### DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PLAN For

"Bhataura Rankot Soapstone Deposit", at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand

Lease area: Area -6.864 ha Production: Capacity- maximum proposed production is 15980 TPA (in Vth year)



**Submitted to** State Level Expert Appraisal Committee, U.K.

### **PROJECT PROPONENT:**

Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K.)

### **ENVIRONMENT CONSULTANT**

Natureanalytica Envirocare Solutions Pvt. Ltd (Accredited by QCI / NABET) NABET/EIA/2225/IA 0099, Valid till 15/06/2025 info.natureanalytica@gmail.com

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#### **CHAPTER-1 INTRODUCTION**

#### **PURPOSE OF THE REPORT**

Environmental Impact Assessment (EIA) is a decision making tool, in the hands of the Authorities which brings forth the factual position about a project that enables them in arriving at an appropriate conclusion for the proposed projects, to retain them if environmentally sound, and reject if found having deleterious overall impact. EIA identifies the extent of the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse impacts of the proposed project over and above the prevailing conditions of environmental parameters and ensure that these impacts are taken into account during the project designing stage itself and the values of the combined impacts are never allowed to exceed and remain within the statutory norms. This process has been envisioned and set in motion by the Ministry of Environment and Forests for sustainable development and the final decision is arrived at only, when those to whom it matters are made known of the salient features of the project being envisaged close to them. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (ToR) received from SEIAA, Uttarakhand, under EIA Notification of the MoEF dated 19-8-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for mining of soapstone mining of "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha, at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand The proposed project falls under Category "B1" as per EIA Notification 2006 its amendment 2009, 2011, 2012 & 2016 of the Ministry of Environment and Forests, New Delhi.

#### **IDENTIFICATION OF PROJECT & PROJECT PROPONENT**

Mining lease was initially granted to Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K) for extraction of soapstone from **"Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand** The State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021-01(35)/2021 dated 07.01.2022, for a period of

50 years (LOI Attached as Ann.1)

S. No.	Year	Production (Tonnes)
1.	1 <sup>st</sup> Year	6739
2.	2 <sup>nd</sup> Year	8221
3.	3 <sup>rd</sup> Year	11080
4.	4 <sup>th</sup> Year	13520
5.	5 <sup>th</sup> Year	15980
Maximum Proposed Production per year: 15980 tonnes (in 5 <sup>th</sup> year)		

### YEAR WISE PROPOSED PRODUCTION DETAILS:-

### **General Information on Mining of Minerals**

The soapstone mineral in Kumaon Himalaya is an alteration a products magnesium bearing minerals, soapstone occurs as pocket type massive and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending about 330°N to 340°N, amount of dip varies 30 degree to 35 degree, direction varies 50°N to 55°N.

Talc is one of the abundant and economically proven mineral resources of Uttarakhand. Occurrences of talc bands, lenses, veins and pockets are known in magnesite, dolomite and chloritic talc schist in different parts of district Bageswar, Pithoragarh, Chamoli and adjoining localities

### **Environmental Clearance:**

As per EIA notification, 2006 and its subsequent amendments later, the project activity has been categorized as Category-B1 project

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

- Scoping,
- Public consultation &
- Appraisal

Scoping of the EIA study (in the form of Terms of Reference) has already been carried out by the SEAC in its meeting dated 14<sup>th</sup> September, 2023 examined the proposal. After through discussion and deliberation, it has been conveyed that SEAC desires Rapid EIA report of this proposal after due public Consultation Conducted by Uttarakhand Environment Protection and Pollution Control Board and the TOR was granted vide letter no. 339/SEIAA dated 29/09/2023.

### **Terms of Reference (TOR)**

The lease over an area of 6.864Ha was granted to Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K). Environmental Impact Assessment report is prepared to comply with the Terms of Reference (ToR) received from SEAC UK 339/SEIAA dated 29/09/2023 regarding above proposal. SEAC in its meeting dated 14<sup>th</sup> September, 2023 examined the proposal. After through discussion and deliberation, it has been conveyed that SEAC desires Rapid EIA report of this proposal after due public Consultation Conducted by Uttarakhand Environment Protection and Pollution Control Board.

The terms of reference (ToR) for the EIA report is being out lined below:

S. No.	TOR Points	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.rt. the highest production achieved prior to 1994.	It is a new mining project
2	A copy of the document in support of the fact that	Mining lease was initially

	the Proponent is the rightful lessee of the mine	granted to Shri Pushkar Lal
	should be given.	Shah R/o-Village-
		Numaishkhet, Tehsil & Distt-
		Bageshwar (U.K) for
		extraction of soapstone from
		"Bhataura Rankot Soapstone
		Deposit", Area- 6.864 Ha , at
		Village: Bhataura Rankot
		Tehsil & District-Bageshwar,
		State- Uttarakhand. The
		State Govt. willing to grant
		Mining Lease vide G.O./LoI
		No. 2455/VII-A-1/2021-
		01(35)/2021 dated 07.01.2022,
		for a period of 50 years (LOI
		Attached as Ann.1)
3	All documents including approved mine plan, EIA	All the document s are
	and Public Hearing should be compatible with one	compatible to one another and
	another in terms of the mine lease area, production	the lease was granted to
	levels, waste generation and its management,	Shri Pushkar Lal Shah R/o-
	mining technology etc. and should be in the name	Village-Numaishkhet, Tehsil
	of the lessee The above reports should also match	& Distt- Bageshwar (U.K)
	with the latest District Survey Report (DSR)	Lease Area: 6.864 Ha
	notification no- 2827 dated 25 July, 2018 Data	Maximum Production:
	obtained from this DSR should be incorporated in	Capacity- 15980 TPA (in Vth
	the EIA Report for Impact Identification,	year)Mine plan is attached as
	Interpretation, Prediction, Carrying Capacity and	Annexure II
	Mitigation	
4	All corner coordinates of the mine lease area,	All the coordinates of lease
	superimposed on a High Resolution Imagery/	area are given on lease map

	toposheet, topographic sheet, geomorphology and	Which annexed in report
	geology of the area should be provided. Such an	The lease area is clearly
	imagery of the proposed area should clearly show	showing on google map and
	the land use and other ecological features of the	the landforms indicated the
	study area (core and buffer zone).	Geomorphological features &
		other ecological features
		within core and buffer zone of
		10 km
5	Information should be provided in Survey of India	Shri Pushkar Lal Shah R/o-
	Toposheet in 1:50,000 scale indicating geological	Village-Numaishkhet, Tehsil
	map of the area, geomorphology of land forms of	& Distt- Bageshwar (U.K)
	the area, existing minerals and mining history of	Lease Area: 6.864 Ha
	the area, important water bodies, streams and rivers	Maximum Production:
	and soil characteristics.	Capacity- 15980 TPA (in Vth
		year) Google map is
		incorporated in the report
6	Details about the land proposed for mining	incorporated in the report State Govt. willing to grant
6	Details about the land proposed for mining activities should be given with information as to	incorporated in the report State Govt. willing to grant Mining Lease vide G.O./LoI
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of	incorporated in the report State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021-
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have	incorporated in the report State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021- 01(35)/2021 dated 07.01.2022,
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6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority. It should be clearly stated whether the proponent Company has a well laid down Environment Policy	incorporated in the report State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021- 01(35)/2021 dated 07.01.2022, for a period of 50 years (LOI Attached as Ann.1) There is no any land diversion proposed for mining and therefore no need for any approval from concern authority. Environment Policy and Management cell has been laid
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority. It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be	incorporated in the report State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021- 01(35)/2021 dated 07.01.2022, for a period of 50 years (LOI Attached as Ann.1) There is no any land diversion proposed for mining and therefore no need for any approval from concern authority. Environment Policy and Management cell has been laid down as per IS:14001:2014.

	prescribed operating process/procedures to bring	consumer feedback, periodic
	into focus any infringement/deviation/violation of	monitoring and review.
	the environmental or forest norms/ conditions? The	Minimization of waste
	hierarchical system or administrative order of the	management by adopting best
	Company to deal with the environmental issues and	practices. Optimum utilization
	for ensuring compliance with the EC conditions	of natural resources. By
	may also be given. The system of reporting of non-	adopting approved /Govt.
	compliances / violations of environmental norms to	norms for mining purposes and
	the Board of Directors of the Company and/or	environment conservation.
	shareholders or stakeholders at large, may also be	EMC shall comprises of
	detailed in the EIA Report	Environmental officer, who
		shall report to management
		and govt. authorities as and
		when required.
8	Issues relating to Mine Safety, including	It is open-cast sand mining
	subsidence study in case of underground mining	project, PPEs (Mask, Gloves,
	and slope study in case of open cast mining,	gum boots, helmet, etc. ) will
	blasting study etc should be detailed. The proposed	be provided to mining workers
	safeguard measures in each case should also be	during mining activity.
	provided	The soapstone shall be
		extracted with the help of
		excavator as well as manually
		with the help of hand tools like
		crow bar, chisels, pickaxe,
		hammers, spade. No drilling &
		blasting shall be required
		during the operation because
		soapstone is a soft mineral.
9	The study area will comprise of 10 km zone around	The study area comprises of
	the mine lease from lease periphery and the data	10.0 km zone around the mine
	contained in the EIA such as waste generation etc.	lease periphery as shown in the

	should be for the life of the mine / lease period	study area. Approx 150
		gm/person/day (MSW Rule
		2016) solid waste will be
		generated from the sites and
		for their management color
		coded dustbin will be
		available at the project site .
10	Land use of the study area delineating forest area,	The proposed activity will not
	agricultural land, grazing land, wildlife sanctuary.	alter the Land use because of
	national park, migratory routes of fauna, water	after mining it will refill by
	bodies, human settlements and other ecological	overburden . Land use map
	features should be indicated. Land use plan of the	given in the report
	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.	
11	Details of the land for any Over Burden Dumps	The lessee is private individual
	outside the mine lease, such as extent of land area,	and the lease is allotted for
	distance from mine lease, its land use, R&R issues,	Soapstone mining. There is no
	if any, should be given.	Rehabilitation & Resettlement
		of population, therefore R&R
		plan and compensation are not
		required.
12	A Certificate from the Competent Authority in the	Forest NOC is attached as
	State Forest Department should be provided,	annexure III
	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	
1		

	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	
13	Status of forestry clearance for the broken up area	Not applicable
	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.	
14	Implementation status of recognition of forest	Not applicable
	rights under the Scheduled Tribes and other	
	Traditional Forest Dwellers (Recognition of Forest	
	Rights) Act, 2006 should be indicated	
15	The vegetation in the RF / PF areas in the study	There is no any RF/PF areas in
	area, with necessary details, should be given.	the study area. Google map is
		attached
16	A study shall be got done to ascertain the impact of	Within 10 km buffer zone of
	the Mining Project on wildlife of the study area and	the mining lease area National
	details furnished. Impact of the project on the	Parks, Sanctuaries, Biosphere
	wildlife in the surrounding and any other protected	Reserves Wildlife Corridors,
	area and accordingly, detailed mitigative measures	Tiger/Elephant Reserves are
	required, should be worked out with cost	not found
	implications and submitted	
17	Location of National Parks, Sanctuaries, Biosphere	No National Parks,
	Reserves, Wildlife Corridors, Ramsar site	Sanctuaries, Biosphere
	Tiger/Elephant Reserves/(existing as well as	Reserves Wildlife Corridors,
	proposed), if any, within 10 km of the mine lease	Tiger/Elephant Reserves are

	should be clearly indicated, supported by a location	falling within 10 Km of the
	map duly authenticated by Chief Wildlife Warden.	study area.
	Necessary clearance, as may be applicable to such	The location map is shown in
	projects due to proximity of the ecologically	Chapter:3
	sensitive areas as mentioned above, should be	
	obtained from the Standing Committee of National	
	Board of Wildlife and copy furnished.	
18	A detailed biological study of the study area [core	A detailed biological study (of
	zone and buffer zone (10 km radius of the	10 Km radius study area) was
	periphery of the mine lease)] shall be carried out.	conducted by Ecology and
	Details of flora and fauna, endangered, endemic	Biodiversity Expert and the
	and RET Species duly authenticated, separately for	details are incorporated in the
	core and buffer zone should be furnished based on	EIA/EMP Report.
	such primary field survey, clearly indicating the	Detailed study for biological
	Schedule of the fauna present. In case of any	environment is carried out and
	scheduled- I fauna found in the study area, the	detail of flora and fauna in
	necessary plan alongwith budgetary provisions for	core and buffer zone is given
	their conservation should be prepared in	in Chapter No:3
	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.	
20	R&R Plan/compensation details for the Project	There is no Project Affected
	Affected People (PAP) should be furnished While	Person (PAP) by the proposed
	preparing the R&R Plan, the relevant	mining activities. Hence, no
	State/National Rehabilitation & Resettlement	R&R Plan is envisaged; as
	Policy should be kept in view. In respect of SCS	there is no displacement of
	/STS and other weaker sections of the society in the	people from their respective
	study area, a need based sample survey, family-	areas.
	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(s) located in the mine lease area will be	
	shifted or not. The issues relating to shifting of	
	village(s) including their R&R and socio-economic	
	aspects should be discussed in the Report.	
21	One season (non-monsoon) [.e. March-May	Environmental baseline
	(Summer Season); October-December (post	monitoring data and results are
	monsoon season): December-February (winter	given in Chapter 3. Base line
	season)] primary baseline data on ambient air	monitoring done premonsoon
	quality as per CPCB Notification of 2009, water	of year 2023 (March 2023 to
	quality, noise level, soil and flora and fauna shall	May 2023)
	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	
22	Air quality modeling should be carried out for	Air quality modeling was
	prediction of impact of the project on the air quality	carried out and impact of Air
	of the area. It should also take into account the	quality has been incorporated
	impact of movement of vehicles for transportation	in the EIA/EMP report. Max.
	of mineral The details of the model used and input	Predicted cumulative ground
	parameters used for modeling should be provided.	level concentration (GLC) of

	The air quality contours may be shown on a	$PM_{10}$ , $SO_x$ , and $NOx$ . The
	location map clearly indicating the location of the	predominant over all wind
	site, location of sensitive receptors, if any, and the	patterns for the study period
	habitation. The wind roses showing pre-dominant	
	wind direction may also be indicated on the map	
23	The water requirement for the Project, its	The water requirement will be
	availability and source should be furnished. A	around 8.62 About 0.31 KLD for
	detailed water balance should also be provided.	domestic and 1.0 KLD will be
	Fresh water requirement for the Project should be	required for dust suppression.
	indicated	Water for drinking purpose will
		be supplied from the
		Uttarakhand Jal Sansthan and
		naulla's of nearby villages. This
		water will be supplied by
		private tankers. For dust
		suppression and Plantation the
		water supplied from nearby
		private tankers. The details are
		incorporated in the EIA/EMP
		report.
		Total Water Requirement=
		58.62 KLD
		Dust Suppression =1 KLD
		Plantation=7 KLD
		Domestic Purpose= 0.62KLD
24	Necessary clearance from the Competent Authority	Water requirement will be met
	for drawl of requisite quantity of water for the	by tanker supply therefore
	Project should be provided	permission from Central
		Ground Water Authority for
		pumping of groundwater is not

