most basic requirements are willingness and inclination to learn and differentiate the poisonous. Both, local villagers and workers will be educated regarding while conducting the awareness programme to play ecologically significant role in maintaining the ecological integrity of forests and other habitats of Chameleon.

- **Poaching**

The beautiful and shiny skin of the Chameleon makes them target species for poachers. In some area the meat is eaten by locals as the fat is purported to have medicinal value.

- **Conservation Plan**

During formal interview and discussion with locals it was noted that study area is not prone to poaching or any other wildlife violence related of Chameleon. But, precaution will be always taken while dealing with wildlife. If any kind of poaching or other offense is noticed; it will be immediately clued-up to the concern Forest and Wildlife Officials.

- **Habitat threats/Loss**

Rapid degradation of forest areas, due to climate change degradation of grassland, swamps and marshes is a major threat to Chameleon because it causes population fragmentation. Furthermore, habitat degradation caused by overgrazing, overharvest of forest products, expansion of agricultural

areas, and use huge amounts of pesticides agricultural areas also poses threats to the habitat of Chameleon as well as their prey material.

- **Conservation Action**

Although, India has established several large areas to protect the habitat of several endangered wildlife, but main dilemma arises outside the protected areas where the human wildlife encounter is very frequent. For habitat improvement of the Chameleon all possible activities will be carried out in the buffer area of present mine. Their habitat will be artificially improved in the study area by planting suitable species along with the development of grasslands in the respective area. Any existing stream and pond will be preserved and no discharge of any harmful effluent will be drained in the stream.

3.18. *Varanus bengalensis* (Monitor Lizard)

Source: http://www.natureswindow.dk

i. Classification

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Reptilia
Order	:	Squamata
Family	:	Varanidae
Genus	:	Varanus
Species	:	*V. bengalensis*

ii. Conservation Status

Varanus bengalensis is classified as least concern on the IUCN Red List of Threatened Species; moreover this species is mentioned under the Schedule-I of Wildlife Protection Act (1972). This listing indicates that it may become threatened with extinction and is in need of frequent reassessment.

iii. Habitat

The *Varanus bengalensis* is found mainly in the lower elevations, dry semiarid desert habitats, moist forest and the river valleys. They are found in a wide range of habitats, viz. river banks, by the side of canals, scrubby lands and agricultural land. They occupy burrows, dense vegetation, hollows of trees, rock cracks and crevices. In Uttarakhand, *Varanus bengalensis* and *other monitor lizards* are mainly found in Jim Corbet National Park and Rajaji National Park along with open forests.

iv. Food and Feeding

Varanus bengalensis mainly feed on beetles, grubs, scorpions, snails, crabs, ants and other invertebrates. Vertebrate prey is comparatively rare, and includes frogs, fish, lizards, snakes and rodents. They sometimes feed on dead animals.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of *Varanus bengalensis* in their respective habitats other than the natural death. Loss of forest areas along with the reduction of different small size animals due to climate change and deforestation are a major threat to *Varanus bengalensis* India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of *Varanus bengalensis* is a deadly crime against wildlife. While, forestation and grassland development will be done in the study area and surrounding the mining lease area for enhancement of habitat to protect loss animal diversity.

- **Conflicts with Human/Farmer**

Due to the loss of habitat they move towards agriculture land. Sometimes due to the lack of awareness farmer kill them that also a responsible factor for declining the monitor species.

- **Conservation Plan**

For the protection of *Varanus bengalensis*, awareness programme for workers and farmers in the buffer zone will be conducted. Beside these, respective habitats will be improved.

- **Poaching**

Poaching is major threats of monitor lizards. Generally, they are hunted for skin and their body fat. The eggs of monitor lizards are considered a delicacy and the entire animal is also eaten. Body parts are also used for medicine to cure numerous ailments.

- **Conservation Plan**

According to the Wild Life Protection Act (1972) hunting and poaching of *Varanus bengalensis* is a deadly crime against wildlife. While, forestation and grassland development will be done surrounding the mining area for enhancement of habitat and protecting the loss of their diversity.

- **Habitat threats/Loss**

On account of rapid large-scale deforestation, urbanization, dams and hydroelectric projects, habitats of *Varanus bengalensis* declining day by day along with their population density. Other factors such as impact of climate changes and some biotic factors are also responsible for the population decline of the *Varanus bengalensis* species.

- **Habitat Improvement**

The *Varanus bengalensis* lives mostly in burrows in the ground which they dig themselves. For habitat improvement, afforestation will be done with suitable forage plants. Similarly the ponds, canals or water holes in the forest will be maintained in good condition along with grasslands near the ponds. The species planted as part of greenbelt will be also selected as per requirement of *Varanus bengalensis* and will be included in plan. The prey species preferred by *Varanus bengalensis* will be conserved to insure sufficient prey availability, which will also reduce the conflict with humans.

CONSERVATION AVIAN FAUNA

3.19. *Pavo Cristatus* (Indian Peafowl)

Source: http://www.sanctuariesindia.com

i. Classification

Kingdom	**:**	Animalia
Phylum	**:**	Chordata
Class	**:**	Mammalia
Order	**:**	Aves
Family	**:**	Phasianidae
Genus	**:**	*Pavo*
Species	**:**	*P. cristatus*

ii. Conservation Status

Indian Peafowl are widely distributed in the wild across India and protected both culturally in many areas and by law in India. Indian peafowl is mentioned in Schedule-I of Wildlife Protection Act (1972), indicates the high conservation value of species.

iii. Habitat

The Indian Peafowl is found mainly on the ground in open forest or on land under cultivation where they forage for berries, grains but will also prey on snakes, lizards, and small rodents. They forage on the ground in small groups and will usually try to escape on foot through undergrowth and avoid flying, though they will fly into tall trees to roost.

iv. Food and Feeding

Indian Peafowl are omnivores and they eat plants, berries, seeds, spiders, insects, small reptiles and amphibians. They are very clean eaters and will generally eat everything you put out for them, provided they like it. While domestic peafowl consumes commercial feeds designed for their dietary needs also. Cabbage heads are a good choice, as they can keep the chicks occupied for quite some time.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Peafowl reduction is mainly due to reduction in their habitat range (Forest and Grassland), scarcity of food and water in their habitat etc. However, Peafowl is often found in areas where they share their habitats with larger carnivorous mammals such as Tigers, Leopards, Dogs and Bears which could be of threat to them. Indian Peafowl living near human habitations are sometimes hunted by domestic dogs.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Peafowl is a deadly crime against wildlife. While, forestation and grassland will be develop surrounding the mining area for enhancement of habitat, protecting the loss of Peafowl diversity due to habitat loss.