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		required.
25	Description of water conservation measures	It is mining project. Area is
	proposed to be adopted in the Project should be	porous and slope gradient high.
	given Details of rainwater harvesting proposed in	Due to high drainage density
	the Project, if any, should be provided.	and porous of land water can
		rainwater harvesting is not
		possible.
26	Impact of the Project on the water quality, both	Surface Water:
	surface and groundwater, should be assessed and	No permanent infrastructure
	necessary safeguard measures, if any required,	will be developed which may
	should be provided.	obstruct the surface water,
		Ground Water:
		The ground water quality will
		not be changed because mining
		activity will not intersect the
		ground water table
27	Based on actual monitored data, it may clearly be	There are no water springs
	shown whether working will intersect groundwater.	near about the lease area so
	Necessary data and documentation in this regard	there are no chances to
	may be provided. In case the working will intersect	encounter the water table
	groundwater table, a detailed Hydro Geological	during the mining throughout
	Study should be undertaken and Report furnished.	the year. Practically no
	The Report inter-alia shall include details of the	fluctuation of water table
	aquifers present and impact of mining activities on	within applied area throughout
	these aquifers. Necessary permission from Central	the year. Mine working will
	Ground Water Authority for working below ground	not go beyond 1403.10mRL
	water and for pumping of ground water should also	during first five years, thus
	be obtained and copy furnished	there is no chance to encounter
		the water table. Hence
		permission is not required

		from CGWA. Water
		requirement will be met from
		bore well.
28	Details of any stream, seasonal or otherwise,	No any seasonal stream,
	passing through the lease area and	passing through the lease area
	modification/diversion proposed, if any, and the	and nor any modification
	impact of the same on the hydrology should be	/diversion proposed
	brought out.	
29	Information on site elevation, working depth,	The highest
	groundwater table etc. Should be provided both in	level of area is 1403.10mRL
	AMSL and bgl. A schematic diagram may also be	towards eastern side along
	provided for the same.	boundary pillar 23-24 while
		lowest level is
		1323.0mRL towards South
		West flank near pillar 12.The
		proposed maximum depth of
		working is 24m There are no
		water springs near about the
		lease area so there are no
		chances to encounter the water
		table during the mining
		throughout the year.
		Practically no fluctuation of
		water table within applied area
		throughout the year
30	A time bound Progressive Greenbelt Development	Plantation will mainly be done
	Plan shall be prepared in a tabular form (indicating	along the road side /gram
	the linear and quantitative coverage, plant species	panchayat land and along the
	and time frame) and submitted, keeping in mind,	river bank and Gram

	the same will have to be executed up front on	Panchayat land). No. of plants
	commencement of the Project. Phase-wise plan of	to be planted 3500 sapling
	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.	
	The plant species selected for green belt should	
	have greater ecological value and should be of good	
	utility value to the local population with emphasis	
	on local and native species and the species which	
	are tolerant to pollution	
31	Impact on local transport infrastructure due to the	The lease area is in Village:
	Project should be indicated. Projected increase in	Bhataura Rankot Tehsil &
	truck traffic as a result of the Project in the present	District-Bageshwar, State-
	road network (including those outside the Project	Uttarakhand. The area is well
	area) should be worked out, indicating whether it is	connected with dhalan khunoli
	capable of handling the incremental load.	road and NH309A
	Arrangement for improving the infrastructure, if	
	contemplated (including action to be taken by other	
	agencies such as State Government) should be	
	covered. Project Proponent shall conduct Impact of	
	Transportation study as per Indian Road Congress	
	Guidelines	
32	Details of the onsite shelter and facilities to be	Onsite shelter facilities
	provided to the mine workers should be included in	provided to day worker
	the EIA Report	
33	Conceptual post mining land use and Reclamation	Noted : Reclamation and
	and Restoration of mined out areas (with plans and	Restoration of mined out areas
	with adequate number of sections) should be given	are given in Report

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in the	EIA report	
34 Occu	pational Health impacts of the Project should	Labourers will be provided
be	anticipated and the proposed preventive	with onsite basic first aid (first
meas	ures spelt out in detail. Details of pre-	aid box) facility and personal
place	ment medical examination and periodical	protective equipments (PPE),
medi	cal examination schedules should be	including boots, helmets and
incor	porated in the EMP. The project specific	Gloves
occuj	bational health mitigation measures with	Regular medical check will be
requi	red facilities proposed in the mining area may	done (including the test for
be de	tailed.	silicosis) for all the labours and
		cost to be borne by the project
		proponent.
		Training of the workers
		regarding use of safety
		appliances and first aid.
		Training shall also includes
		emergency response including
		location and proper use of
		emergency equipment's
		procedure for raising alarm
		and notifying contractor and
		proper response action for
		each foreseeable emergency
		situations.
		In case of severe injury,
		immediate action will be taken
		to take the injured to the
		nearest hospital/ dispensary
		and entire cost will be borne
		by the project proponent

35	Public health implications of the Project and related	The proposed site is away from
	activities for the population in the impact zone	the nearest habitat yet
	should be systematically evaluated and the	periodically health check-up
	proposed remedial measures should be detailed	camp will be organized under
	along with budgetary allocations.	the CER activity.
36	Measures of socio economic significance and	Job Opportunity to local
	influence to the local community proposed to be	community for betterment of
	provided by the Project Proponent should be	livelihood, amenities etc.
	indicated. As far as possible, quantitative	Direct and in-direct
	dimensions may be given	employment.
	with time frames for implementation	Skill development and training
		programme (Carpentry,
		Welding, Masonry works,
		plumbing, Tailoring etc.) for
		the local community will be
		conducted.
37	Detailed environmental management plan (EMP) to	Noted
	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	Noted
	the Project Proponent on the same along with time	
	bound Action Plan with budgetary provisions to	
	implement the same should be provided and also	
	incorporated in the final EIA/EMP Report of the	
	Project.	

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39	Details of litigation pending against the project, if	NA
	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	Detail cost of Project is as
	cost) as well as the cost towards implementation of	follows:
	EMP should be clearly spelt out.	Project Cost- 3250000 per
		annum
		CER 162000/-
		Total EMP Cost- 702000/-
41	A Disaster management Plan shall be prepared and	Though no mining activities is
	included in the EIA/EMP Report.	envisaged during monsoon
		season (June to September),
		yet the inundation cannot be
		ruled out due to flash flood in
		the catchment during non-
		monsoon season. Following
		precautionary measures shall
		be undertaken in respect of
		mining operation during non-
		monsoon season and before the
		onset of monsoon.
		A careful assessment of the
		danger of inundation from
		surface water shall be made
		before onset of monsoon
		season every year and
		adequate precautions against
		such dangers shall be
		implemented.
		Effectiveness of precautions,
		obstruction in normal drainage

		system etc. shall be checked
		regularly.
		During May no mining pit
		excavation shall be carried out
		adjacent to the bank offset line.
		Standing orders for withdrawal
		of persons and mining
		equipment from mine in case
		of apprehend danger shall be
		framed and enforce
42	Benefits of the Project if the Project is implemented	Job Opportunity to local
	should be spelt out. The benefits of the Project shall	community for betterment of
	clearly indicate environmental, social, economic,	livelihood, amenities etc.
	employment potential, etc	Direct and in-direct
		employment.
		Skill development and training
		programme (Carpentry,
		Welding, Masonry works,
		plumbing, Tailoring etc.) for
		the local community will be
		conducted.
43	Besides the above, the below mentioned general	
	points are also to be followed:	
a	Executive Summary of the EIA/EMP Report	Noted
b	All documents to be properly referenced with	All documents to be properly
	index and continuous page numbering	referenced with index and
		continuous page numbering.
c	Where data are presented in the Report especially	Noted

	in Tables, the period in which the data were	
	collected and the sources should be indicated.	
d	Project Proponent shall enclose all the	Analysis/testing reports are
	analysis/testing reports of water, air, soil, noise etc.	enclosed the report
	using the MoEF&CC/NABL accredited	
	laboratories. All the original analysis/testing reports	
	should be available during appraisal of the Project	
e	Where the documents provided are in a language	Noted
	other than English, an English translation should be	
	provided.	
f	The Questionnaire for environmental appraisal of	Noted
	mining projects as devised earlier by the Ministry.	
	shall also be filled and submitted	
g	While preparing the EIA report, the instructions	Noted
	for the Proponents and instructions for the	
	Consultants issued by MoEF&CC 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 be followed.	
h	Changes, if any made in the basic scope and project	Noted
	parameters (as submitted in Form-1 and the PFR for	
	securing the TOR) should be brought to the	
	attention of MoEF&CC 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.	
i	As per the circular no. J-11011/618/2010-IA.II(1)	Compliance of the conditions
	dated 30.5.2012, certified report of the status of	is followed after getting
	compliance of the conditions stipulated in the	environment clearance
	environment clearance for the existing operations	
	of the project, should be obtained from the	
	Regional Office of Ministry of Environment, Forest	
	and Climate Change, as may be applicable	
j	The EIA report should also include	
i	Surface plan of the area indicating contours of main	Topographic feature and
	topographic features, drainage and mining area,	drainage given in report
ii	Geological maps and sections and	Geological maps and sections
ii	Geological maps and sections and	Geological maps and sections are enclosed in report
ii iii	Geological maps and sections and Sections of the mine pit and external dumps, if	Geological maps and sections are enclosed in report Noted
ii iii	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the	Geological maps and sections are enclosed in report Noted
ii iii	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area	Geological maps and sections are enclosed in report Noted
ii	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area	Geological maps and sections are enclosed in report Noted
ii iii iv	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should	Geological maps and sections are enclosed in report Noted
ii iii iv	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent	Geological maps and sections are enclosed in report Noted
ii iii iv	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both	Geological maps and sections are enclosed in report Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per	Geological maps and sections are enclosed in report Noted Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per annum should match with as mentioned in DSR and	Geological maps and sections are enclosed in report Noted Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per annum should match with as mentioned in DSR and LOI. in case there is any difference	Geological maps and sections are enclosed in report Noted Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per annum should match with as mentioned in DSR and LOI. in case there is any difference classification/amendment letter from competent and	Geological maps and sections are enclosed in report Noted Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per annum should match with as mentioned in DSR and LOI. in case there is any difference classification/amendment letter from competent and authorities	Geological maps and sections are enclosed in report Noted Noted
ii iii iv v	Geological maps and sections and Sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area All pages of technical documents/EIA/EMP should be signed by the consultant and project proponent both The lease area, its address and production per annum should match with as mentioned in DSR and LOI. in case there is any difference classification/amendment letter from competent and authorities Plan for using the mine void production use in	Geological maps and sections are enclosed in report Noted Noted Noted

	consultation with local administration and gram	
	panchayat	
vii	In case project proponent intends to temporarily	Noted
	mine out materials outside the mine lease area than	
	NOC form competent authority for doing so should	
	be submitted and details of such area and associated	
	environmental impacts should be included in EIA	
	EMP report this should be clearly mentioned during	
	public hearing.	
viii	Road network to be used by the project should be	Noted
	clearly shown on survey of India topo sheet in	
	1:20,000 scale. In case road network involves forest	
	road, permission should be obtained from forest	
	department and a copy of the same should be	
	submitted at the time of appraisal of EIA-EMP	
	repot	
ix	Project Proponent (PP) should submit action plan for	Noted
	carrying out plantation at least 1000 plants/ha of lease	
	area. In case PP, should prepare a plan duly approved	
	either by forest department of Horticulture department	
	for planting either on government land or community	
	for planting either on government land or community land within periphery of 5 kms form the boundary of	
	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5	
	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest	
	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of	
	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition	
X	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition In view of the agricultural land proposed under the	Will be complied
X	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition In view of the agricultural land proposed under the mining lease area, the project proponent needs to	Will be complied
X	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition In view of the agricultural land proposed under the mining lease area, the project proponent needs to submit the cost benefit analysis composing the current	Will be complied
X	for planting either on government land or community land within periphery of 5 kms form the boundary of lease area along with provision for maintenance for 5 years. Survival of plants below Uttarakhand Forest Departments survival rate will be treated as violation of EC condition In view of the agricultural land proposed under the mining lease area, the project proponent needs to submit the cost benefit analysis composing the current agricultural production and annual turnover vis-à-vis	Will be complied

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Xi	To ensure proper monitoring, the project	Noted
	proponent/consultant should provide evidence in for of	
	(A)	
	Raw Data (B) Logbook of their site visit along with	
	activities carried out during monitoring (C) Real time	
	photographs showing monitoring machine, public, lab	
	person etc. Proprietor/proprietor representative	
	should be present at the time of monitoring and	
	monitoring should be conducted as per CPCB	
	SOP/NABET/QCI guidelines. Lab responsible person	
	should be present at the time of EIA presentation.	
Xii	EIA coordinator & FAE should give a photo affidavit	Noted
	during EIA presentation that they have personally	
	visited the site & they have also taken all the mitigating	
	measures for any critical issues involved in the	
	project.	
Xiii	The project proponent will have to inform the schedule	
	of monitoring/data collection programme to the	
	SEIAA, Uttarakhand before start of data collection. In	
	case of failure, the collected baseline monitoring	
	data will be treated as null and void.	
Xiv	The details of equipment used for baseline monitoring	Noted
	alongwith its photograph mentioning date, time	
	and geo coordinates for preparation of EIA report	
	should be clearly displayed to the people present	
	during public hearing and the complete details related	
	to monitoring period must be mentioned in the	
	minutes of public hearing.	
Xv	Original lab analysis report of the project proposal	Noted
	along with EIA report should be uploaded on	
	Parivesh Portal.	

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Xvi	During the EIA presentation latest KML of site pillar	Noted		
	should be presented.			
Xvii	Combined KML of all mines in a cluster should be	Noted		
	submitted at the time of EIA.			
Xviii	The project proponent/Consultant should identify the	Compliend		
	core & buffer zone (2.5 km) of the mining site.			
Xix	Agreement/ Consent between project proponent and	Noted		
	competent authority/ landowner for haulage road			
	from lease site to link road to be submitted at the time			
	of EIA presentation.			
Xx	Proponent/ Consultant should submit the	Noted Simple water tankers		
	plan/information along with technology (photographs	will be used		
	of water sprinklers/ tankers) to be implemented for			
	mitigating dust at source points in lease area and			
	haulage road during operation activity/vehicular			
	movement. Technology should be displayed at the time			
	of EIA presentation.			
Xxi	Proposed plantation plan with area specific plant	Noted		
	species, number of plants to be planted and place of			
	plantation along with a proper map to be submitted at			
	the time of EIA presentation.			
Xxii	Water requirement details along with source of water	Noted		
	and the permission/ agreement with the concerning			
	authority/ person to be submitted at the time of EIA			
	presentation.			
Xxiii	Proponent/consultant shall present TOR	Noted		
	specific/additional conditions compliance,			
	observation/suggestions raised during the public			
	hearing and commitment made by the project			
	proponent in a tabular form with a time bound plan at			
	the time of EIA presentation.			

Xxiv	Corporate Social Responsibility (CSR) to be prepared as	Noted		
	per the MoEF&CC guidelines and present it at the time			
	of EIA presentation.			
Xxv	The Project Proponent shall carry out geological	Compliend		
	stability study along with detailed flora and fauna			
	investigation by subject specialist. The Project			
	Proponent shall submit mitigation plan for avoiding the			
	runoff and leaching of debris during the monsoon.			
xxvi	The Project Proponent shall obtain clearance under the	Not Applicable		
	Wildlife (Protection) Act, 1972 from the competent			
	Authority as may be applicable to this project.			
xxvii	The Project Proponent shall follow all relevant	Noted		
	directions/orders issued by Hon'ble High Court]NGT/			
	Supreme Court.			
xxviii	Copy of all the analysis reports duly signed by analyst	Will be complied		
	approved by NABL or MoEF&CC shall be annexed with			
	the EIA report and original analysis reports shou14 be			
	presented at the time of presentation.			
Xxix	MOU signed between the project proponent and the	Compliend		
	consultant should be submitted.			
Xxx	All pages of all documents should be signed by PP and	Noted		
	EIA consultant			

### **1.4 Post-Environmental Clearance Monitoring**

For category B projects, irrespective of its clearance by MoEF/SEIAA, the project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of MoEF website where it is displayed.

The project management shall submit half-yearly compliance reports in respect of the stipulated prior environmental clearance terms and conditions on 1st June and 1st December of each

calendar year. All such reports shall be public documents. The latest such compliance report shall be displayed on the web site of the concerned regulatory authority.

### **1.5 Transferability of Environmental Clearance**

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written "no objection" by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period.

### **1.6 Generic Structure of Environmental Impact Assessment Document**

### **1.6.1 Preparation of EIA**

The EIA includes the following details:

1) Study of the reports like Geological report, Pre-Feasibility Report (PFR) or mining plan made available by the client.

2) Present Environmental Setting

3) Identification, prediction and evaluation of Anticipated Environmental Impact due to the proposed mine and related facilities.

The environmental impacts would be anticipated in core and buffer zone on:

- > Topography and drainage,
- ➢ Climate,
- Water quality (Surface/Ground),
- Hydro-geological Regime,
- $\succ$  Air quality,
- ➢ Noise Levels,
- ➢ Soil Quality,
- ➢ Flora and Fauna,
- Traffic density survey,
- ➤ Land-Use,
- Socio-Economic Conditions,
- ➢ Habitat,

- Health, culture, human environment including public health, occupational health and safety
- Sensitive Places/Historical Monuments.

This EIA Report is prepared in accordance with has been divided into twelve chapters (in addition to Executive Summary) as briefed hereunder:

### **Chapter 1 – Introduction**

The chapter provides description of project background, site and surroundings, objectives, scope and organization of the study and format of this report.

### **Chapter 2 – Project Description**

This chapter provides information on project and capacity; need for the project; location; size or magnitude of operation; technology and process description; maps showing project layout, component of projects etc.

### Chapter 3 – Analysis of Alternatives (Technology and Site)

This chapter will include a comparison of alternatives in this chapter to determine the best method of achieving the project objectives with minimum environmental impacts or indicates the most environmentally friendly and cost effective options, if any.

### **Chapter 4– Description of the Environment**

This chapter deals with the methodology and findings of field studies undertaken with respect to ambient air, meteorology, water, soils, noise levels, ecology to define the various existing environmental status in the area of the project. This also deals with the infrastructural development as a part of project and sources of pollution from the proposed mining project.

### **Chapter 5 – Anticipated Environmental Impacts and Mitigation Measures**

In this chapter, the potential impacts of the proposed mining and allied activities, which could cause significant environmental concerns, are identified and discussed. This discussion will form the basis for environmental management activities.

### **Chapter 6 – Environmental Monitoring Program**

This chapter will include ascertaining the environmental impacts; state of pollution within the mine lease and in its vicinity; planning for predictive or corrective actions in respect of pollution to keep it within permissible limits.

### **Chapter 7 – Additional Studies**

This chapter will include outcomes of public consultation, risk assessment, social impact assessment, R&R action plan, biodiversity conservation plan, watershed management etc.

### **Chapter 8 – Project Benefits**

This chapter deals with improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits due to proposed project activity.

### **Chapter 9 – Environment Cost benefit Analysis**

The net benefits are analyzed from a social (cost-benefit analysis) and a private (financial analysis) perspective

### **Chapter 10 – Environmental Management Plan**

This chapter will include the description of administrative aspects of ensuring that the mitigation measures suggested are implemented and their effectiveness is monitored, after approval of the EIA.

### Chapter 11 – Summary & Conclusion

This will constitute the summary of EIA Report.

### **Chapter 12 – Disclosure of Consultant**

This will includes the names of the consultants engaged in preparation of EIA and nature of consultancy rendered.

\*\*\*\*\*\*\*

#### **CHAPTER – 2 PROJECT DESCRIPTION**

#### **TYPE OF PROJECT**

Talc is a hydrous magnesium silicate and is commonly known with de has chemical composition 3Mg4Si02.H20 containing theoretically, 63.36 % '02, j}. 0 – MgO and 4.75 % - H20 as pure mineral. Though, in nature chemically pure talc is very rare and usually associated with numerous other minerals like Serpentine, Chlorite, Tremolite, Anthophyllite, Diophyllite, Diopside, Quartz, Calcite, Dolomite and Magnesite.

It is very soft mineral with hardness I on mohs' seale having greasy or soapy feel. Usually foliated, finely granular, fibrous, compact and blocky in nature, talc occurs in cryptocrystalline form. The colour of the talc is almost milky white and sometimes grayish, bluish to greenish white. The specific gravity of talc ranges from 2.5 to 2.8.

The physical and chemical properties of Talc such as its smoothness, good luster and shine, high slip and lubricating properties, low moisture content, high oil absorption, chemical inertness, high dielectric strength, good retention for filler purposes, high specific heat, whiteness, low shrinkage etc. make it extremely versatile important industrial mineral. It is mostly used in the pulverized form in the industries like: soap, paper, paint, ceramic, cosmetic, pharmaceutical, insecticide, pesticide, plastic, roofing, rubber, leather, textile, refractory, insulator, tile, addition in animal food stuff, petroleum etc. Other use for commercial talc include cereal (Rice, Corn and Barley) polishing, bleaching agents, floor wax, water filtration, joint fillers and grouts, shoe polish, welding rod coatings, printing inks toilet preparation, odour absorption from food, foundry, source of magnesium in plant food, lens polishing etc. Along with these uses, it is a primary ingredient in talcum powder and other cosmetics. of existing rocks under hydrothermal.

Talc deposits always result from the transformation Si02, H20) required for forming the activity. Through this process, the components (MgO, parent rock in to talc are brought by the hydrothermal water. The size and geometry of the final deposit depend up on the size and nature of the parent rock, and the intensity and scale of the phenomenon. The geological context required for such a transformation to occur is known as a low to medium temperature

and pressure metamorphism. Tectonic movement always plays a major role. Earth movements allow the hydrothermal fluid to penetrate in to penetrate in to the mother rock, generating permeability that makes reaction inside the rock mass possible and the surrounding pressure, either at the time of the transformation or later, determines the mineral degree of lamellarity.

Talc is one of the abundant and economically proven mineral resource of Uttarakhand Occurrences of talc bands, lenses, veins and pockets are known in magnesite dolomite and chloritic talc schist in different parts of district Bageswar, Pithoragarh, Chamoli and adjoining localities

Though soapstone is very important mineral source for development, its mining through scientific methods have also become equally imperative. It is for this purpose that "mining plan' is being drawn so that all its aspects are taken care of justifiably, according to law, protecting the environment, removing all adverse impacts and creating a direct and indirect employment opportunities, improving socio-economic conditions of the local inhabitants and all round status of life, achieving thereby a sustainable development. Besides above, the process of mining of minor minerals is a constant source of revenue generation to the State Government to Royalty.

#### **NEED FOR THE PROJECT**

Soap stone is mostly used in the pulverized form in the industries like: soap, paper, paint, ceramic, cosmetic, pharmaceutical, insecticide, pesticide, plastic, roofing, rubber, leather, textile, refractory, insulator, tile, addition in animal food stuff, petroleum etc. Other use for commercial talc include cereal (Rice, Corn and Barley) polishing, bleaching agents, floor wax, water filtration, joint fillers and grouts, shoe polish, welding rod coatings, printing inks toilet preparation, odour absorption from food, foundry, source of magnesium in plant food, lens polishing etc. Along with these uses, it is a primary ingredient in talcum powder and other cosmetics. of existing rocks under hydrothermal

Talc is one of the abundant and economically proven mineral resource of Uttarakhand Occurrences of talc bands, lenses, veins and pockets are known in magnesite dolomite and chloritic talc schist in different parts of district Bageswar, Pithoragarh, Chamoli and adjoining localities

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### LOCATION DETAILS

Project location & surroundings of the project are described in the Table No. 2.1 given below:

Sr. No.	Particular	Detail			
		S			
А.	Nature of the Project	"Bhataura Rankot Soapstone Deposit",			
1.	ML Area	6.864 Ha			
2.	Proposed Production Capacity	maximum proposed production is 15980 TPA (in Vth year)			
3.	Lease Period of Mine	Lease was granted for a period of 50 Years.			
С.	Method of Mining				
1.	Method	Open-Cast semi-mechanized Mining			
2.	Blasting/Drilling	Not proposed			
D.	Project Location				
1.	Village	Bhataura Rankot			
2.	Tehsil	Bageshwar,			
3.	District	Bageshwar,			
4.	State	Uttarakhand			
5.	Topo Sheet No.	-			
6.	Lease Area Coordinates	<b>29°51'48.91''N</b> 79°51'43.99"E (Pillar No. 1, details about other pillars given below column)			
Е.	Cost Details				
1.	Project Cost	Rs. 3250000.			
F.	Water Demand				

Table N	<b>No.2.1:-</b>	<b>Details</b> o	of the	Project	Location	& Su	rroundings
							0
1.	Requirement	8.62 KLD					
----	--	---					
2.	Source of water	Nearby villages & natural springs.					
G.	Man Power Requirement	31					
Н.	Environmental Setting						
1.	Nearest Village	<b>Bhataura Rankot -</b> 500m away					
2.	Nearest Town	Bageshwar-8.17 km away					
3.	Nearest National /State Highway	NH-309A, 3.2 Km South					
4.	Nearest Railway Station	Kathgodam Railway Station, towards SSW direction (approx. 72.6 Km*)					
5.	Nearest Airport	Naini Saini, Pithoragarh Airport, towards SE direction (47.12 km*)					
6.	EcologicalSensitiveAreas(Nation alPark,WildLifeSanctuaries,Biosp hereReserveetc.) within 10kmradius	None					
7.	Water bodies within 10 km radius of the mine site.	Sarju river-7.27 Km NNE, Pungar Nadi-1.41 NNW, Lohar nadi-10 Km WNW, Gomati nadi – 9.71 Km WSW, Surju river – 8.42 Km SSW, Bhadrapati river- 8.08 KM SE.					
8.	Archaeological Important Place	None					
9.	Seismic Zone	V					

### Geocordinates

Pillar No	N	E			
1.	29°51'48.91''N	79°51'43.99"E			
2.	29°51'46.53"N	79°51'42.99"E			
3.	29°51'45.91"N	79°51'42.29"E			
4.	29°51'45.65"N	79°51'43.20"E			
5.	29°51'45.15"N	79°51'43.31"E			
б.	29°51'44.83"N	79°51'43.79"E			
7.	29°51'42.20"N	79°51'42.86"E			
8.	29°51'42.11"N	79°51'43.43"E			
9.	29°51'42.99"N	79°51'43.90"E			
10.	29°51'42.92"N	79°51'44.17"E			
11.	29°51'41.98"N	79°51'43.58"E	24.	29°51'43.20"N	79°51'53.36"E
12.	29°51'39.80"N	79°51'43.12"E	25	29°51'45.59"N	79°51'52.66"E
13.	29°51'39.38"N	79°51'46.50"E	25.		
14.	29°51'38.12"N	79°51'47.32"E	26.	29°51'46.27"N	79°51'48.77"E
15.	29°51'37.85"N	79°51'48.12"E	27	29°51'45.41"N	79°51'46.53"E
16.	29°51'38.96"N	79°51'50.99"E		00054140 00007	
17.	29°51'38.44"N	79°51'52.52"E	28.	29°51'43.90"N	/9°51'4/.35"E
18.	29°51'36.52"N	79°51'53.19"E	29.	29°51'43.86"N	79°51'44.23"E
19.	29°51'36.32''N	79°51'54.08"E		20951'45 51"N	70°51'45 11"E
20.	29°51'37.73"N	79°51'53.99"E	30.	29 5145.51 N	79 5145.11 E
21.	29°51'38.28"N	79°51'54.80''E	31.	29°51'46.44"N	79°51'47.63"E
22.	29°51'40.81"N	79°51'54.23"E	22	29°51'48 50"N	79°51'47 36"E
23.	29°51'40.91"N	79°51'53.25"E	32.	27 51 10.50 11	19 91 11 30 2



Figure: 1.1 - Project Location



Figure: 500 M Study area

Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand



Figure: 1.2 10 KM Study area

#### **TOPOGRAPHY & GEOLOGY**

#### Topography

Bageshwar district comprises two broad physiographic divisions from north to south viz. Central Himalayan Zone (north of the Main Central Thrust) and Lesser Himalayan Zone (south of the Main Central Thrust). The area shows an extremely rugged topography characterized by precipitous hills and deep gorges with sharp variation of high magnitude in surface relief. The general slope is towards south. In the northern parts the elevation of the land surface ranges from about 3000 m to 6861 m above mean sea level whereas in the valleys of southern part, the altitude is as low as 795 m. The soils of Bageshwar district can be broadly classified into two types, viz. Soils of Lesser Himalaya and Soils of Greater or Central Himalaya. Majority of the area is covered by the first type. The soils in this area are exposed in massive mountainous tracts and

tangled mass of series of ridges divided from each other by deep, narrow valleys. The soils of Lesser Himalaya are further subdivided into a) Soils of Summits and Ridge tops, b) Soils of Side Slopes, c) Soils of Glacio-Fluvial Valleys, d) Soils of Fluvial Valleys and e) Soils of Cliffs. The soils of Greater Himalaya have been broadly classified under a) Soils of Summits, Ridge Tops and Mountain Glaciers, b) Soils of Side Slopes, c) Soils of Upper Glacio-Fluvial Valleys and d) Soils of Cliffs.

The lease area comprises of terraced agricultural field showing undulating topography. Slope of the area varies from low to moderate & general slope of the area is towards north east & south west. The highest level of area is 1403.10mRL towards eastern side along boundary pillar 23-24 while lowest level is 1323.0mRL towards South West flank near pillar 12. One Seasonal drainage exists towards south east flank of lease area & it is within the area & flows north east to south west direction & another seasonal drainage towards west direction within lease area & meet the river pungar which is the main catchment of the area.

#### Geology

The Kumaon Himalaya, lying between the Kali River in the east and Sutlej in the west, include a stretch of 320 km. of mountainous terrain. Kumaon is one of the two regions and administrative divisions of Uttarakhand, a mountainous state of northern India, the other being Garhwal. It includes the districts of Almora, Bageshwar, Champawat, Nainital, Pithoragarh, and Udham Singh Nagar. It is bounded on the north by Tibet, on the east by Nepal, on the south by the state of Uttar Pradesh, and on the west by the Garhwal region. The Lesser or Lower Himalaya is limited by the Main Boundary Thrust (MBT) to its south and MCT to its north and consists of the late Proterozoic to early Cambrian sediments intruded by some granites and acid volcanics (Valdiya 1980; Srikantia and Bhargava 1982). It mainly comprises the marine sequences of late Proterozoic to early Cambrian age and some sedimentary record of transgressing shallow sea during Permian and late Cretaceous to early Eocene periods. The predominant rock types are quartzites, siltstone, shale and carbonates. There are zone of Phyllite, schist with subordinate impure marbles, metamorphosed mafic rocks and augen orthogneisses (Valdiya 1980). The MBT separates the northern Lesser Himalayan sediments (hanging wall) from the sediments of the sub-Himalaya (footwall) to the south. In spite of a lot of good work by many generations of geologists in the Lesser Kumaon Himalaya, many

structural and stratigraphic interpretations remain inadequate because of the meagre fossil record. Geological correlation is based almost entirely on stratigraphic evidence. Most workers postulate the existence of regional inversion of sedimentary sequences in the form of two elongated tectonic belts of sedimentary/ metasedimentary rocks separated by an ENEWSW trending zone of metamorphic rocks – the Almora-Dudhatoli Crystalline Zone. The southern sedimentary belt which occurs south of the Almora-Dudhatoli Crystalline and is called the Outer Sedimentary Belt. The northern sedimentary belt occurring north of the Crystalline is the Inner Sedimentary Belt, which has also been referred to as the Deoban-Tejam Zone (Gansser 1964) or the Jaunsar-Berinag Nappe (Valdiya 1978). The Crystalline zone representing the divide between the two sedimentary belts constituting the Kumaon Lesser Himalaya is itself an inverted sequence of low to very high grade older metamorphic thrust over the younger sedimentaries from the Central Axial Crystalline Zone during the main Himalayan orogeny. The area forms the part of Calc Zone of Tejam. The stratigraphical sequence of the region as per monumental work (Geology of Lesser Himalayas; 1980 of Prof. K.S. Valdiya is as below:

#### Local Geology

District Bageshwar is mainly represented by the rocks of Lesser Himalaya and Central Himalaya. The geological set up is very complex due to the repeated tectonic disturbances caused by different orogenic cycles. Valdiya (1980) carried out extensive geological and structural mapping in this area. The rock units exposed in various parts of Bageshwar district comprise current-bedded quartzite with associated volcanics, mica-talc schist, limestone, conglomerate, slate, quartzite, granodiorite, augen gneiss, and migmatite and granite gneiss. Many areas in the northern part of the district are yet to be mapped by conventional field methods due to inaccessibility and permanent snow cover. However a group of regionally metamorphosed rocks known as the Central Crystallines are exposed in this area. The Central Crystallines of the Central Crystallines are exposed in this area. The Central Crystalline of the Central Himalayan Zone occur as thrus sheets over the met sedimentary and sedimentary rocks of Lesser Himalayan Zone in varied tectonic settings. Major rock types of Central Crystalline are migmatites, psammitic and mica gneiss, calc gneiss, quartzite, marble, mica schist and amphibolites. Granites of different ages ranging from Paleoproterozoic to Mesozoic-Tertiary intrude the Central Crystallines. Major parts of Bageshwar district falls under the geotectonic zone known as the Lesser Himalaya. Rock types in the Lesser Himalayan Zone include sedimentaries, metasedimentaries and plutonic igneous rocks. The various

rock units have suffered multiple phases of deformation and metamorphism in major parts of the district. Geological framework of Almora-Bageshwar regions is so wide where that region is divided in different litho-tectonic units. The geology of the area consists of three Stratigraphic and tectonic units, namely (a) The Central Crystalline, (b) The Baijnath Crystalline and (c) The Garhwal Group. In the north the meta-sedimentary rocks of the Garhwal group have been thrust over by the Central Crystalline and the contact is known as the Main Central thrust. In the south the Kausani thrust separates the Garhwal group from the physically overlying Baijnath Crystalline. In the central part of the Bageshwar region there are rocks of Garhwal group is found to expose. On the basis of previous works by Heim and Gansser (1939) and Gansser (1964) gave an account of different lithogical units and structural trends, with regional interpretations in the Kumaun Himalaya. Rocks of the central part of the Bageshwar region is remarked as a part of "The Calc zone of Tejam". The first geological map of the area was published by Misra and Banerjee (1968). Subsequently it was revised by Misra and Bhattacharya (1972), after that work has been carried out by A. Ahmad (GSI, 1975), A.R. Bhattacharya (1979) and besides those workers K.S. Valdiya (1980) and A.K. Sinha (1981) also gave their contribution in the account of the Geology of the region.