- **Poaching**

Poaching of peacocks for their meat and feathers has declined their population in many parts of India. Intensive poaching Peafowl by local communities for meat and folk remedies involving the use of "peacock oil" is also emerging as a serious threat in different parts of the country. Mostly people poach Peafowl for having them as pets. On the other hand, poaching case of Peafowl has not been observed in present study area.

- **Conservation Plan**

According to Wild Life Protection Act (1972), poaching of Peafowl is a deadly crime against wildlife in India. Indian law allows only the collection of feathers that have been shed, to ensure the legal collection certain methods have been developed to identify if feathers have been plucked or have been shed naturally.

During formal interview and discussion with local people, it was observed that study area is not prone to poaching or any other wildlife violence related to Peafowl and any other species.

- **Conflicts with Human/Farmers**

During the cropping season in different parts of India, the Peafowl can be a nuisance to agriculture as they damage crops. Peafowl are omnivorous and their diet includes seeds, fruits, flower buds, shoots, invertebrates, and small vertebrates. Vertebrates make up a large component of peafowl diet; crops may be damaged and seeds and seedlings dug up as peafowl scratch through soil and litter to find invertebrates. To counter drop damage by Peafowl many time farmers used to poison the bird, as they treat bird as big threat to their crop. Its adverse effects on crops, however, seem to be offset by the beneficial role it plays by consuming prodigious quantities of pests such as grasshoppers.

- **Conservation Plan**

The role of Peafowl in cropland ecosystem is very crucial, and the damage done by the bird is negotiable in terms of direct benefits and environmental services. The awareness among the farmers will be generated through the formal educational programmes.

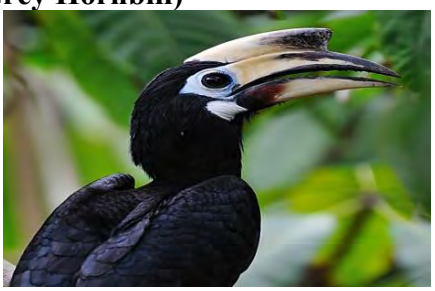
- **Habitat Threats/Loss**

Rapid habitat destruction and scarcity of suitable food are the major cause of the declining the numbers of Peafowl in India. These animals are threatened mainly due to deforestation, the conversion of their habitat to agricultural land; and the burning of grassland.

- **Habitat Improvement**

Indian Peafowl is a bird of scrub-jungles and forest edges, showing affinity to moist and deciduous and semiarid biomes. It is also successfully adopts to the agriculture fields, along streams with good vegetation and close to human habitations in a semi-feral condition. It generally prefers a habitat mosaic of scrub and open areas. The plantation of suitable species (preferred by them) will be done in the buffer zone to modify their habitat to ensure food availability.

3.20. *Ocyceros birostris* (Indian Grey Hornbill)



Source: https://funbirdingmarielouise.files.wordpress.com

i. Classification

Kingdom	:	Animalia
Phylum	:	Chordata
Class	:	Aves
Order	:	Bucerotiformes
Family	:	Bucerotidae
Genus	:	*Ocyceros*
Species	:	***O. birostris***

ii. Conservation Status

Indian grey hornbill is protected by law in India. Indian Pied Hornbill is classified as Least Concern on the IUCN Red List of Threatened Species; moreover this species is mentioned under the Schedule-I of Wildlife Protection Act (1972). This listing indicates that it may become threatened with extinction and is in need of frequent reassessment.

iii. Habitat

Indian grey hornbill likes deciduous forest, parkland and open thorn-forest with fig trees. Also found around rural cultivation and in gardens. They likes deciduous forest, parkland and open thorn-

forest with fig trees. Also, found even in cities that have old avenue trees. In Uttarakhand, Indian grey hornbill it is mainly found in Jim Corbet National Park and Rajaji National Park along with northern part of Uttarakhand. Indian grey hornbills usually nest in tree hollows on tall trees. It is found mainly on the plains up to about 1400.

iv. Food and Feeding

Indian grey hornbill feed on fruits, nuts, seeds, small insects, lizards, small fish and small snakes. The Great Pied Hornbill is omnivorous, taking fruit and fish. Common figs are an important part of their diet.

v. Ecological Threats and Conservation Plan

- **Direct Population Threats**

Direct population threats include all reasons and actions which directly reduce the number of Indian grey hornbill in their respective habitats other than the natural death. Deforestation of forest areas along with the reduction of different small size animals due to climate change are a major threat to Indian grey hornbill in India.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and declared that hunting of Indian grey hornbill is a deadly crime against wildlife. Plantation (forestation) will be done in the study area for enhancement of habitat and protecting loss of Indian grey hornbill diversity due to habitat loss.

- **Conflicts with Human/Farmer**

Three is no conflict of Indian grey hornbill with human except habitat degradation. On the other hand, some peoples believed that hanging a skull of the hornbill brought wealth. So, they kill captured and kill them from nearby settlements.

- **Conservation Plan**

The awareness among workers/ local people and farmers will be generated through the formal educational/ awareness programmes to make them aware that hanging a skull of the hornbill does not brought wealth.

- **Poaching**

Intensive poaching of Indian grey hornbill by tribal/local communities for meat and skull is emerging as a serious threat in different parts of the country, but not in Uttarakhand. On the other hand, poaching case of Indian grey hornbill has not been observed in the study area.

- **Conservation Plan**

The Wild Life Protection Act (1972) provides us with the statutory framework for wildlife conservation, and poaching of Indian grey hornbill is a deadly crime against wildlife. Present study area is not prone to poaching or any other wildlife violence related to Indian grey hornbill and any other species.

Any kind of illegal collection of meat or poaching noted in study area will be immediately informed to concern authority. The contact information of concern wildlife and forest department will be provided to every worker or at the field office.

- **Habitat threats/Loss**

Rapid degradation of forest and water resources is a major threat to Indian grey hornbill because it causes population fragmentation. Furthermore, habitat degradation caused by rapid urbanization and impact of climate change also poses threats to their habitat as well as prey material.