The proposed lease area belongs to a part of Calc Zone of Tejam. The Stratigraphic sequence of the region as per monumental work (Geology of Lesser Himalaya, 1980) of Prof. K.S. Valdia, given as below-

Berinag Quartzite	Unconformity
Gangolihat Dolomite	Dolomite and Dolomitic limestone with Algal structures, Magnesite with minor talc/Talcose phyllite and dolomitic intercalations. Unconformity
- Sor Slates	Shales, Slates and Phyllites

The above Stratigraphic sequence as observed in this region is considered to be an inverted one. Soapstone pockets/lenses occurs within carbonates of Gangolihat Dolomite.

#### Local Geology:

Locally the area only shows the part of carbonates of Gangolihat Dolomite sequence. The local stratigraphy shows that the mineralized zone lies between upper & lower carbonates as below-

Upper Carbonates: Magnesite sporadic dolomite

Middle Talcose phyllite: Talc in pockets

Lower Carbonates: Dolomite & dolomitic intercalations

As per UNFC, the deposit is lenticular of all dimensions, UNFC category IV

#### CLIMATE

Climatically the area falls in temperate zones with pleasant summer & extreme cold winters. The area receives moderate snowfall during winters between January & February. The maximum temperature goes up to  $35^{\circ}$ . While the average minimum temperature goes up to  $2^{\circ}$  to  $4^{\circ}$  in the months of January & February.

#### **Temperature, Relative Humidity Precipitation and Wind**

Climatically the area falls in temperate zones with pleasant summer & extreme cold winters. The area receives moderate snowfalls during winters between January & February. The maximum temperature goes up to 35°. While the average minimum, temperature goes up to 2° to 4° in the month of January & February.

January is the coldest month with mean maximum temperature of  $10^{\circ}$ C, the mean minimum temperature being about 2°C. Temperature drops down to  $-6^{\circ}$ C during January and February in the northern part of the district. June is the warmest month with the mean maximum and the mean minimum temperatures of 25°C and 15°C respectively. The maximum temperature recorded in the district was 43°C (May 2003) whereas the minimum temperature recorded was 4°C (January 2003).

The relative Humidity shows rise from June to February with highest values in the month of January and decreases during months of April & May. On the basis of past experience reveals that the maximum average humidity in the month of January is about 96.33% while the minimum average humidity is about 32.43% during month of April.

#### Rainfall

Most of the rainfall, about 75% of the annual value, occurs during monsoon months of June to

September. July is the rainiest month followed by August. In September, depressions from Bay of Bengal occasionally reach Uttarakhand and affect the weather of Bageshwar district too. This phenomenon may cause heavy rains. With the withdrawal of monsoon in September, the intensity of rainfall rapidly decreases. The decrease continues till November, which is a practically rainless month. Winter precipitation is associated with the passage of the Western Disturbances and is in the form of snowfall over higher elevations. The monthly and annual average rainfall data of District Bageshwar in year 2013, 2014, 2015, 2016 is 1697 mm, 1157.38 mm, 1241.52 mm, and 1346.34 mm respectively. Maximum rainfall occurred in July 2016 is 1684.05 mm. (**Ref: Dist. Survey Report).** 

#### SURFACE DRAINAGE PATTERN

Drainage of the area is mainly controlled by Saryu, Gomti and Pindar Rivers and their tributaries (locally called Nadi, Gad or Gadhera) viz. Pungar Nadi, Khir Ganga Nadi, Bhadrapati Nadi, Revti Ganga, Kanal Gad, LahorNadi, Jagtana Gad, Kulur Gad, Sukunda Gad etc. Sub-trellis, sub-rectangular and sub-dendritic are the most common drainage patterns in the area. The Central and North-Central parts of the district are drained by Saryu River. Gomti River drains the western and south eastern parts whereas Pindar River drains the northern part. These rivers are primarily fed by snowmelt with relatively smaller contribution from ground water. However, during the lean period, the rivers are fed by ground water occurring as base flow. The surface drainage pattern map is shown below



Fig. 2.3: Surface Drainage map

### MINING

It will be opencast semi mechanized mine. The overburden & inter burden shall be removed deployment of an excavator as well as with the help of rock breaker. The soapstone shall be extracted with deployment of an excavator as well as manually with the help of crow bar; chisels, pickaxe, hammers, spade and different grade of soapstone will be stacked separately near the mining faces. Soapstone is soft mineral; therefore no drilling & blasting shall be required. The soapstone shall be dressed manually& stacked separately. No further beneficiation shall be undertaken during first five years. The different grade of soapstone will be filled into 50 kg plastic bags & transported the road side by mules. From road side the soapstone bags will be loaded into trucks through manually and transported

### Details of mining given in mine plan attached as Annexure: 2

### 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.

### **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.

### 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, soas 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
- Uttarakhand 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

#### **CHAPTER 3**

#### **BASELINE ENVIRONMENT STATUS**

#### **INTRODUCTION**

The main objectives of describing the environment, which may be potentially affected, are (i) to assess present environmental quality and the environmental impacts and (ii) to identify environmentally significant factors that could preclude Mine development. This chapter discuss about the present scenario of the study area with reference to the prominent environmental attributes. The study area covers 10 Km radius of the mine lease area. Baseline data has been collected out during the March 2023 to May 2023 by NABL MoEF & CC Accredited Lab, (Baseline data enclosed as Annexure VII) in accordance with the Guidelines for EIA issued by the Ministry of Environment Forests and Climate Change, Govt. of India and CPCB, New Delhi. The impact identification always commences with the collection of baseline data such as Ambient Air Quality, Micro-Meteorology, Ground and Surface Water Quality, Noise levels, Soil Quality, Land use pattern, Biological Environment and Socio-economic aspects, Solid and Hazardous waste, Risk Assessment, Geology and Hydrology within the study zone of 10 Km. radius. Apart from these, secondary data have been collected from Census Handbook, Revenue Records, Statistical Department, Soil Survey and Land use Organization, District Industries Centre, Forest Department, Central Ground Water Authority, Botanical Survey of India, Zoological Survey of India, Geological Survey of India etc. The generation of primary data as well as collection of secondary data and information from the site and surroundings was carried out during winter season.

The EIA study is being done for the Mine Lease (core zone) and area within 10 Km distance from mine lease boundary (buffer zone), both of which together comprise the study area. The following data, through field survey and other sources, has been collected for preparing the EIA/EMP for the proposed mining area with related facilities.

- $\star$  Physical environment (Air, Water, Soil and Noise) baseline data.
- ★ Relevant meteorological data, for previous decades from Indian Meteorological Department (IMD) and primary data.

- ★ Land use pattern within core zone and buffer zone (10 Km distance around the core zone) based on Survey of India Toposheet map, ground truth and satellite image.
- ★ Identification of water bodies, hills, roads etc. within 10 Km radius.
- ★ Eco-sensitive places, sanctuaries, biosphere reserves within 10 Km radius.
- ★ Religious places / historical monuments and tourist places within 10 Km radius.
- ★ Details of fauna and flora within a distance of 10 Km from the project site and information about forests, if any.
- ★ Demography and Socio-economic based on last available Census data for entire study area.
- ★ Major industries within 10 Km radius.
- ★ Study of present environmental protection and mitigation measures in nearby operating similar projects, if any.

This section contains the description of baseline studies of the area within 10 Km radius surrounding the proposed **"Bhataura Rankot Soapstone Deposit"**, Area- 6.864 Ha, at **Village: Bhataura Rankot Tehsil & District-Bageshwar**, **State- Uttarakhand**. The study was undertaken for prevailing environment in respect of land, air, water (both ground and surface), soil, noise, biological (both flora and fauna). The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the proposed project can be assessed.

#### 3.1 LAND ENVIRONMENT

Area statistics of land use classes has been generated within 10 Km radius of mine lease area (Core zone and Buffer zone) and given in **Table 3.1**.

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

### 3.1.1 Data Used

Indian Remote Sensing satellite IRS-P6, LISS III, multi-spectral digital data has been used for the preparation of land use/ land cover map of present study. Survey of India reference map on 1:50,000 scales have been used for the preparation of base map and

geometric correction of satellite data. Ground truth has been carried out to validate the interpretation accuracy and reliability of remotely sensed data, by enabling verification of the interpreted details and by supplementing with the information, which cannot be obtained directly on satellite imagery.

#### 3.1.2 Methodology for Baseline Data Generation

Land use / Land cover map preparation, Base map creation; Geometric and Radiometric correction of satellite image has been processed using ERDAS Imagine 9.2 and Arc GIS 9.3 Software.

#### 3.1.3 Observation of Land Use Study

In the present study, both digital image processing and using visual interpretation technique were used to generate output of Land use / Land cover map of study area on 1: 50,000 scale (as shown in **Figure 3.1**). Land use pattern of the study area (10 Km distance from the mine site.

Land Use	Area (in ha.)	% Area
Water bodies	132.35	0.4
trees	22831.63	69
Crop land	661.78	2
Buildup	661.78	2
range	8272.33	25
Total	33089.32	100

Table 3.1 Land Use Pattern of the Study Area

(Source: lulc\_bhuvan\_nrsc)



### 3.1.4 Description of Land Use

The study area is prominently covered by trees (69.00%). crop land covers 2 % of the study area. The water bodies cover 0.4 % while Buildup Area are covering 2 % of the study area. range constitutes about 25 % of the study area.



Figure 3.2: Land Use Pattern of the Study Area (10 Km Radius from the Mine Site



Figure 3.3 Drainage map of the Study Area (10 Km Radius from the Mine Site)



Figure 3.3 Environmental Sensitivity of the Study Area (10 Km Radius from the Mine Site)



Figure 3.4 Toposheet Map of the Study Area (10 Km Radius from the Mine Site)

#### 3.1.5 CROPPING PATTERN

Despite technological advancement and conquest over nature, the agricultural patterns are closely controlled by the physical factors such as terrain, topography, altitude, slope and climatic factors i.e. Temperature, humidity, wind, rainfall, fog and frost, sunshine other than surface, soil, drainage and underground water table are important vital determinants of agricultural as well as horticultural activities and influence of the cropping pattern In Uttarakhand, mainly there are two separate cropping seasons viz. Kharif season; from July to October and Rabi season; from October to March. The crops grown between March to June called Zaid season. The crops are grown solo or mixed called multi-cropping or in a definite sequence under rotational cropping. The land may be occupied by one crop during one session is mono-cropping or by two crops during one season as doublecropping which may be grown in a year in a sequence. The Kumaun Himalaya has practiced fruits crops mainly Tropical; Mango, Litchi, Guava, Papaya and Temperate; Apple, Pear, Orange, Malta (Citrus Fruits), Kiwi, Plum, Apricot, Pecan Nut, Chestnut and Walnut. These conditions apply only on the cultivation of vegetable crops in general and not applicable for the fruit cultivation but in Kumaun Himalaya practices mixed cropping pattern i.e., the apple orchard and other seasonal vegetable crops grow together in the same land simultaneously. Types, pattern and distribution of fruit crops in Kumaun Himalaya clearly show the impact of the physiographic conditions and types of climate. Hence various horticulture crops grown in the different altitudinal zones. The fruit crops not cultivated in every physiographic zones, the region has some specific climatic zones or physiographic patches are suitable for the fruit crop cultivation which is the indicating the environmental restriction, as result it we can see the various cropping pattern and distribution in the Himalayan regions, therefore the production of fruit crops are keenly limited and occupied area under the fruit crops in Kumaun Himalaya.

#### 3.1.6 PHYSIOGRAPHY OF THE MINE AREA

The lease area comprises of terraced agricultural field showing undulating topography. Slope of the area varies from low to moderate & general slope of the area is towards north east & south west. The highest level of area is 1403.10mRL towards eastern side along boundary pillar 23-24 while lowest level is 1323.0mRL towards South West flank near pillar 12. One Seasonal drainage exists towards south east flank of lease area & it is within the area & flows north east to south west direction & another seasonal drainage towards west direction within lease area & meet the river pungar which is the main catchment of the area.

#### 3.1.7 SEISMICITY OF THE AREA

Many parts of the Indian subcontinent have historically high Seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. By contrast, peninsular India is relatively less seismic, having suffered only infrequent earthquakes of moderate strength. The main seismogenic belts are associated with the collision plate boundary between the Indian and Eurasian plates. The project site as well as study area lies in Zone-V of Seismic Zoning Map (Figure-3.3), and thus can be said to be located in an area of moderate seismic hazard by national standards. Hence the risk of earthquake at the site persists though there has been no incident in the near past.



#### UTTARAKHAND EARTHQUAKE ZONATION

Information on the existing environmental status is essential for assessing the likely environmental impacts of the project. In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment have been studied/ monitored.

#### **STUDY PERIOD**

Primary Baseline monitoring data used for air, water, noise and soil quality monitoring has been conducted at project site and four other locations from March 2023 to May 2023 Apart from field monitoring, additional data was also collected from secondary sources like irrigation department, India Meteorological Department (IMD), Central Ground Water Board, Geological Survey of India, State

Ground Water Department, State Pollution Control Board, Census of India and Local Forest Department, Non - Governmental Agencies, etc.

#### STUDY AREA

The present report covers baseline environmental data generated in the study area (10 Km radius around the project site for land use and the sample selection for air, water, soil and noise monitoring).

#### **BASELINE MONITORING OF ENVIRONMENTAL COMPONENTS**

In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment have been studied/monitored

### **Meteorology Climate**

#### **Climate:**

The climate in Bageshwar district is temperate to sub-humid. The northern part of district experiences subzero temperature almost throughout the year whereas the central and southern parts are comparatively warm and humid. Severe winter is the chief climatic feature in the district. In general, the district experience a tropical to sub-tropical and sub-humid climate except for the northern part where a cold temperature climate prevails.

#### **Temperature, Relative Humidity and Wind:**

January is the coldest month with mean maximum temperature of 10oC, the mean minimum temperature being about 2oC. Temperature drops down to 6oC during January and February in the northern part of the district. June is the warmest month with the mean maximum and the mean minimum temperatures of 25oC and 15oC respectively. The maximum temperature recorded in the district was 43oC (May 2003) Whereas the minimum temperature recorded was 4oC (January 2021). The relative Humidity increase rapidly with the onset of monsoon and reaches at about 80% during July to September. The driest part of the year is the pre-monsoon period, when the humidity is as low as 30% in the afternoons. Skies are heavily clouded during the monsoon months and for short spells when the district is affected by Western Disturbances. Two broad wind pattern are observed in the district viz north easterly to easterly (May to September) and south easterly to westerly (October and March).

#### **Rainfall:**

Most of the rainfall, about 75% of the annual value, occurs during monsson months of June to September. July is the rainiest followed by August. In September, depressions from Bay of Bengal occasionally reach Uttrakhand and affect the weather of Bageshwar District also. The phenomenon may cause heavy rains. With the withdrawal of monsoon in September, the intensity of rainfall rapidly

decreases. The decrease continues till November, which is a practically rainless month. Winter precipitation is associated with the passage of the western Disturbances and is in the form of snowfall over higher elevations. The monthly and annual average rainfall data of District Bageshwar in year 2017, 2018, 2019, 2020 is 1697mm, 1157.38mm, 1241.52mm and 1346.34mm respectively. Maximum rainfall occurred in July 2021 is 1684.05mm.In Pithorāgarh, the wet season is warm, humid, and partly cloudy and the dry season is comfortable and mostly clear. Over the course of the year, the temperature typically varies from  $40^{\circ}F$  to  $81^{\circ}F$  and is rarely below  $35^{\circ}F$  or above  $87^{\circ}F$ .

#### Air Environment

The prime objective of the baseline study with respect to ambient air quality is to establish the present air quality and its conformity to National Ambient Air Quality Standards. This data has been further used during impact assessment to predict the final air quality. This section describes the sampling locations, frequency of sampling and methodology adopted for monitoring ambient air quality.

To quantify the impact of the project on the ambient air quality, it is necessary at first to evaluate the existing ambient air quality of the area. The existing ambient air quality, in terms of Particulate Matter – 10 ( $PM_{10}$ ), Particulate Matter- 2.5 ( $PM_{2.5}$ ), Sulphur-dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>2</sub>), has been measured through a planned field monitoring.

To assess the ambient air quality level, 6 monitoring stations were set up. Table 3.1 gives location of the ambient air quality monitoring stations.

The prominent seasonal wind directions are NW & SE direction

#### FIGURE 3.1 WIND ROSE March 2023 to May 2023

Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand



### AMBIENT AIR QUALITY

The study area represents mostly rural and urban environment. The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality network





Figure: 3.1. Air quality monitoring location

### (a) Monitoring Schedule

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for 12 weeks.

### (b) Methods of Sampling and Analysis

The brief methodology of the parameter analyzed is as follows:

- I. Particulate Matter (PM2.5): (CPCB Method) Particulate Matter (PM2.5) was analyzed by Fine Particulate Sampler Envirotech Model APM 550. PM 2.5 was collected on 47 mm diameter filter paper. The mass concentration of (PM2.5) fine particles in ambient air was calculated as the total mass of collected particles divided by the volume of air sampled.
- II. Particulate Matter (PM10): Particulate Matter (PM10) was carried out by Respirable Dust Sampler Envirotech Model APM 460 BL. The cyclone of this instrument is used for fractionating the dust into two fractions. PM 10 dust is accumulated on the filter paper (8"×10" size) while coarse dust is collected in a cup placed under the cyclone.PM 10 was

calculated as per IS: 5182 (Part 23):2006. The mass of these particles was determined by the difference in filter weight prior to and after sampling. The concentration of PM 10 in the designated size range was calculated by dividing the weight gain of the filter by the volume of air sampled.

- III. Sulphur dioxide (SO2): SO2 was monitored with the help of APM 411 assembly attached with APM 460 BL using theimpinge. It was absorbed by aspirating a measured air sample through a solution of Potassium tetrachloromercurate (TCM). This procedure resulted in the formation of a dichlorosulphitemercurate complex. The complex was made to react with pararosaniline and methylsulphonic acid. The absorbance of the solution was measured by means of spectrophotometer.
- IV. Nitrogen Dioxides: NO2 was monitored with the help of APM 411 assembly attached with APM 460 BL using the impinge. It was collected by bubbling air through a solution of sodium hydroxide and sodium arsenite. The concentration of nitrite ion produced during sampling was determined calorimetrically by reacting with the nitrite ion with phosphoric acid, sulphanilamide and NEDA and absorbance of highly colored azo-dye was measured at 540nm.

#### (c) Results and Discussion

The results of AAQ are given and summarized in the tables below. The results on comparison with National Ambient Air Quality Standards (NAAQS), 2009 of Central Pollution Control Board (CPCB) show that the values of ambient air quality parameters are well within the stipulated limits at various monitoring locations.

Particulate Particulate Sulphur Nitrogen Carbon Matter Dioxide Matter Dioxide monoxide NO<sub>2</sub> S.N PM2.5 ( $\mu g / m^3$  $SO_2 (\mu g / m^3)$ CO (mg  $/m^3$ ) PM10 (µg  $(\mu g / m^3)$ Date  $/m^3$ ) 0 IS:5182(Part-IS:5182(Par IS:5182(Part-24 IS:5182(Part-6) IS:5182( Partt-23 2) X) 01-03-2023 68.63 32.69 7.01 14.37 < 0.5 1 2 04-03-2023 65.24 36.30 8.21 16.30 < 0.5 3 08-02-2023 71.40 34.77 < 0.5 6.63 15.63 4 67.49 11-03-2023 32.57 7.54 16.73 < 0.5 5 15-03-2023 68.22 35.83 6.33 17.79 < 0.5 6 18-03-2023 69.32 33.80 7.85 18.15 < 0.5 22-03-2023 65.37 34.89 6.93 18.64 < 0.5 7 8 25-03-2023 70.37 36.04 8.01 15.63 < 0.5 9 29-03-2023 7.57 67.68 37.18 14.30 < 0.5 10 7.03 01-04-2023 69.14 32.37 15.73 < 0.5 11 05-04-2023 66.19 34.47 8.73 16.24 < 0.5

<u>The results of ambient air quality monitoring are summarized below in the Tables 3.2:</u> TEST RESULT Project Site (AQ1)

12	08-04-2023	68.88	35.02	6.40	16.67	<0.5
13	12-04-2023	65.54	36.17	7.90	18.46	< 0.5
14	15-04-2023	70.69	35.37	8.51	17.90	< 0.5
15	19-04-2023	69.39	34.89	7.63	18.64	< 0.5
16	22-04-2023	66.87	36.43	6.98	16.36	< 0.5
17	26-04-2023	68.88	37.02	8.46	14.40	< 0.5
18	01-05-2023	66.21	34.53	7.03	15.92	< 0.5
19	05-05-2023	70.21	37.71	8.38	16.73	< 0.5
20	08-05-2023	67.18	35.19	6.08	17.47	< 0.5
21	12-05-2023	68.70	34.59	8.35	18.34	< 0.5
22	15-05-2023	71.64	34.65	7.30	15.58	<0.5
23	19-05-2023	70.27	37.99	8.02	14.98	< 0.5
24	22-05-2023	65.65	36.30	8.35	16.67	< 0.5
Minir	num	65.24	32.37	6.08	14.30	< 0.5
Maxi	mum	71.64	37.99	8.73	18.64	< 0.5
Avera	ıge	68.30	35.28	7.55	16.57	< 0.5
98 <sup>th</sup> P	ercentile	71.53	37.86	8.63	18.64	<0.5
NAA( Monit	QS,For 24 Hourly oring	100.0	60.0	80.0	80.0	4.0

	Ghingharutola, AQ2							
			TEST RES	SULT				
S.No	Date	Particulate Matter PM10 (μg /m <sup>3</sup> )	Particulate Matter PM2.5 (µg /m <sup>3</sup> )	Sulphur Dioxide SO <sub>2</sub> (µg /m <sup>3</sup> )	Nitrogen Dioxide NO <sub>2</sub> (µg /m <sup>3</sup> )	Carbon monoxide CO (mg/m <sup>3</sup> )		
		IS:5182(Part- 23	IS:5182(Part-24	IS:5182(Part- 2)	IS:5182(Part-6)	IS:5182( Part- X)		
1	01-03-2023	69.01	33.86	7.26	15.80	< 0.5		
2	04-03-2023	65.32	38.30	6.93	16.98	< 0.5		
3	08-02-2023	70.91	35.07	8.26	14.66	< 0.5		
4	11-03-2023	68.26	33.78	6.97	17.62	< 0.5		
5	15-03-2023	67.98	37.85	8.27	18.66	< 0.5		
6	18-03-2023	68.77	34.95	7.54	16.44	< 0.5		
7	22-03-2023	66.37	38.16	7.18	18.39	< 0.5		
8	25-03-2023	71.44	33.00	6.89	14.68	< 0.5		
9	29-03-2023	68.05	35.79	8.23	15.52	< 0.5		
10	01-04-2023	70.13	32.69	7.29	16.79	< 0.5		
11	05-04-2023	65.96	35.62	6.63	14.71	< 0.5		
12	08-04-2023	69.13	37.29	7.40	17.66	< 0.5		
13	12-04-2023	66.39	35.44	8.35	18.71	< 0.5		
14	15-04-2023	71.94	32.54	8.26	16.50	< 0.5		
15	19-04-2023	65.47	33.50	6.91	17.84	< 0.5		
16	22-04-2023	67.24	38.01	7.23	15.75	< 0.5		
17	26-04-2023	69.12	34.16	8.35	13.89	< 0.5		
18	01-05-2023	65.97	33.55	6.73	14.93	< 0.5		
19	05-05-2023	70.71	35.83	7.73	17.23	< 0.5		
20	08-05-2023	68.04	34.04	6.79	16.61	< 0.5		
21	12-05-2023	69.25	36.43	8.52	18.22	< 0.5		
22	15-05-2023	66.83	37.47	6.86	16.26	< 0.5		
23	19-05-2023	67.54	34.41	7.71	15.86	< 0.5		

24 22-05-2023	65.89	37.71	6.98	17.66	< 0.5
Minimum	65.32	32.54	6.63	13.89	<0.5
Maximum	71.94	38.30	8.52	18.71	<0.5
Average	68.16	35.39	7.47	16.56	<0.5
98 <sup>th</sup> Percentile	71.71	38.24	8.44	18.69	<0.5
NAAQS,For 24 Hourly Monitoring	100.0	60.0	80.0	80.0	4.0

<b>TEST</b> RESULT (Chaubata, AQ3)							
S.No	Date	Particulate Matter PM10 (µg /m <sup>3</sup> )	Particulate Matter PM2.5 (µg /m <sup>3</sup> )	Sulphur Dioxide SO <sub>2</sub> (µg /m <sup>3</sup> )	Nitrogen Dioxide NO <sub>2</sub> (µg /m <sup>3</sup> )	Carbon monoxide CO (mg/m <sup>3</sup> )	
		IS:5182(Part- 23	IS:5182(Part-24	IS:5182(Part- 2)	IS:5182(Part-6)	IS:5182( Part- X)	
1	01-03-2023	66.43	35.95	6.97	16.71	< 0.5	
2	04-03-2023	65.23	36.12	8.31	14.75	< 0.5	
3	08-02-2023	69.72	32.91	7.56	15.56	< 0.5	
4	11-03-2023	65.14	34.16	6.68	17.41	< 0.5	
5	15-03-2023	68.50	36.51	7.70	18.82	< 0.5	
6	18-03-2023	66.24	33.64	6.85	16.78	< 0.5	
7	22-03-2023	67.50	35.99	7.59	17.45	< 0.5	
8	25-03-2023	70.12	33.80	7.98	16.50	< 0.5	
9	29-03-2023	68.56	37.84	8.36	15.14	< 0.5	
10	01-04-2023	69.36	34.76	7.69	17.69	< 0.5	
11	05-04-2023	67.87	36.54	6.78	15.67	< 0.5	
12	08-04-2023	70.14	38.03	8.21	16.68	<0.5	
13	12-04-2023	65.59	34.92	7.91	18.47	< 0.5	
14	15-04-2023	70.82	32.84	7.54	15.52	< 0.5	
15	19-04-2023	66.32	35.74	6.65	16.61	<0.5	
16	22-04-2023	68.09	34.29	7.68	14.87	< 0.5	
17	26-04-2023	71.13	35.40	8.16	16.29	< 0.5	
18	01-05-2023	67.15	37.55	7.03	17.79	< 0.5	
19	05-05-2023	69.85	34.84	8.41	16.79	< 0.5	
20	08-05-2023	68.10	33.07	7.18	15.08	< 0.5	
21	12-05-2023	70.30	37.18	8.35	17.61	< 0.5	
22	15-05-2023	69.61	36.39	7.17	15.60	< 0.5	
23	19-05-2023	65.55	35.19	6.99	14.89	< 0.5	
24	22-05-2023	68.28	33.95	7.60	16.57	< 0.5	
N	Iinimum	65.14	32.84	6.65	14.75	<0.5	
N	laximum	71.13	38.03	8.41	18.82	<0.5	
1	Average	68.15	35.32	7.56	16.47	<0.5	
<b>98</b> <sup>th</sup>	Percentile	70.98	37.95	8.38	18.66	<0.5	
NAAQS,For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0	

### **TEST RESULT (Bhataura AQ4)**

S.No	Date	Particulate Matter PM10 (µg /m <sup>3</sup> )	Particulate Matter PM2.5 (µg /m <sup>3</sup> )	Sulphur Dioxide SO <sub>2</sub> (µg /m <sup>3</sup> )	Nitrogen Dioxide NO <sub>2</sub> (µg /m <sup>3</sup> )	Carbon monoxide CO (mg/m <sup>3</sup> )
		IS:5182(Part- 23	IS:5182(Part-24	IS:5182(Part- 2)	IS:5182(Part-6)	IS:5182( Part- X)
1	01-03-2023	67.52	32.46	8.07	18.34	< 0.5
2	04-03-2023	68.19	34.77	7.60	16.19	< 0.5
3	08-02-2023	70.18	38.32	6.86	14.61	< 0.5
4	11-03-2023	66.09	33.24	7.22	15.71	< 0.5
5	15-03-2023	69.58	35.57	6.98	17.66	< 0.5
6	18-03-2023	67.32	37.34	8.61	16.38	< 0.5
7	22-03-2023	69.20	38.03	7.16	18.15	< 0.5
8	25-03-2023	65.10	34.15	6.87	14.63	< 0.5
9	29-03-2023	70.84	36.50	8.20	15.29	< 0.5
10	01-04-2023	71.07	35.55	6.98	16.72	< 0.5
11	05-04-2023	69.20	38.59	7.60	18.21	< 0.5
12	08-04-2023	68.78	37.10	7.64	17.57	< 0.5
13	12-04-2023	66.18	33.14	6.92	14.75	< 0.5
14	15-04-2023	65.69	32.35	8.21	16.04	<0.5
15	19-04-2023	67.40	36.52	6.92	17.50	< 0.5
16	22-04-2023	69.76	38.49	8.08	15.21	< 0.5
17	26-04-2023	66.58	34.46	7.72	14.95	<0.5
18	01-05-2023	68.77	36.56	7.29	18.28	< 0.5
19	05-05-2023	70.92	32.62	6.99	15.82	< 0.5
20	08-05-2023	66.43	34.70	7.31	14.68	< 0.5
21	12-05-2023	69.84	38.38	8.47	16.65	< 0.5
22	15-05-2023	67.02	36.73	6.88	16.30	< 0.5
23	19-05-2023	65.76	34.29	8.24	17.66	< 0.5
24	22-05-2023	70.57	33.87	7.31	15.61	< 0.5
N	linimum	65.10	32.35	6.86	14.61	< 0.5
N	laximum	71.07	38.59	8.61	18.34	< 0.5
Average		68.25	35.57	7.51	16.37	< 0.5
98 <sup>th</sup> Percentile		71.00	38.54	8.55	18.31	<0.5
NAAQS,For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