- **Habitat Improvement**

Deforestation and urbanization has led to habitat shrinkage and fragmentation of Indian grey hornbill. For habitat improvement of Indian grey hornbill all possible activities will be carried out in the buffer area of present mine. Their habitat will be artificially improved in the study area by planting suitable species for their habitat and food. Any existing stream and pond will be preserved and no discharge of any harmful effluent will be drained in the stream. Also, workers will be educated and make aware of the conservation value of Indian grey hornbill..

4. Greenbelt Development and Habitat Improvement Plan

For the improvement of habitat for different wildlife fauna, grassland and forestation will be done in the study area to ensure to availability of preferred pray and food source. The trees and grass species preferred by them in the study area will also be conserved to reduce the conflict with humans.

Green belt plantation will be started with the beginning of the mining and will be completed within five years from the beginning. To raise seedlings for plantation in the green belt a nursery will be developed. Seedlings of only local species, suitable for green belt plantation will be raised in this nursery. Together with the trees, greenbelt plantation will include shrubs, climbers and some herbaceous species also. Green belt will help in reducing the spread of fugitive dust and noise from the mining area.

- **Criteria for plants/trees species selection for Ggreenbelt development :**

1. Having tolerance to dust pollution.
2. Should maintain leaves for as longer a time as possible.
3. Combination of plants should be such so that almost a screen of plants is formed to check the dust from escaping the area. Thus the green belt plants will consist of mainly the trees and shrubs with some herbs also.
4. The trees should provide shade.
5. Plants possessing economic and/or aesthetic value should be given preference.
6. Trees less affected due to pruning should be given preference because pruning will yield fuel wood.
7. Every plant species to be planted in the green belt should have some basis for its selection to be planted in the green belt.
8. Only local species will be taken for plantation.

- **Saplings:-**

Saplings for planting will be procured form the nurseries of the State Forest Department. Saplings will be planted after the commencement of the monsoons. Saplings will be planted in pits at specific distance/intervals. The pits will be filled with a mixture of good quality soil and organic manure (cattle dung, agricultural waste, kitchen waste). The saplings will be planted just after the commencement of the monsoons to ensure maximum survival. The species selected for plantation must be locally growing varieties with fast growth rate and ability to flourish even in thin, dry soils.

- **Post Plantation Management**

Watering will be done immediately after plantation. Further watering will depend on the rain while during dry seasons watering will be regularly done at least twice a week. Saplings will be regularly monitored and remedial actions will be undertaken as required. During this four year period, casualties will be replaced at the beginning of each monsoon.

Table 6: List of Plant / Trees/ Herbs/ Shrubs / Grasses for Habitat Improvement

S.No.	Scientific Name	Local name	Family
Trees			
1	*Aegle marmelos*	Bel	Rutaceae
2	*Aesculus turbinata*	Japanese horse-chestnut	Hippocastanaceae
3	*Astragalus sinicus*	Chinese milk vetch	Leguminosae
4	*Bauhinia variegate*	Kachnar	Leguminosae
5	*Bombax ceiba*	Silk-cotton tree	Bombaceae
6	*Brassica campestris*	Rape	Cruciferae
7	*Castanea pubinervis*	Sweet chestnut	Fagaceae
8	*Citrus limon*	Nimu	Rutaceae
9	*Emblica officinalis*	Amla	Euphorbiaceae
10	*Eupatorium odoratum*	Snakeroot	Compositae
11	*Euphoria longan*	Longan, Lamyai	Sapindaceae
12	*Ficus bengalensis*	Bargad	Moraceae
13	*Ficus palmate*	Bedu	Moraceae
14	*Ficus religiosa*	Pipal	Moraceae
15	*Malus pumice*	Apple	Rosaceae
16	*Mangifera indica*	Aam	Anacardiaceae
17	*Melia azedarach*	Dhenk	Meliaceae
18	*Melilotus alba*	Sweet clover	Leguminosae
19	*Musa paradisiacal*	Kela	Musaceae
20	*Prunus sp.*	Cherry, Apricot, Peach	Rosaceae
21	*Punicagranatum*	Aanar	Punicaceae
22	*Pyrus pyrifolia*	Pear	Rosaceae
23	*Salix sp.*	Willows	Salicaceae
24	*Styrax japonica*	Snowball	Styracaceae
25	*Syzygium cumini*	Jamun	Myrtaceae
26	*Toona serrata*	Kakuru	Meliaceae
27	*Trifolium pretense*	Red clover	Leguminosae
28	*Zizyphus jujuba*	Chinese jujube	Rhamnaceae

Shrubs			
1	*Adhatoda vasica*	Basinga	Acanthaceae
2	*Berberis aristata*	Karmshal	Berberidaceae
3	*Coriaria nepalensis*	Makhoi	Coriariaceae
4	*Debregeasia hypoleuca*	Sihanru	Urticaceae
5	*Eupatorium adenophorum*	Kala bansa	Asteraceae
6	*Plectranthu scoesta*	Chichiri	Lamiaceae
7	*Pyracantha crenulata*	Ghingaru	Rosaceae
8	*Ricinus communis*	Arandi	Euphorbiaceae
9	*Rosa brunonii*	Kunja	Rosaceae
10	*Urtica parviflora*	Kandali	Urticaceae
11	*Zanthoxylum alatum*	Timbur	Rutaceae
12	*Ziziphus mauritiana*	Ber	Rhamnaceae
Herbs			
1	*Achyranthes aspera*	Puthkanda	Amarantaceae
2	*Artemisia capillaries*	Pati	Asteraceae
3	*Bidens bipinnata*	Kuru	Asteraceae
4	*Bergeniali gulata*	Silphara	Saxiferaceaa
5	*Euphorbia hirta*	Dudhi	Euphorbiaceae
6	*Galinsoga parviflora*	Marchya	Asteraceae
7	*Hedychium spicatum*	Banhaldu	Zingiberaceae
8	*Sonchus asper*	Dudhi	Asteraceae
9	*Thalictrum foliolosum*	Mamiri	Ranunculaceae
10	*Tridex procumbens*	Ground weed	Amarantaceae
Grasses			
1	*Apluda mutica*	Tachula	Gramineae
2	*Cynodon dactylon*	Dhub	Gramineae
3	*Chrysopogon fulvus*	Godia	Gramineae
4	*Parthenium hysterophorus*	Congress grass	Compositae

5. Common Public Awareness Programme for Wildlife Protection and Conservation

Among all the threats of biodiversity, lack of awareness is the major cause for their loss. Hence, public awareness programmes will be conducted regarding the issues, conflicts and facts of wildlife, especially for the entire schedule-I & II species present in the study area and buffer zone of respective mining project situated in different river.

Conservation education and public awareness are useful tools in changing the behavior of people. Illegal entry into the Wildlife Sanctuary/National Park and forest for collection of forest products should be stopped. Awareness programmes about various wildlife species, their ecology, habitat, food & feeding and behavior will be conducted in the study area. Programmes will target to make aware of all groups (Community Forest User Group, Women's groups, Villagers of the Buffer Zone, School Teachers and Students). Recommendations against walking inside or at the edge of the forest during night hours, and at dawn or dusk should also be avoided to reduce human and animal encounters.

Involvement of local people in conservation activities will be ensured by organizing meetings and Seminars/Workshop from village to village on regular basis to carry the people along with implementation. It will include the formal training on the importance of biodiversity and also to make available the information of the flora and fauna of high conservation value present in the surrounding areas. Functions like Van Mahotsav, Wildlife Week, World Forestry Day, and World Environment Day will be with the help of Gram Panchayat and regional NG's. Information on Wildlife policies and Government regulation and penalties will be provided to workers.

6. Tentative Budget for Conservation Plan of Schedule I & II Species

Table 7: Expenditure For Conservation Plan (Amount in lakhs)

Sl. N.	Proposed Conservation Activity	Capital Cost	Annual Recurring Cost.
1	Improvement of Water Resources: • Maintenance of existing Ponds and water Holes; • Creation of ponds/ Construction of Check Dams	4.00	2.00
2	Habitat Improvement (1000 trees/year) : • Improvement Food Sources; • Creation village forests on Gram Panchayat land of selected villages/ School & College Campus • Plantations over open land and in scrub land	4.00	3.00
3	• Protection of habitat area schedule-1 & II species by participatory programme of public and Forest Department; • Training and Public Awareness Programme for Wildlife Conservation	3.00	2.00
4	• Implementation of legal safety measures by public-Forest Depart participatory programme;	3.00	2.00
	Total	**14.00**	**9.00**

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10 KM BUFFER MAP OF THE STUDY AREA

77°45'0"E 77°50'0"E 77°55'0"E

30°35'0"N 30°30'0"N 30°25'0"N

HIMACHAL PRADESH

UTTARAKHAND

Project Site

YAMUNA RIVER

YAMUNA RIVER

LEGEND

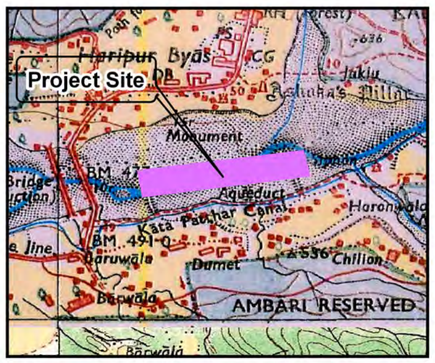
Project Site

10 KM Buffer Boundary

State Boundary

Doon Valley

Toposheet No:
53F14(Site) &53F10 ,
53F11,53F15



YAMUNA (23/1) Sand,Bajri & Boulder Mining Project,Dist: Dehradun,Uttarakhand

Fig No:1

Source:SOI Toposheet

0 0.5 1 2 3 4 5 Km

77°45'0"E 77°50'0"E 77°55'0"E

30°35'0"N 30°30'0"N 30°25'0"N

N W E S

Bhainjra
Lelta
Danda
Koti
Nichiya
Thaina
Noru
Fairly Dense Mixed Jungle
Nagheta
Kalatha
Kalsi RF
Kalsi
Tauru
Project Site
Haripur Byas
Tons River
Salahat RF
Nigli RF
Yamuna River
Mehruwala RF
Dakpatthar Dam
Dakpatthar
Bhangani
Katapatthar Canal
Vikasnagar-Barkot Road
Dumet Block RF
Vinhar RF
Mehunwala
Bhud
Ambari Block RF
Pasta
Vikas Nagar
Bulaqiwala
Rudarpur Block RF
Barwa
Gauna Nadi
Barotiwala
Kedarwala
Sheetla Rao
Chandpur Block RF

0 0.5 1 2 3 4 5 Km

Legend

- Project Site
- Buffer Boundary
- Road
- Settlement
- River
- River With Dry Channel
- Water Bodies
- Forest
- Vegetation
- Open Land
- Agricultural Land
- Agricultural Fallow Land

LU Class	Area (Ha)
Water Bodies	64.97
Vegetation	178.71
Settlement	511.57
River	254.31
Open Land	1546.45
Forest	25184.54
Agricultural Land	4687.85
Agricultural Fallow Land	1242.62
River With Dry Chhanel	759.66
Total	34430.73

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Landuse/Landcover Map of the Study Area

77°45'0"E

77°50'0"E

77°55'0"E

30°35'0"N

30°30'0"N

30°25'0"N

AQ4-Kalsi
SQ3
NQ4
GW3
SW3
AQ1-Project Site
NQ1
SW1
AQ3-Katapatthar
NQ3
SQ1-Baruwala
GW1
SW2
AQ2-Dakpatthar
SQ2
NQ2
GW2
NQ5-Vikasnagar
AQ5-Kedarwala

Project Site

Buffer Boundary

AQ

SQ

NQ

GW

SW

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Monitoring Map for Ambient Air Quality, Noise Monitoring, Soil Sampling,Ground Water & Surface Water Sampling

0 1.25 2.5 5

Kilometer

77°45'0"E
77°50'0"E
77°55'0"E
30°35'0"N
30°30'0"N
30°25'0"N

N
W
E
S

1500
1000
500
Amlawala Nadi
Tons River
Project Site
Yamuna River
Naro Nadi
Bin Nadi
Katapatthar Canal
Gauna Nadi
Mauti Nadi
Koti Nadi
Sheetla Rao
2000