	TEST RESULT (Pipalkhet AQ5)								
S.No	Date	Particulate Matter PM10 (µg /m <sup>3</sup> )	Particulate Matter PM2.5 (µg /m <sup>3</sup> )	Sulphur Dioxide SO <sub>2</sub> (µg /m <sup>3</sup> )	Nitrogen Dioxide NO <sub>2</sub> (µg /m <sup>3</sup> )	Carbon monoxide CO (mg /m <sup>3</sup> )			
		IS:5182(Part- 23	IS:5182(Part-24	IS:5182(Part- 2)	IS:5182(Part-6)	IS:5182( Part- X)			
1	01-03-2023	68.57	37.90	6.94	16.62	< 0.5			
2	04-03-2023	64.95	36.81	7.17	14.68	< 0.5			
3	08-02-2023	71.59	35.05	8.12	15.02	< 0.5			
4	11-03-2023	67.60	32.48	6.68	17.61	< 0.5			
5	15-03-2023	70.56	36.30	7.65	16.67	< 0.5			
6	18-03-2023	68.68	34.06	6.16	18.06	< 0.5			
7	22-03-2023	65.39	35.84	6.87	14.63	< 0.5			
8	25-03-2023	67.16	33.00	7.58	15.23	< 0.5			

9	29-03-2023	68.05	37.89	6.17	14.61	< 0.5
10	01-04-2023	69.63	32.46	7.37	17.41	< 0.5
11	05-04-2023	69.15	36.60	6.93	17.90	< 0.5
12	08-04-2023	67.12	34.62	6.54	16.68	< 0.5
13	12-04-2023	66.46	35.32	7.21	14.80	< 0.5
14	15-04-2023	68.81	37.55	7.97	15.56	< 0.5
15	19-04-2023	66.51	33.83	6.20	16.51	< 0.5
16	22-04-2023	71.23	32.19	7.41	15.64	< 0.5
17	26-04-2023	69.24	33.24	8.02	14.60	< 0.5
18	01-05-2023	67.74	35.22	7.00	17.70	< 0.5
19	05-05-2023	70.46	34.84	6.03	14.93	< 0.5
20	08-05-2023	67.42	37.45	8.04	16.43	< 0.5
21	12-05-2023	68.70	36.30	7.93	17.60	< 0.5
22	15-05-2023	70.12	34.65	6.47	15.03	< 0.5
23	19-05-2023	66.86	32.81	7.64	16.64	< 0.5
24	22-05-2023	68.23	36.04	8.15	14.71	< 0.5
N	Ainimum	64.95	32.19	6.03	14.60	<0.5
Ν	Iaximum	71.59	37.90	8.15	18.06	<0.5
	Average	68.34	35.10	7.18	16.05	<0.5
98 <sup>th</sup> Percentile		71.42	37.90	8.13	17.99	<0.5
NAAQS,For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

### TEST RESULT (Malladaba AQ6)

		Particulate	Particulate	Sulphur	Nitrogen	Carbon
		Matter	Matter	Dioxide	Dioxide NO <sub>2</sub>	monoxide
S No	Date	PM10 (µg	PM2.5 (µg /m <sup>3</sup>	$SO_2 (\mu g / m^3)$	$(\mu g / m^3)$	$CO (mg/m^3)$
5.110	Date	/m <sup>3</sup> )	)			
		IS:5182(Part-	IS:5182(Part-24	IS:5182(Part-	IS:5182(Part-6)	IS:5182( Part-
		23		2)		X)
1	01-03-2023	67.74	35.69	7.61	17.51	< 0.5
2	04-03-2023	66.05	38.00	6.88	15.57	< 0.5
3	08-02-2023	70.22	36.66	7.96	14.62	< 0.5
4	11-03-2023	65.05	33.26	8.20	18.31	< 0.5
5	15-03-2023	66.12	37.07	7.22	17.56	< 0.5
6	18-03-2023	68.65	34.83	6.29	18.20	< 0.5
7	22-03-2023	67.12	36.63	7.54	15.52	< 0.5
8	25-03-2023	69.51	35.07	6.88	14.66	< 0.5
9	29-03-2023	66.74	36.58	8.08	16.41	< 0.5
10	01-04-2023	68.92	33.26	7.22	18.31	< 0.5
11	05-04-2023	70.77	37.37	6.64	16.58	< 0.5
12	08-04-2023	67.53	36.65	8.19	14.79	< 0.5
13	12-04-2023	66.53	34.35	7.60	15.63	< 0.5
14	15-04-2023	71.32	35.79	6.86	16.26	< 0.5
15	19-04-2023	67.58	32.49	6.72	18.12	< 0.5
16	22-04-2023	69.30	37.29	7.96	14.87	< 0.5
17	26-04-2023	65.91	32.71	8.27	15.87	< 0.5
18	01-05-2023	66.83	36.69	7.73	18.54	< 0.5
19	05-05-2023	69.70	33.91	6.29	15.27	< 0.5
20	08-05-2023	67.84	36.07	7.88	17.49	< 0.5
21	12-05-2023	70.81	37.71	6.98	16.73	< 0.5
22	15-05-2023	71.59	35.62	7.46	14.71	< 0.5

23	19-05-2023	67.43	33.31	6.96	17.60	< 0.5
24	22-05-2023	65.05	35.54	7.58	15.60	< 0.5
Minimum		65.05	32.49	6.29	14.62	<0.5
Maximum		71.59	38.00	8.27	18.54	<0.5
	Average	68.10	35.52	7.38	16.45	<0.5
<b>98</b> <sup>tl</sup>	<sup>h</sup> Percentile	71.46	37.87	8.24	18.43	<0.5
NA Hour	AQS,For 24 ly Monitoring	100.0	60.0	80.0	80.0	4.0

The values of PM2.5, PM10, SO2 & NOx at project site and 5 other monitoring locations are presented above in Table 3.2.All the parameters are well within the stipulated limits of NAAQS, 2009.

#### **Noise Levels**

Noise is one of the most undesirable and unwanted by-products of our modern life style. It may not seem as insidious or harmful as air and water pollutants but it affects human health and wellbeing and can contribute to deterioration of human well-being in general and can cause neurological disturbances and physiological damage to the hearing mechanism in particular. It is therefore, necessary to measure both the quality as well as the quantity of noise in and around the site.

#### (a) Methodology

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

Noise levels were measured using an Integrating sound level meter manufactured by Pulsar Instruments Plc, Model NO. 91 (SL.No.B21625). It has an indicating mode of Lp and Leq Keeping the mode in Lp for few minutes and setting the corresponding range and the weighting network in "A" weighting set the sound level meter was run for one hour time and Leq was measured at all locations.

The day noise levels have been monitored during 6.00 am to 10.00 pm and night noise levels,

during 10.00 pm to 6.00 am at all the 6 locations, which covers residential areas, commercial, industrial areas, silence area within 10 km radius of the study area.

### (b) Sampling Locations

A preliminary survey was undertaken to identify the major noise generating sources in the area. The noise survey was conducted to assess the background noise levels in different zones. Gazettes Notification (S.O. 123(E)) of MoEF&CC dated December 14, 2000 on ambient air quality standards has different noise levels for different zones viz. industrial, residential and silence zones. Five sampling locations were selected for sampling of noise levels. The sampling locations are given in figure below.



Fig: 3.2 Noise quality monitoring location

Ministry of Environment Forests and Climate Change (MoEF&CC) has notified the noise standards vide gazette notification dated December 14, 2000 for different zones under the Environment Protection Act (1986). These standards are given in Table - 3.3.

	Tuble 5.5 Timblent Police Outliny Stundards						
Area	Catagory of Arag	Noise dB(A) Leq					
Code	Category of Area	Day time*	Night time*				
Α	Residential Zone	55	45				

Table 3.3 Ambient Noise Ouality Standards

В	Silence zone	50	40
С	Industrial Zone	75	70
D	Commercial Zone	65	55

Note:

1. Daytime is from 6.00am to 10.00 pm and Night time is from 10.00 pm to 6.00 am.

2. Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicle hours, loud speakers and bursting of crackers are banned in these zones.

#### (c) Results and Discussion

The noise level monitoring results of March 2023 to May 2023 are presented below in Table 3.4. The ambient noise level in study area during the day time varies from 44.46 to 39.42 dB (A) during day time and 42.63 to 35.66 dB (A) during night which is within the specified limits of CPCB.

S.No	Data	Observed	Value Leq, dB(A)	LIMIT as per CPC dB	CB Guidelines Leq, (A)
	Date	Date DAY NIGHT	NIGHT	Zone - Commercial	
				DAY*	NIGHT*
1	01-03-2023	57.6	48.1		
2	04-03-2023	58.2	45.2		
3	08-02-2023	59.1	46.2		
4	11-03-2023	55.4	48.1		
5	15-03-2023	58.1	45.8		
6	18-03-2023	55.2	46.5		
7	22-03-2023	53.6	47.2		
8	25-03-2023	57.1	43.6		
9	29-03-2023	52.8	48.7		
10	01-04-2023	55.8	46.5		
11	05-04-2023	58.1	48.9		
12	08-04-2023	56.5	47.5		
13	12-04-2023	55.4	48.2		
14	15-04-2023	57.1	45.2	65.0	55.0
15	19-04-2023	59.1	48.2		
16	22-04-2023	58.7	46.5		
17	26-04-2023	56.8	47.5		
18	01-05-2023	58.3	48.2		
19	05-05-2023	57.7	45.4		
20	08-05-2023	58.2	46.1		
21	12-05-2023	60.4	46.8		
22	15-05-2023	58.2	44.5		
23	19-05-2023	57.4	46.7		
24	22-05-2023	58.2	45.2		
	Minimum	52.8	43.6		
	Maximum	60.4	48.9		
	Average	57.2	46.7		
	Day time		(6.00AM	TO 10.00PM)	

Table 3.4: Hourly Leq Noise Level in Study Area (March 2023 May 2023)

TEST DESULT (Droject Site N1)

Night time	(10.00PM TO 6.00AM)
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S.No	S.No		ed Value Leq, dB(A)	LIMIT as per CP Leq, d	CB Guidelines B(A)
	Date	DAY	NIGHT	Zone - Re	sidential
				DAY*	NIGHT*
1	01-03-2023	48.5	39.5		
2	04-03-2023	51.6	38.7		
3	08-02-2023	50.6	36.8		
4	11-03-2023	53.7	39.5		
5	15-03-2023	49.5	39.5		
6	18-03-2023	50.4	40.5		
7	22-03-2023	49.7	39.5		
8	25-03-2023	48.2	41.5		
9	29-03-2023	50.5	39.5		
10	01-04-2023	52.4	38.6		
11	05-04-2023	53.6	40.5		
12	08-04-2023	50.7	39.7		
13	12-04-2023	51.5	38.2		
14	15-04-2023	50.8	38.4	55.0	45.0
15	19-04-2023	53.4	39.5		
16	22-04-2023	50.8	39.1		
17	26-04-2023	52.7	36.2		
18	01-05-2023	53.4	38.7		
19	05-05-2023	50.8	42.1		
20	08-05-2023	50.9	40.1		
21	12-05-2023	53.5	38.5		
22	15-05-2023	50.8	39.7		
23	19-05-2023	51.7	40.5		
24	22-05-2023	51.8	40.8		
	Minimum	48.2	36.2		
Maximum		53.7	42.1		
Average		51.3	39.4		
Day time			(6.00AM 7	ГО 10.00РМ)	
Night time			(10.00PM	TO 6.00AM)	

TEST RESULT (Chaubata N3)						
S.No	Date	Observed Value Leq, dB(A)	LIMIT as per CPCB Guidelines Leq, dB(A)			

#### **TEST RESULT(Ghingharutola N2)**

		DAY	NIGHT	Zone - R	esidential
				DAY*	NIGHT*
1	01-03-2023	51.7	39.1		
2	04-03-2023	52.7	39.8		
3	08-02-2023	50.8	40.2		
4	11-03-2023	48.9	38.2		
5	15-03-2023	54.5	39.8		
6	18-03-2023	50.6	41.2		
7	22-03-2023	50.9	42.6		
8	25-03-2023	51.8	40.8		
9	29-03-2023	50.7	38.1		
10	01-04-2023	50.8	37.5		
11	05-04-2023	51.6	40.5		
12	08-04-2023	53.4	42.8		
13	12-04-2023	49.7	40.2		
14	15-04-2023	50.4	42.5	55.0	45.0
15	19-04-2023	51.6	38.4		
16	22-04-2023	51.6	39.2		
17	26-04-2023	52.7	39.5		
18	01-05-2023	50.6	41.8		
19	05-05-2023	50.2	40.7		
20	08-05-2023	53.6	41.5		
21	12-05-2023	49.7	39.2		
22	15-05-2023	49.2	41.5		
23	19-05-2023	50.4	40.5		
24	22-05-2023	52.7	41.8		
	Minimum	48.9	37.5		
Maximum Average Day time		54.5	42.8		
		51.3	40.3		
			(6.00AM	TO 10.00PM)	
Night time			(10.00PM	1 TO 6.00AM)	

	]	TEST RES	ULT (Bhataura N4)		
S.No		Observed V		LIMIT as per C Leq,	PCB Guidelines dB(A)
	Date	DAY	NIGHT	Zone - R	esidential
				DAY*	NIGHT*
1	01-03-2023	51.2	41.2		
2	04-03-2023	53.2	42.5	]	
3	08-02-2023	50.4	39.7		
4	11-03-2023	50.8	38.7		
5	15-03-2023	49.8	38.7	]	
6	18-03-2023	52.7	41.5	55.0	45.0
7	22-03-2023	50.6	40.6	]	
8	25-03-2023	49.8	40.1	]	
9	29-03-2023	50.6	39.7		
10	01-04-2023	51.4	38.2		
11	05-04-2023	50.8	40.5		

12	08-04-2023	53.2	39.8	
13	12-04-2023	50.4	40.7	
14	15-04-2023	49.7	38.4	
15	19-04-2023	48.2	39.2	
16	22-04-2023	50.6	39.1	
17	26-04-2023	51.4	39.7	
18	01-05-2023	50.8	39.1	
19	05-05-2023	53.4	40.7	
20	08-05-2023	51.6	39.7	
21	12-05-2023	52.7	40.8	
22	15-05-2023	48.7	39.5	
23	19-05-2023	53.5	40.5	
24	22-05-2023	51.4	39.8	
	Minimum	48.2	38.2	
	Maximum	53.5	42.5	
	Average	51.1	39.9	
Day time		(6.00AM TO 10.00PM)		
Night time			(10.00PM	TO 6.00AM)

	]	TEST RESUI	LT (Pipalkhet N5)						
S.No	D.(	Observed Value Leq, dB(A)		LIMIT as per CPCB Guidelin Leq, dB(A)					
	Date	DAY	NIGHT	Zone - Residential					
				DAY*	NIGHT*				
1	01-03-2023	50.4	40.6						
2	04-03-2023	52.1	41.5						
3	08-02-2023	52.9	40.8						
4	11-03-2023	49.6	42.5						
5	15-03-2023	50.2	40.6						
6	18-03-2023	52.4	42.5						
7	22-03-2023	50.1	41.6						
8	25-03-2023	52.4	40.5						
9	29-03-2023	50.7	38.0						
10	01-04-2023	49.6	39.5						
11	05-04-2023	51.7	40.2						
12	08-04-2023	52.6	41.7						
13	12-04-2023	50.8	42.1	55.0	45.0				
14	15-04-2023	49.8	39.5						
15	19-04-2023	49.2	38.4						
16	22-04-2023	51.5	40.5						
17	26-04-2023	50.6	41.2						
18	01-05-2023	52.8	41.6						
19	05-05-2023	50.5	40.8						
20	08-05-2023	53.6	39.6						
21	12-05-2023	49.2	40.6						
22	15-05-2023	52.7	38.7						
23	19-05-2023	49.7	40.2	]					
24	22-05-2023	50.4	39.5	]					
	Minimum	49.2	38.0						
Maximum	53.6	42.5							
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Average	51.1	40.5							
Day time	(6.00AM TO 10.00PM)								
Night time		( <b>10.00P</b> )	M TO 6.00AM)						

	TEST RESULT ( Malladaba N6)											
S.No	D-4	Observed	Value Leq, dB(A)	LIMIT as per CPCB Guidelines Leq, dB(A)								
	Date	DAY	NIGHT	Zone - Residential								
				DAY*	NIGHT*							
1	01-03-2023	51.7	41.2									
2	04-03-2023	50.6	42.7									
3	08-02-2023	51.5	40.5									
4	11-03-2023	53.2	39.6									
5	15-03-2023	51.4	41.5									
6	18-03-2023	50.5	41.2									
7	22-03-2023	52.4	42.5									
8	25-03-2023	50.6	41.7									
9	29-03-2023	53.5	42.5									
10	01-04-2023	50.1	41.5									
11	05-04-2023	51.5	42.1									
12	08-04-2023	53.6	41.7									
13	12-04-2023	52.1	41.2	0	15.0							
14	15-04-2023	50.4	39.4	55.0	45.0							
15	19-04-2023	51.2	39.1									
16	22-04-2023	51.5	40.5									
17	26-04-2023	50.2	42.5									
18	01-05-2023	50.8	41.4									
19	05-05-2023	51.4	43.2									
20	08-05-2023	53.2	40.2									
21	12-05-2023	52.4	39.7									
22	15-05-2023	50.2	41.5									
23	19-05-2023	53.1	41.8									
24	22-05-2023	52.5	40.5									
	Minimum	50.1	39.1									
	Maximum	53.6	43.2									

Average	51.7	41.2							
Day time	(6.00AM TO 10.00PM)								
Night time		(10.00PM TC	<b>6.00AM</b> )						

#### WATER ENVIRONMENT

#### (a) Water Quality

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of ground water has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture purpose.