UTTARAKHAND

Project Site

Buffer Boundary

Contour
Canal
Distributary
River
River With Dry Channel

Contour Interval :500 Meters

YAMUNA (23/1)
Mining Project,Dist:Dehradun
Uttarakhand

Drainage Map of The Study Area

0 0.5 1 2 3 4 5
Km

KML File of All the GMVN Projects including the individual lease

GMWN DEHRADUN KML.kml

(48)
405

प्रेषक

निदेशक,
भूतत्व एवं खनिकर्म इकाई,
उद्यान निदेशालय उत्तराखण्ड देहरादून।

सेवा में

प्रबन्ध निदेशक,
गढ़वाल मण्डल विकास निगम लि0
74/1 राजपुर रोड देहरादून।

संख्या- 2214 / भू0खनि0 / उ0खनि0 / देहरादून / 2013–14 दिनांक 3 मार्च फरवरी, 2015

विषयः– पर्यावरणीय अनुमति प्राप्ति हेतु प्रबन्ध निदेशक, गढवाल मण्डल विकास निगम लि0 74/1 राजपुर रोड, देहरादून के पक्ष में जनपद देहरादून के ग्राम डूमेट, तहसील विकासनगर जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 23/1 खसरा नम्बर 649क मध्य कुल रकवा 30.035 है0 राजस्व भूमि में बालू, बजरी, बोल्डर के खनन हेतु 05 वर्ष की अवधि हेतु आशय पत्र पर स्वीकृत क्षेत्र से सम्बन्धित खनन योजना के अनुमोदन के सम्बन्ध में।

महोदय,

आपके आशय संख्या 698/खनन योजना दिनांक 25 नवम्बर, 2014 के द्वारा जनपद देहरादून के ग्राम डूमेट, तहसील विकासनगर जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 23/1 खसरा नम्बर 649क मध्य कुल रकवा 30.035 है0 राजस्व भूमि जो कि भूतत्व एवं खनिकर्म विभाग के कार्यालय ज्ञापन संख्या 589/भू0खनि0ई0/2012–13 दिनांक 23 जनवरी 2013 द्वारा आपके पक्ष में पर्यावरणीय अनुमति प्राप्त किये जाने हेतु अशय पर स्वीकृत किया गया है, से सम्बन्धित प्रस्तुत खनन योजना जो भारतीय खान ब्यूरो द्वारा तदर्थ मान्यता प्राप्त आर0क्यू0पी0 श्री हरीश कैथौला आर0क्यू0पी0/UTNR/141/2002-A के द्वारा तैयार की गयी है को वैज्ञानिक, तकनीकी एवं पर्यावरण सुरक्षा के दृष्टिकोण से खनन गतिविधियों 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:

शर्तें:–

1. खनन योजना का अनुमोदन खनन पट्टा विलेख के निष्पादन की तिथि से आगामी पांच वर्षो की अवधि के लिए किया जा रहा है।
2. पट्टाधारक द्वारा खनन क्षेत्र के सम्बन्ध में पर्यावरण एवं वन मंत्रालय भारत सरकार से पर्यावरणीय अनुमति प्राप्त की जायेगी तथा पर्यावरणीय अनुमति की समस्त शर्तो का अनुपालन किया जायेगा।
3. खनिज क्षेत्र की सीमाबन्धन/पिलरबन्दी उपखनिज परिहार नियामवली–2001 के नियम–17 के अनुसार भूतत्व एवं खनिकर्म विभाग के द्वारा राजस्व विभाग के साथ सयुक्त 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 सम्बन्धित को खनन/वुगान प्रारम्भ किया जायेगा।
4. प्रस्तुत खनन योजना के अनुसार, मैनुवल माइनिंग से, बिना ब्लास्टिंग के प्रथम वर्ष में आर0एल0 473.0 मी0 से आर0एल0 477.5 मी0 तक 280,000.00 टन, द्वितीय वर्ष में आर0एल0 473.0 मी0 से आर0एल0 477.5 मी0 तक 280,000.00 टन, तृतीय वर्ष में आर0एल0 473.0 मी0 से आर0एल0 477.5 मी0 तक 280,000.00 टन,

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चतुर्थ वर्ष में आर0एल0 473.0 मी0 से आर0एल0 477.5 मी0 तक 280,000.00 टन एवं पंचम वर्ष में आर0एल0 473.0 मी0 से आर0एल0 477.5 मी0 तक 280,000.00 टन उपखनिज का खनन किया जायेगा।

5. यह खनन योजना अन्य किसी अधिनियम जो कि इस खान या क्षेत्र पर लागू होते है या समय-समय पर राज्य सरकार या केन्द्र सरकार या अन्य किसी सक्षम द्वारा प्रख्यापित किये जाते है, को छोड 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 लागू होगा।

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 है तब संशोधित खनन योजना प्रस्तुत करने का पूर्ण उत्तरदायित्व पट्टाधारक का होगा।

9. खनन में 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 विरूद्ध पट्टे की शर्तो 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।

संलग्नकः– खनन योजना की अनुमोदित प्रति।

भवदीय

(श्रीधर बाबू अद्दांकी)
निदेशक

संख्या–2214/ मा0प्लान / उ0खनि0 / देहरादून / 2013–14 तद्दिनांकित।

प्रतिलिपिः– निम्नलिखित को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

1. जिलाधिकारी, देहरादून।
2. सुपरिटेन्डिंग खनन, भूतत्व एवं खनिकर्म विभाग, देहरादून।

(श्रीधर बाबू अद्दांकी)
निदेशक

Geology and Mining unit, Directorate of Industries
Govt of Uttarakhand, Bhopalpani, Dehradun

Letter No. 13/Bhu. Khani/2015-16
Date 27-04-2015

To,

The Managing Director
Garhwal Mandal Vikas Nigam Ltd
74/1 Rajpur Road Dehradun.

Ref:- Letter No 36 /Khanan dated 18/04/2015 and Letter No 40/ Khanan dated 18/4/2015.

Sir,

In reference to the above mentioned letters and on the basis of the letter of RQP Shri Harish Kanthola dated 15/04/2015, it is stated that mining project and the mining characteristics in the 34 aproved mining plans of GMVN (list attached) is compatible with and similar in all aspects in the EIA Report both in draft and final EIA.

Your Faithfully

27/4/15
(S.L patrick)
Joint Director

Enclosure: As mentioned above.

1.	आसन नदी लॉट संख्या 14/5 ग्राम सहसपर	अन्तर्गत ख0नं0 240क, 410क	32.2180	संख्याः 2196/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
2.	टौंस नदी लॉट संख्या 14/9 ग्राम जस्सोवाला, लाखनवाला, मेदनीपुर बद्रीपुर	721/3, 722/1, 651/3, 483, 484	45.0	संख्याः 2208/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
3.	आसन नदी लॉट संख्या 14/1ए 14/1बी ग्राम सिंहनीवाला शीशमबाड़ा	खसरा संख्या 77मि0 खसरा संख्या 462मि0 खसरा संख्या 77मि	18.400	संख्याः 1344/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
4.	आसन नदी लॉट संख्या 14/2 कुल रकवा ग्राम सेरपुर सेन्ट्रल होप टाउन	खसरा संख्या 197मि0 खसरा संख्या 1353मि	21.094	संख्याः 1351/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
5.	आसन नदी लॉट संख्या 14/3 रकवा ग्राम हसनपुर, जमनपुर	ख0नं0 1122मि, 1मि मध्य	88.61	संख्याः 2219/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
6.	आसन नदी लॉट संख्या 14/4 रकवा ग्राम रामपुर, कल्याणपुर	ख0नं0 1175ग, 139, 140	35.405	संख्याः 2215/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
7.	आसन नदी लॉट संख्या 14/6 ग्राम सभावाला, इन्द्रीपुर, लक्ष्मीपुर एवं सहसपुर	खसरा नम्बर 2मि, 1मि, 585मि, 593, 594	32.709	संख्याः 2217/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
8.	टौंस नदी लॉट संख्या 14/8 रकवा ग्राम खुशालपुर अन्तर्गत	खसरा नम्बर 819ज	32.0	संख्याः 2216/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
9.	आसन नदी लॉट संख्या 14/10 ग्राम फतेहपुर, धर्मावाला, प्रतीतपुर	ख0नं0 1409, 2मि, 1मि, 2मि, 583	62.00	संख्याः 2212/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
10.	बांण गंगा, बालावाली, जनपद हरिद्वार	591क	31.570	संख्याः 2209/मा0प्लान/उ0खनि0/हरिद्वार/2013–14 दिनांक 03 मार्च, 2015
11.	जाखन नदी रानीपोखरी ग्रांट लॉट संख्या 13/1	खसरा संख्या 923क	18.00	संख्याः 1349/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
12.	जाखन नदी माजरी ग्रांट लॉट संख्या 13/2 (अब 13/2ए एवं 13/2बी) है0		92.652	संख्याः 1348/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
13.	ग्राम गुजराड़ा करनपुर, गुजराड़ा, फुलसडी, विलासपुर कांडली लॉट नं0 8/4 नून नदी	खसरा नं0–476 खसरा नं0–278 खसरा नं0–418 खसरा नं0–400 खसरा नं0–1	21.6680	संख्याः 1345/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
14.	ग्राम हरनोल व धंधोरा के मध्य स्थित नून नदी केलॉट नं0 8/3	खसरा सं0 136	10.360	संख्याः 1346/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
15.	ग्राम गल्जवाड़ी व	ख0नं0 78 (आंशिक)	7.500	संख्याः 2198/मा0प्लान/

	सलियावाला तहसील देहरादून एवं विकासनगर नून नदी लॉट संख्या 8/1			उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
16.	ग्राम धोलास तहसील देहरादून एवं विकासनगर जनपद देहरादून क्षेत्रान्तर्गत नून नदी लॉट संख्या 8/2	ख0नं0 1084 (आंशिक), ख0नं0 1(आंशिक)	7.60	संख्याः 2203/मा0प्लान/ उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
17.	ग्राम सलेमपुर मेहदूद तहसील एवं जनपद हरिद्वार के राऊ नदी	खसरा नं0 431	7.702	संख्याः 2197/मा0प्लान/ उ0खनि0/हरिद्वार/2013–14 दिनांक 03 मार्च, 2015
18.	ग्राम सुमननगर तहसील एवं जनपद हरिद्वार राऊ नदी	खसरा संख्या 2, 639	10.350	संख्याः 2204/मा0प्लान/ उ0खनि0/हरिद्वार/2013–14 दिनांक 03 मार्च, 2015
19.	ग्राम गढ रोसनाबाद तहसील एवं जनपद हरिद्वार के राऊ नदी	खसरा नं0 684	11.883	संख्याः 2213/मा0प्लान/ उ0खनि0/हरिद्वार/2013–14 दिनांक 03 मार्च, 2015
20.	गंगा नदी मिस्सरपुर	खसरा नं0 1,2,3,7 से 9, 11 से 19, 23 से 36, हादीपुर 1, 2, व 3	74.208	संख्याः 1342/मा0प्लान/ उ0खनि0/हरिद्वार/2013–14 दिनांक 02 जनवरी, 2015
21.	ग्राम डोईवाला, मिसरवाला खुर्द, घिरपढी, डेसवाला, फतेहपुर टाण्डा, मारखमग्रान्ट तहसील ऋषिकेश एवं देहरादून जनपद देहरादून सौंग नदी लॉट संख्या 7/2	ख0नं0 264, 242, 243, 455, 226, 228, 229, 215/1, 226/1, 227/1, 242, 243/2, 245, 247, 248/2, 368, 1794, 1795, 1796, 1797, 1798	135.856	संख्याः 2211/मा0प्लान/ उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
22.	ग्राम रांगड़वाल, शाहपुर सन्तौर, कोटड़ा सन्तौर तहसील विकास नगर जनपद देहरादून टॉस नदी लॉट संख्या 3/8	ख0नं0 2, 1, 388, 389	15.363	संख्याः 2207/मा0प्लान/ उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
23.	राजस्व ग्राम कौलागढ, प्रेमपुर माफी, बिलासपुर कांडली तथा बाजावाल तहसील एवं जनपद देहरादून क्षेत्रान्तर्गत टौंस नदी लॉट संख्या 3/6	खसरा नं0–1 (कौलागढ) खसरा नं0–1 (प्रेमपुर माफी) खसरा नं0 361 (विलासपुर कांडली) खसरा नं0–1 (बाजावाला)	10.523	संख्याः 2205/मा0प्लान/ उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
24.	ग्राम आरकेडिया ग्रान्ट अन्तर्गत टौंस नदी लॉट संख्या 3/11	ख0नं0 1, 30, 31मि	11.100	संख्याः 1342/मा0प्लान/ उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
25.	ग्राम झाझरा, ईस्ट होप टाऊन तहसील	ख0नं0 1166मि, ख0नं0 1166मि0,	46.931	संख्याः 2210/मा0प्लान/ उ0खनि0/देहरादून/2013–14