The water quality at project site and other locations within the 10 km impact zone was monitored during March 2023 to May 2023. The locations of the monitoring are given below in Table -3.6 Results of monitoring of ground water quality is presented in Figure below:



Figure – 3.3 Ground water quality monitoring location

#### Table : 3.5 Water Sample Analysis Discipline/Group-Chemical/Water

Analysis Duration

: 12/04/2023 to 18/04/2023

	RESULTS as per IS 10500:2012										
				Results				Permissible			
S No	Doromotor	Tost Mothod		Location	Γ	Unite	Acceptable	the			
5.110	r ar ameter	Test Method	GW-1	GW-2	GW-3	Units	Limit	Absence of Alternate Source			
1	рН	IS:3025(Part- 11)	7.48	7.18	7.23	-	6.5-8.5	-			
2	Colour	IS:3025(Part- 04)	<5.0	<5.0	<5.0	Hazen	5	15			
3	Odour	IS-3025(Part- 05)	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable			
4	Taste	IS:3025(Part- 07)	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable			
5	Turbidity	IS-3025(Part- 10)	<0.5	<0.5	0.8	NTU	1	5			
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part- 21)	164	172	152	mg/l	200	600			
7	Calcium(as Ca)	IS:3025(Part- 40)	32.80	34.40	30.40	mg/l	75	200			
8	Magnesium(as Mg)	IS:3025(Part- 46)	19.93	20.90	18.47	mg/l	30	100			
9	Chloride(as Cl)	IS:3025(Part- 32)	45.01	82.19	78.27	mg/l	250	1000			
10	Iron(as Fe)	IS:3025(Part- 53)	< 0.05	0.075	0.061	mg/l	0.3	No Relaxation			
11	Fluoride(as F)	IS:3025(Part- 60)	0.39	0.31	0.27	mg/l	1	1.5			
12	Free Residual chlorine	IS:3025(Part- 26)	<0.1	<0.1	<0.1	mg/l	0.2	1			
13	Total Dissolved Solid	IS:3025(Part- 16)	379	354	405	mg/l	500	2000			
14	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part-43)	<0.001	<0.001	<0.001	mg/l	0.001max	0.002 Max			
15	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	< 0.1	<0.1	mg/l	0.2	1.0			
16	Sulphate (as SO <sub>4</sub> )	IS:3025(Part- 24)	47.14	31.94	38.43	mg/l	200	400			
17	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part-34)	2.32	2.91	2.23	mg/l	45	No Relaxation			
18	Alkalinity(as CaCO3)	IS:3025(Part- 23)	176	120	148	mg/l	200	600			
19	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part- 26)	< 1.0	< 1.0	< 1.0	mg/l	4	No Relaxation			
20	Cadmium (as Cd)	IS-3025(Part- 41)	< 0.001	< 0.001	< 0.001	mg/l	0.003	No Relaxation			
21	Lead ( as Pb)	IS:3025(Part- 47)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation			
22	Total Chromium (as Cr)	IS:3025(Part- 52)	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation			

23	Copper (as Cu)	IS:3025(Part- 42)	< 0.01	< 0.01	<0.01	mg/l	0.05	1.5
24	Total Ammonia	IS: 3025 (Part-34)	<0.5	<0.5	<0.5	mg/l	0.5	No Relaxation
25	Sulphide (as H2S)	IS:3025(Part- 29)	< 0.05	< 0.05	< 0.05	mg/l	0.05	No Relaxation
26	Zinc (as Zn )	IS:3025(Part- 49)	<0.1	<0.1	<0.1	mg/l	5	15
27	Manganese (as Mn)	IS:3025(Part- 59)	<0.1	<0.1	<0.1	mg/l	0.1	0.3
28	Boron (as B)	IS:3025(Part- 57)	<0.1	<0.1	<0.1	mg/l	0.5	1
29	Selenium (Se)	IS:3025(Part- 56)	< 0.01	< 0.01	<0.01	mg/l	0.01	No Relaxation
30	Arsenic (as As)	IS:3025(Part- 37)	<0.01	<0.01	<0.01	mg/l	0.01	0.05

		В	acteriologica	al Quality of	Drinking W	Vater			
Analysis I	Duration	:	12/04/2023 t	to 18/04/2023					
RESULTS As per IS 10500:2012									
S.No	Parameter	Test Method	Results			Units	Requirements		
1	E.coli	IS-1622	Not Detected ( <2)	Not Detected (<2)	Not Detected (<2)	E.Coli/100ml	Shall not be detectable in100 ml sample		
2	Total Coliform	IS-1622	Absent	Absent	Absent	MPN/100ml	Shall not be detectable in100 ml sample		

Water Sample Analysis Discipline/Group-Chemical/Water									
Analysis Duration : 12/04/2023 to 18/04/2023									
	RESULTS as per IS 10500:2012								
~	_			Results Location		-	Acceptable	Permissible Limit in the	
S.No	Parameter	Test Method	GW-4	GW-5	GW-6	Units	Limit	Absence of Alternate Source	

1	рН	IS:3025(Part- 11)	7.11	7.49	7.64	-	6.5-8.5	-
2	Colour	IS:3025(Part- 04)	<5.0	<5.0	<5.0	Hazen	5	15
3	Odour	IS-3025(Part- 05)	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
4	Taste	IS:3025(Part- 07)	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
5	Turbidity	IS-3025(Part- 10)	<0.5	<0.5	<0.5	NTU	1	5
6	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part- 21)	136	152	196	mg/l	200	600
7	Calcium(as Ca)	IS:3025(Part- 40)	27.20	30.40	39.20	mg/l	75	200
8	Magnesium(as Mg)	IS:3025(Part- 46)	16.52	18.47	23.81	mg/l	30	100
9	Chloride(as Cl)	IS:3025(Part- 32)	35.22	35.22	72.40	mg/l	250	1000
10	Iron(as Fe)	IS:3025(Part- 53)	< 0.05	< 0.05	0.053	mg/l	0.3	No Relaxation
11	Fluoride(as F)	IS:3025(Part- 60)	0.25	0.38	0.60	mg/l	1	1.5
12	Free Residual chlorine	IS:3025(Part- 26)	<0.1	<0.1	<0.1	mg/l	0.2	1
13	Total Dissolved Solid	IS:3025(Part- 16)	285	263	472	mg/l	500	2000
14	Phenolic Compound (as C <sub>6</sub> H <sub>5</sub> OH)	IS: 3025 (Part- 43)	<0.001	<0.001	<0.001	mg/l	0.001max	0.002 Max
15	Anionic Detergents (as MBAS)	Annex K of IS 13428	<0.1	<0.1	<0.1	mg/l	0.2	1.0
16	Sulphate (as SO <sub>4</sub> )	IS:3025(Part- 24)	32.96	36.21	73.78	mg/l	200	400
17	Nitrate (as NO <sub>3</sub> )	IS: 3025 (Part- 34)	0.94	0.60	4.78	mg/l	45	No Relaxation
18	Alkalinity(as CaCO3)	IS:3025(Part- 23)	128	112	172	mg/l	200	600
19	Chloramines (as Cl <sub>2</sub> )	IS:3025(Part- 26)	< 1.0	< 1.0	< 1.0	mg/l	4	No Relaxation
20	Cadmium (as Cd)	IS-3025(Part- 41)	< 0.001	< 0.001	< 0.001	mg/l	0.003	No Relaxation
21	Lead ( as Pb)	IS:3025(Part- 47)	< 0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
22	Total Chromium (as Cr)	IS:3025(Part- 52)	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
23	Copper (as Cu)	IS:3025(Part- 42)	<0.01	< 0.01	<0.01	mg/l	0.05	1.5
24	Total Ammonia	IS: 3025 (Part- 34)	<0.5	<0.5	<0.5	mg/l	0.5	No Relaxation
25	Sulphide (as H2S)	IS:3025(Part- 29)	< 0.05	< 0.05	< 0.05	mg/l	0.05	No Relaxation
26	Zinc (as Zn )	IS:3025(Part- 49)	<0.1	<0.1	<0.1	mg/l	5	15
27	Manganese (as Mn)	IS:3025(Part- 59)	<0.1	<0.1	<0.1	mg/l	0.1	0.3
28	Boron (as B)	IS:3025(Part- 57)	<0.1	<0.1	<0.1	mg/l	0.5	1
29	Selenium (Se)	IS:3025(Part- 56)	< 0.01	< 0.01	<0.01	mg/l	0.01	No Relaxation

30         Arsenic (as As)         IS:3025(Part- 37)         <0.01         <0.01         <0.01	0.01	0.05

	Bacteriological Quality of Drinking Water									
Analysis	Duration	:	12/04/2023	to 18/04/2023						
RESULTS As per IS 10500:2012										
S.No	Parameter	Test Method	Results			Units	Requirements			
1		10,1(22)	GW-4	GW-5	GW-6	E C 1'/100 1	<u>(1)</u>			
	E.COII	18-1622	Not Detected ( <2)	Not Detected ( <2)	Not Detected ( <2)	E.Coll/100ml	Shall not be detectable in100 ml sample			
2	Total Coliform	IS-1622	Absent	Absent	Absent	MPN/100ml	Shall not be detectable in100 ml sample			



Figure : 3.4 - Surface water quality monitoring location

#### Table : 3.6 Surface Water Sample Analysis Discipline/Group-Chemical/Water

Analysis Duration

: 12/04/2023 To 18/04/2023

			R	ESULTS	5						
				•.		Tolerance Limit as per IS:2296					
S.No	Parameter	Test Method	Res	Kesuits		Class	Class	Class	Class	Class	
			SW1	SW2		A	D	C	D	Ľ	
1	pН	IS:3025(Part- 11)	7.68	7.74	-	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	6.5- 8.5	
2	Temperature	IS:3025(Part- 09)	20.8	20.9	°C	-	-	-	-	-	
3	Turbidity	IS:3025(Part- 10)	3	2.9	NTU	-	-	-	-	-	
4	Conductivity @25°C	IS:3025(Part- 14)	225	220	μs/cm.	-	-	-	1000	2250	
5	Total Suspended Solid	IS:3025(Part- 17)	10	9	mg/l	-	-	-	-	-	
6	Total Alkalinity (as CaCO <sub>3</sub> )	IS:3025(Part- 23)	69	62	mg/l	-	-	-	-	-	
7	Biological Oxygen Demand (Max.) (at 270C for 3 days)	IS:3025(Part- 44)	2.1	2.6	mg/l	2	3	3	-	-	
8	Dissolved Oxygen (as O <sub>2</sub> ) Min.	IS:3025(Part- 38)	6.9	6.1	mg/l	6	5	4	4	-	
9	Calcium(as Ca)	IS:3025(Part- 40)	27.20	25	mg/l	80	-	-	-	-	
10	Magnesium(as Mg)	IS:3025(Part- 46)	6.80	7.1	mg/l	24	-	-	-	-	
11	Chloride(as Cl),Max	IS:3025(Part- 32)	18	12	mg/l	250	-	-	-	600	
12	Iron(as Fe),Max	IS:3025(Part- 53)	0.11	0.14	mg/l	0.3	-	50	-	-	
13	Fluoride(as F),Max	IS:3025(Part- 60)	0.42	0.38	mg/l	1.5	1.5	1.5	-	-	

14	Total Dissolved Solid	IS:3025(Part- 16)	134	127	mg/l	500	-	1500	-	2100
15	Total Hardness (as CaCO <sub>3</sub> )	IS:3025(Part- 21)	96.00	99	mg/l	300	-	-	-	-
16	Sulphate (as SO <sub>4</sub> )Max	IS:3025(Part- 24)	7.61	10	mg/l	400	-	400	-	1000
17	Phosphate (as P)	IS:3025(Part- 31)	< 0.2	<0.2	mg/l	-	-	-	-	-
18	Sodium (as Na)	IS:3025(Part- 45)	11.5	10.5	mg/l	-	-	-	-	-
19	Manganese (as Mn)	IS:3025(Part- 59)	<0.1	<0.1	mg/l	0.5	-	-	-	-
20	Total Chromiun (as Cr)	IS:3025(Part- 52)	< 0.05	< 0.05	mg/l	0.05	0.05	0.05	-	-
21	Zinc (as Zn)	IS:3025(Part- 49)	<0.1	< 0.1	mg/l	15	-	15	-	-
22	Potassium (as K)	IS:3025(Part- 45)	2.2	2.6	mg/l	-	-	-	-	-
23	Nitrate (as NO <sub>3</sub> ),Max	IS: 3025 (Part- 34)	0.05	0.06	mg/l	20	-	50	-	-
24	Cadmium (as Cd)	IS-3025(Part- 41)	< 0.01	< 0.01	mg/l	0.01	-	0.01	-	-
25	Lead ( as Pb)	IS:3025(Part- 47)	< 0.01	< 0.01	mg/l	0.1	-	0.1	-	
26	Copper (as Cu)	IS:3025(Part- 42)	< 0.01	< 0.01	mg/l	1.5	-	1.5	-	-
27	Chemical Oxygen Demand (asO <sub>2</sub> )	IS-3025(Part- 58)	9.60	8	mg/l	-	-	-	-	-
28	Arsenic (as As	IS:3025(Part- 37)	< 0.01	< 0.01	mg/l	0.05	0.2	0.2	-	

	Surface Water Sample Analysis Discipline/Group-Chemical/Water									
Analysis	Analysis Duration : 12/04/2023 To 18/04/2023									
RESULTS										
						Tol	erance I	Limit as	per IS:22	296
S.No	Parameter	Test Method	Results	lts	Units.	Class	Class	Class	Class	Class
	Total Coli Form		SW1	SW2		A	Б	C	D	Ľ
1	1 IS:1622 8		5	MPN/100ml	50	500	5000	-	-	

(b) Sampling Frequency and Sampling Techniques

Quality of ground water was compared with IS: 10500: 1991 (Reaffirmed 1993 with Amendment No.3 July 2010) for drinking purposes. Water samples were collected in a 5 liter plastic jerry can and 500ml sterilized clean glass bottles for physico-chemical and bacteriological tests respectively. GW sampling was done after flushing out the source (minimum 10 minutes) to get the fresh ground water and grab sampling method was used. The samples were analyzed as per Indian standard /APHA latest edition.