	विकासनगर, जनपद देहरादून क्षेत्रान्तर्गत टौंस नदी लॉट संख्या 3/12	1156मि, 1156मि, 1161मि, 1162मि, 1163मि, 1164मि		दिनांक 03 मार्च, 2015
26.	ग्राम बंशीवाला, तहसील विकासनगर, जनपद देहरादून क्षेत्रान्तर्गत टौंस नदी लॉट संख्या 3/13	239मि	6.0	संख्याः 2206/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
27.	ग्राम मेहरका गांव व शीशमबाड़ तहसील विकास नगर जनपद देहरादून क्षेत्रान्तर्गत टौंस नदी लॉट संख्या 3/14	ख0नं0 688, 466 मध्ये	6.700	संख्याः 2202/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
28.	ग्राम सुद्धोवाला ईस्ट होप टाऊन अन्तर्गत टौंस नदी लॉट संख्या 3/10	ख0नं0 716, 1	23.00	संख्याः 1350/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
29.	ग्राम डाकपत्थर, नवाबगढ, मण्डीगंगभेवा व भीमावाला, तहसील विकासनगर जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 21/1	खसरां नम्बर 396मि, 386मि, 389मि, 1मि, 3मि मध्य	123.1900	संख्याः 2200/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
30.	ग्राम ढकरानी, तहसील विकासनगर, जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 21/2	खसरा नम्बर 971, 969, 970, 936मि मध्य	34.940	संख्याः 2201/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
31.	ग्राम कुल्हाल क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 23/3	खसरा नम्बर 1क मध्ये	14.970	संख्याः 1347/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 02 जनवरी, 2015
32.	ग्राम ढकरानी, मण्डी गंगभेवा, तहसील विकासनगर जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 21/3	खसरा नम्बर 1(आंशिक), 2क, 618,1 मध्य	68.364	संख्याः 2218/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
33.	ग्राम डूमेट, तहसील विकासनगर जनपद देहरादून क्षेत्रान्तर्गत यमुना नदी लॉट संख्या 23/1	खसरा नम्बर 649क मध्य	30.035	संख्याः 2214/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015
34.	ग्राम डुमेट, तहसील विकास नगर जनपद देहरादून क्षेत्रान्तर्गत अन्तर्गत यमुना नदी लॉट संख्या 23/2	ख0नं0 1घ, 2क मध्य	31.203	संख्याः 2199/मा0प्लान/उ0खनि0/देहरादून/2013–14 दिनांक 03 मार्च, 2015

Annexure III

River Yamuna lot no 23/1 Projects for Sand Bajri & Boulders Mine					
Ambient Air Quality Data Oct to Dec 2013				AAQ-1 Baruwala	
S.No	Date	$PM_{2.5}$,µg/m³	PM_{10},µg/m³	SO_2 µg/m³	NO_2, µg/m³
		CPCB Guidlines	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2013	29.6	68.5	BDL	16.1
2	06.10.2013	28.3	69.2	BDL	15.8
3	10.10.2013	30.8	73.5	5.1	16.5
4	14.10.2013	27.1	67.8	BDL	16.3
5	18.10.2013	29.3	70.5	BDL	15.6
6	22.10.2013	30.2	71.4	5.2	17.5
7	26.10.2013	29.3	69.2	BDL	15.1
8	29.10.2013	27.5	68.5	BDL	17.6
9	03.11.2013	29.9	72.2	BDL	16.2
10	07.11.2013	30.7	70.3	5.2	17.2
11	11.11.2013	31.4	71.7	5.4	18.2
12	15.11.2013	27.2	68.3	BDL	16.1
13	19.11.2013	28.5	70.2	BDL	15.4
14	23.11.2013	31.2	73.5	5.1	18.1
15	26.11.2013	27.3	68.6	BDL	16.3
16	29.11.2013	30.2	72.4	5.2	17.6
17	01.12.2013	29.8	69.3	BDL	15.5
18	05.12.2013	33.5	76.4	5.8	19.4
19	09.12.2013	29.4	69.2	BDL	15.3
20	13.12.2013	30.5	71.5	5.1	16.3
21	17.12.2013	28.7	68.9	BDL	15.8
22	21.12.2013	31.4	71.5	5.3	17.2
23	24.12.2013	30.1	69.4	5.1	18.3
24	28.12.2013	28.5	68.2	BDL	16.3
	Min	27.1	67.8	BDL	15.1
	Max	33.5	76.4	5.8	19.4
	Average	29.6	70.4	5.3	16.7
	98 Percentile	32.5	75.1	5.7	18.9
NAAQS, For 24 hourly		60	60	100	80

River Yamuna lot no 23/1 Projects for Sand Bajri & Boulders Mine					
Ambient Air Quality Data Oct to Dec 2013				AAQ-2 (Dakhpathar)	
S.No	Date	$PM_{2.5}$,µg/m³	PM_{10},µg/m³	SO_2 µg/m³	NO_2, µg/m³
		CPCB Guidlines	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	03.10.2013	37.2	75.8	BDL	18.3
2	08.10.2013	36.0	80.5	5.2	19.5
3	12.10.2013	38.5	78.4	BDL	17.7
4	16.10.2013	34.8	76.3	BDL	18.9
5	20.10.2013	38.2	80.8	5.3	20.2
6	24.10.2013	36.3	79.9	BDL	18.5
7	28.10.2013	37.0	81.6	5.2	19.3
8	30.10.2013	35.2	78.3	BDL	17.7
9	05.11.2013	37.6	79.6	BDL	18.2
10	09.11.2013	38.4	82.5	5.3	19.3
11	13.11.2013	36.4	80.2	BDL	18.5
12	17.11.2013	38.2	76.8	5.1	19.8
13	21.11.2013	35.5	78.7	BDL	17.9
14	25.11.2013	36.6	76.2	BDL	18.2
15	28.11.2013	39.6	81.2	5.2	19.8
16	30.11.2013	34.3	75.3	BDL	18.3
17	03.12.2013	37.2	82.7	5.3	19.5
18	07.12.2013	41.3	85.8	5.6	21.2
19	11.12.2013	37.4	79.5	BDL	18.4
20	15.12.2013	38.2	81.2	5.2	19.2
21	19.12.2013	36.4	79.0	BDL	17.7
22	23.12.2013	34.9	76.7	BDL	18.3
23	27.12.2013	37.8	78.5	5.1	19.5
24	30.12.2013	36.2	75.6	BDL	17.8
	Min	34.3	75.3	BDL	17.7
	Max	41.3	85.8	5.6	21.2
	Average	37.1	79.2	5.3	18.8
	98 Percentile	40.5	84.4	5.5	20.7
NAAQS, For 24 hourly		60	60	100	80

River Yamuna lot no 23/1 Projects for Sand Bajri & Boulders Mine					
Ambient Air Quality Data Oct to Dec 2013				AAQ-3 (Katapathar)	
S.No	Date	$PM_{2.5}$,µg/m³	PM_{10},µg/m³	SO_2 µg/m³	NO_2, µg/m³
		CPCB Guidlines	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2013	30.5	65.3	5.9	14.5
2	06.10.2013	29.2	62.5	6.0	15.2
3	10.10.2013	31.7	67.8	5.4	13.2
4	14.10.2013	28.0	59.9	5.7	14.0
5	18.10.2013	30.6	65.5	BDL	13.0
6	22.10.2013	31.5	67.4	5.5	15.2
7	26.10.2013	30.6	69.3	BDL	14.2
8	29.10.2013	28.8	61.6	5.9	16.9
9	03.11.2013	31.2	66.8	BDL	14.7
10	07.11.2013	32.0	68.5	5.8	14.2
11	11.11.2013	32.7	70.0	5.4	13.2
12	15.11.2013	28.5	64.3	BDL	12.3
13	19.11.2013	30.0	66.0	BDL	15.9
14	23.11.2013	32.7	71.3	6.0	18.5
15	26.11.2013	28.8	61.6	BDL	14.7
16	29.11.2013	31.7	69.9	BDL	10.3
17	01.12.2013	31.3	67.0	BDL	9.6
18	05.12.2013	35.0	74.9	5.8	13.5
19	09.12.2013	30.9	66.1	BDL	13.2
20	13.12.2013	32.0	71.3	5.7	14.0
21	17.12.2013	30.2	64.6	5.3	12.0
22	21.12.2013	32.9	70.4	BDL	13.2
23	24.12.2013	31.6	67.6	5.8	14.2
24	28.12.2013	30.0	64.2	BDL	10.6
	Min	28.0	59.9	BDL	9.6
	Max	35.0	74.9	6.0	18.5
	Average	30.9	66.8	5.7	13.8
	98 Percentile	34.0	73.2	6.0	17.8
NAAQS, For 24 hourly monitoring		60	60	100	80

River Yamuna lot no 23/1 Projects for Sand Bajri & Boulders Mine					
Ambient Air Quality Data Oct to Dec 2013				AAQ-4 (Near Kalsi)	
S.No	Date	$PM_{2.5}$,µg/m³	PM_{10},µg/m³	SO_2 µg/m³	NO_2, µg/m³
		CPCB Guidlines	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	03.10.2013	37.5	77.3	BDL	17.4
2	08.10.2013	39.7	82.0	5.6	18.2
3	12.10.2013	42.8	81.3	5.2	16.6
4	16.10.2013	39.1	78.6	BDL	17.4
5	20.10.2013	41.3	82.3	5.3	18.3
6	24.10.2013	39.2	81.4	5.1	17.4
7	28.10.2013	41.3	83.1	5.4	18.9
8	30.10.2013	39.5	79.8	BDL	16.3
9	05.11.2013	40.8	80.4	5.2	17.2
10	09.11.2013	43.2	84.3	5.3	18.6
11	13.11.2013	38.8	81.7	5.1	17.9
12	17.11.2013	39.2	78.3	BDL	16.2
13	21.11.2013	40.5	80.2	5.1	16.7
14	25.11.2013	39.3	78.9	BDL	16.4
15	28.11.2013	42.2	83.5	5.2	18.6
16	30.11.2013	38.1	76.8	BDL	16.8
17	03.12.2013	41.8	79.5	BDL	17.3
18	07.12.2013	44.4	87.6	5.9	19.6
19	11.12.2013	41.7	81.3	5.2	16.7
20	15.12.2013	42.5	83.2	5.4	18.3
21	19.12.2013	40.7	80.5	5.1	17.4
22	23.12.2013	39.2	78.2	BDL	17.6
23	27.12.2013	42.1	84.9	5.1	18.2
24	30.12.2013	40.5	80.1	5.3	16.8
	Min	37.5	76.8	BDL	16.2
	Max	44.4	87.6	5.9	19.6
	Average	40.6	81.1	5.3	17.5
	98thPercentile	43.8	86.4	5.8	19.3
NAAQS, For 24 hourly monitoring		60	60	100	80

River Yamuna lot no 23/1 Projects for Sand Bajri & Boulders Mine					
Ambient Air Quality Data Oct to Dec 2013				AAQ-5 (Kedarwala)	
S.No	Date	$PM_{2.5}$,µg/m³	PM_{10},µg/m³	SO_2 µg/m³	NO_2, µg/m³
		CPCB Guidlines	IS:5182:Pt-23	IS:5182:Pt-2	IS:5182:Pt-6
1	01.10.2013	32.2	65.3	BDL	14.9
2	06.10.2013	31.8	62.4	BDL	13.7
3	10.10.2013	33.4	63.6	5.3	15.4
4	14.10.2013	27.7	61.7	BDL	14.7
5	18.10.2013	30.4	63.2	BDL	13.6
6	22.10.2013	32.6	65.3	5.5	15.3
7	26.10.2013	33.6	66.2	5.1	14.2
8	29.10.2013	27.9	62.6	BDL	13.3
9	03.11.2013	31.2	63.9	BDL	14.2
10	07.11.2013	33.1	68.4	5.6	14.3
11	11.11.2013	35.5	70.5	5.5	17.3
12	15.11.2013	32.6	67.3	BDL	15.8
13	19.11.2013	33.9	68.1	BDL	13.5
14	23.11.2013	30.3	63.7	BDL	14.1
15	26.11.2013	29.8	64.6	BDL	15.5
16	29.11.2013	28.9	62.8	5.2	13.5
17	01.12.2013	27.6	62.3	BDL	14.0
18	05.12.2013	30.4	64.6	BDL	14.5
19	09.12.2013	33.2	67.5	BDL	13.1
20	13.12.2013	32.6	66.2	5.2	14.3
21	17.12.2013	30.4	64.6	BDL	13.5
22	21.12.2013	28.8	63.7	BDL	13.8
23	24.12.2013	29.1	65.3	BDL	15.3
24	28.12.2013	28.6	63.7	BDL	13.3
	Min	27.6	61.7	BDL	13.1
	Max	35.5	70.5	5.6	17.3
	Average	31.1	64.9	5.3	14.4
	98 Percentile	34.8	69.5	5.5	16.6
NAAQS, For 24 hourly		60	100	80	80