The water quality in the impact zone was assessed through physico-chemical and bacteriological analysis of ground samples. CPCB's water quality criteria are presented below in Table 3.7:

Designated-best-use	Class	Criteria
Drinking water source without	А	Total Coliform Organism MPN/100ml will be
conventional treatment		50 or less
but after disinfection		pH between 6.5 and 8.5 Dissolved Oxygen
		6mg/l or more
		Biochemical Oxygen Demand 5 days 20°C
		2mg/l or less
Outdoor bathing (Organized)	В	Total Coliform Organism MPN/100ml will be
		500 or less
		pH between 6.5 and 8.5; Dissolved Oxygen
		5mg/l or more
		Biochemical Oxygen Demand 5 days 20°C
		3mg/l or less
Drinking water source after	С	Total Coliform Organism MPN/100ml will be
conventional treatment and		5000 or less
disinfection		pH between 6 to 9; Dissolved Oxygen 4mg/l or
		more
		Biochemical Oxygen Demand 5 days 20°C
		3mg/l or less
Propagation of Wild life and	D	pH between 6.5 to 8.5
Fisheries		Dissolved Oxygen 4mg/l or more
		Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling,	E	pH between 6.0 to 8.5
Controlled Waste disposal		Electrical Conductivity at 25°C micro
		mhos/cm Max.2250
		Sodium absorption Ratio Max. 26
		Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

Table 3.7: Water Ouality Criteria as per Central Pollution Control Board

(c) The water quality in the impact zone was assessed through physico-chemical and Microbiological

analysis of ground water samples. The results have been compared with the drinking water quality standards specified in IS: 10500. It was observed that all the physico- chemical parameters and heavy metals from ground water samples are below stipulated limits for drinking water standards.

- The pH limit fixed for drinking water samples as per IS-10500 Standards is 6.5 to 8.5 beyond this range the water will affect the mucus membrane or water supply system. During the study period, the pH was varying for ground waters from 7.20 to 7.40 and the surface waters are 7.68 to 7.74. The pH values for all the samples collected in the study area during study period were found to be within the limits.
- The desirable limit for total dissolved solids as per IS-10500 Standards is 500 mg/l whereas the permissible limits in absence of alternate source is 2000 mg/l, beyond this palatability decreases and may cause gastro intestinal irritation. In ground water samples collected from the study area, the total dissolved solids are varying from 255 mg/l to 272 mg/l. The TDS of the samples were above the desirable limit but within the permissible limit of 2000 mg/l.
- The desirable limit for chlorides is 250 mg/l as per IS-10500 Standards whereas, permissible limit of the same is 1000 mg/l beyond this limit taste, and corrosion and palatability are affected. The chloride level in the surface water samples collected in the study area were ranging from 12 mg/l to a maximum of 18 mg/l, in ground water samples 14 mg/l to 22mg/l. The chloride samples are within the desirable limits.
- The desirable limit as per IS-10500 Standards for hardness is 200 mg/l whereas the permissible limit for the same is 600 mg/l beyond this limit encrustation in water supply structure and adverse effects on domestic use will be observed. In the ground water samples collected from the study area, the hardness is varying from 171.8 mg/l to 184 mg/l.
- Fluoride is the other important parameter, which has the desirable limit of 1 mg/l and permissible limit of 1.5 mg/l. however the optimum content of fluoride in the drinking water is 0.6 to 1.5 mg/l. If fluoride content is less than 0.6 mg/l it causes dental carries, above 1.5 mg/l causes flurosis. In the ground water samples of study area the fluoride value were in the range of 0.2 mg/l to 0.98 mg/l. In surfacewater 0.42 mg/l to 0.38 mg/l.

Overall all the samples collected from the study area were found to be fit for consumption, Most of ground water samples are well within the permissible limits, as per IS-10500. Most of the heavy metals in all samples are below detectable limits.

#### SOIL

Soil may be defined as a thin layer of earth's crust, and support medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil samples were carried out / collected to assess the soil characteristics of the study area. Soil

samples were collected from 6 locations as shown in Figure below and analyzed as per CPCB norms. Fig.3.7 showing the soil monitoring stations. Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on PH.

**Type & characteristics:** To assess the soil quality, following stations were selected. Soil profile and quality was studied at 6 locations.



Figure : 3.5 - Soil quality monitoring location

#### (a) Methodology

The soil samples were collected in the March 2023 to May 2023 from 6 locations as stated above. At each of the location, 3 sub-locations were identified randomly from where soil was collected from up to 30 cm below the surface. The final samples represent homogenously mixed soil from these 3 sub-locations for each location. The samples were filled in polythene bags, labeled in the field with number and site name and sent to laboratory for analysis. Table

3.8 gives information of frequency and methodology for selection of soil sampling locations and monitoring process.

Table 5.8: Frequency and Withhodology for Son Sampling					
Particulars	Details				
Frequency	One grab sample from each station- once during the Study Period				
Methodology	Composite grab samples of the topsoil were collected from 3 depths,				
	and mixed to provide a representative sample for analysis. They were				
	stored in airtight Polythene Bags and analyzed at the laboratory				

### Table 3.8: Frequency and Methodology for Soil Sampling

Table 3.9: Soil Sample Analysis					
Discipline/Group-Chemical/ Pollution & Environment					
12/04/2022 TE 10/04/2022					

Analysis D	Juration	:	12/04/2023 T	o 18/04/202	23	
RESULTS						
				Result		
S.No	Parameter	Units	Location			Test Method
			SQ-1	SQ-2	SQ-3	
1	Texture	-	Sandy Clay Loam	Sandy Clay	Sandy Clay	UTRL/LAB/SOIL/SOP/05
	Sand	%	48.80	47.54	46.81	UTRL/LAB/SOIL/SOP/05
	Clay	%	30.57	36.90	38.19	UTRL/LAB/SOIL/SOP/05
	Silt	%	20.63	15.56	15.00	UTRL/LAB/SOIL/SOP/05
2	pH(1:2.5 Suspension)	-	6.94	7.67	6.89	IS: 2720 (Part-26),1987
3	Electrical Conductivity	µmhos/cm	421.3	671.3	412.8	IS: 14767
4	Potassium ( as K)	mg/kg	207.03	138.83	240.64	UTRL/LAB/SOIL/SOP/07
5	Sodium (as Na)	mg/kg	385.54	224.13	364.21	UTRL/LAB/SOIL/SOP/06
6	Calcium (as Ca)	mg/kg	4789.96	4244.87	4306.61	UTRL/LAB/SOIL/SOP/08
7	Magnesium (as Mg)	mg/kg	727.96	627.68	669.72	UTRL/LAB/SOIL/SOP/08
8	Sodium Absorption Ratio	-	1.37	0.85	1.36	UTRL/LAB/SOIL/SOP/14
9	Water Holding Capacity	%	29.03	32.52	31.03	UTRL/LAB/SOIL/SOP/11
10	Total Kjeldahl Nitrogen	%	0.068	0.120	0.102	UTRL/LAB/SOIL/SOP/15
11	Phosphorous	mg/kg	96.53	90.91	86.19	UTRL/LAB/SOIL/SOP/09
12	Bulk Density	gm/cc	1.30	1.28	1.28	UTRL/LAB/SOIL/SOP/10
13	Organic Matter	%	1.02	0.97	1.26	IS: 2720 (Part-22)
14	Porosity	%	43.04	41.79	42.39	UTRL/LAB/SOIL/SOP/17

			Result				
S.No	Parameter	Units		Location	Test Method		
			SQ-4	SQ-5	SQ-6		
1	Texture	-	Silt Clay Loam	Sandy Clay	Clay Loam	UTRL/LAB/SOIL/SOP/05	
	Sand	%	18.57	46.88	38.66	UTRL/LAB/SOIL/SOP/05	
	Clay	%	30.70	39.41	30.59	UTRL/LAB/SOIL/SOP/05	
	Silt	%	50.73	13.71	30.75	UTRL/LAB/SOIL/SOP/05	
2	pH(1:2.5 Suspension)	-	6.85	7.89	6.89	IS: 2720 (Part-26),1987	
3	Electrical Conductivity	µmhos/cm	474.5	628.2	594.5	IS: 14767	
4	Potassium ( as K)	mg/kg	228.18	116.14	193.41	UTRL/LAB/SOIL/SOP/07	
5	Sodium (as Na)	mg/kg	306.40	193.39	232.25	UTRL/LAB/SOIL/SOP/06	
6	Calcium (as Ca)	mg/kg	4510.78	4190.66	4249.79	UTRL/LAB/SOIL/SOP/08	
7	Magnesium (as Mg)	mg/kg	1028.29	505.29	770.07	UTRL/LAB/SOIL/SOP/08	
8	Sodium Absorption Ratio	-	1.07	0.75	0.86	UTRL/LAB/SOIL/SOP/14	
9	Water Holding Capacity	%	45.58	31.36	45.58	UTRL/LAB/SOIL/SOP/11	
10	Total Kjeldahl Nitrogen	%	0.12	0.085	0.11	UTRL/LAB/SOIL/SOP/15	
11	Phosphorous	mg/kg	99.33	59.28	93.98	UTRL/LAB/SOIL/SOP/09	
12	Bulk Density	gm/cc	1.27	1.32	1.28	UTRL/LAB/SOIL/SOP/10	
13	Organic Matter	%	1.35	1.06	1.09	IS: 2720 (Part-22)	
14	Porosity	%	39.61	41.84	39.59	UTRL/LAB/SOIL/SOP/17	

#### (b) **Results:**

Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly basic (7.16 to 7.56). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 268-333 µmhos/cm.

The soils with low bulk density have favorable physical condition where as those with high bulk density exhibit poor physical conditions for agriculture crops.

#### **BIOLOGICAL ENVIRONMENT**

Biological diversity comprises the variability of species, genus and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly it can be divided in to two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for

the sustainable development as it not only provides the food, fodder and medicine but also contribute in improvement of essential environmental attributes like air, water, soil, etc. Before starting any Environmental Impact Assessment study, it is necessary to identify the baseline of relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment.

- (a) Physical Environment of the study area: Bageshwar is one of the mountainous districts of Uttarakhand State. Prior to its formation as a separate district, Bageshwar constituted a part of Almora district. The district was included in Uttarakhand State after the state was carved out of Uttar Pradesh on 9th November 2000. The district lies between latitudes 29°40' and 30°20' N and longitudes 79°25' and 80°10' E (Survey of India Degree Sheet Nos. 53N and 53O). The district is bounded by Almora district in the south, Chamoli district in the north and northwest and Pithoragarh district in the east. The geographical area of the district is 1687.8 km2 (Census, 2001)..
- (b) Drainage: Drainage of the area is mainly controlled by Saryu, Gomti and Pindar Rivers and their tributaries (locally called Nadi, Gad or Gadhera) viz. Pungar Nadi, Khir Ganga Nadi, BhadrapatiNadi, Revti Ganga, Kanal Gad, LahorNadi, Jagtana Gad, Kulur Gad, Sukunda Gad etc. Sub-trellis, subrectangular and sub-dendritic are the most common drainage patterns in the area. The Central and North-Central parts of the district are drained by Saryu River. Gomti River drains the western and south eastern parts whereas Pindar River drains the northern part. These rivers are primarily fed by snowmelt with relatively smaller contribution from ground water. However, during the lean period, the rivers are fed by ground water occurring as base flow.
- (c) Climate: January is the coldest month with mean maximum temperature of 10°C, the mean minimum temperature being about 2°C. Temperature drops down to 6°C during January and February in the northern part of the district. June is the warmest month with the mean maximum and the mean minimum temperatures of 25°C and 15°C respectively. The Relative Humidity increases rapidly with the onset of monsoon and reaches at about 80% during July to September. The driest part of the year is the pre-monsoon period, when the humidity is as low as 30% in the afternoons. Skies are heavily clouded during the monsoon months and for short spells when the district is affected by Western Disturbances. Two broad wind patterns are observed in the district viz. north easterly to easterly (May to September) and south easterly to westerly (October to March).
- (d) Forests cover and Forest Type: The forest of the district includes the vast range found in the

Himalayas, varying from the subtropical species which grow in the outer ranges of low hills to the rich Alpine flowers in the north. The forest cover in the Uttarakhand state, based on interpretation of satellite data of OctoberNovember 2008 mentioned in the India State of Forest Report 2011, is 45.80% of the state's geographical area. In terms of forest canopy density classes, the state has 4762 km2 area under very dense forest, 14167 km2 areas under moderately dense forest and 5567 km2 area under open forest. Out of 3642 km2 total area of Tehri district, 298 km2 area is under very dense forest, 1232 km2 fall under moderately dense forest and 617 km2 area is open forest, 58.95% area of district encompasses forest cover.

- (e) Agriculture: Agriculture is the main occupation of the people. However, intensive cultivation is not possible as major part of the district is mountainous. Agricultural activities are common on gentle hill slopes and in relatively plain, broad river valleys of Gomti and Saryu Rivers. Rice wheat, mandua, barley, maize and sawan are the principal cops grown in the district. Garur valley has the maximum cultivated area. Due to high production of rice, the area is known as "Rice Bowl of Kumaun".
- (f) (f) Study period and methodology 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. Field study period: The ecological survey has been conducted for one season. All data were collected in winter period in order to reduce metrological biasness. The details are given as below:

Survey sites : Around the project site in 10 km radius

Core zone : At the project site

Buffer zone : Around the project site in 10 km radius.

### Methodology:

Aspect	Aspect Data Mode of data collection		Parameters monitored	
Terrestrial	Primary data collection	By conducting field survey	Floral and Faunal diversity	
Ecology From authentic secondary Range office a data Department of Uttarakhand and published literatures	From authentic sources like Range office and Forest Department of Uttarakhand and available published literatures	Floral and Faunal diversity and study of vegetation, forest type, importance etc.		
	Primary data collection	By conducting field survey	Floral and Fauna diversity	
Aquatic Ecology	Secondary data collection	From authentic sources like Range office and Forest Department of Uttarakhand and available published literatures	Floral and Faunal diversity and study of vegetation, forest type, importance etc.	

Mode of data collection & parameters considered during the Survey

(g) General Vegetation Study of the area: Area supports moderately healthy vegetation, the main forest species are scattered all over the hills, riparian vegetation found along the Saryu River and upper reaches of hills covered with pine forest. Species of Quercus, Siris, Sisam, Subabul, Neem, etc. found in mixed deciduous forest. Ground vegetation mainly consists of grasses and small shrubs. Useful fodder grasses, Cynodon dactylon, Eleusine indica, Trifolium alexandrinum, etc. can be seen growing in the area. The large weeds which infest uncultivated tracts are Calotropis procera, Cannabis sativa, Lantana camara and Ziziphus jujuba. Other noxious weeds and those which appear in crops are Carthamus oxyacantha, Argemone mexicana, Solanum xanthocarpum, Parthenium hysterophorus etc.

#### Flora of the Core zone

The core zone comprises of private agriculture land, where mining operation is proposed. There is no tree species found in core zone. Few shrub species like lantana, ank, cannabis etc are grown as weed in area. No ecologically sensitive plant species has been reported from this area.

#### Flora of the Buffer zone:

Buffer zone of the proposed project falls in Lesser and Greater Himalaya region. Many tree species are planted in the area because of their usefulness, economic and aesthetic values. The tree species observed in the area are, Aam (Mangifera indica), Jamun (Syzygium cumini), Indian Bael (Aegle marmelos), Chinaberry tree (Melia azedarach), Neem (Azadirachta indica), Peepal (Ficus religiosa), Bhimal (Grewia optiva) etc. In agricultural waste land and along the road side, growth of weeds like Argemone mexicana, Cannabis sativa, Cenchrus ciliaris, Lantana camara, Parthenium hysterosporus, etc. are very common. These weeds are affecting the agricultural productivity of the region due to fast growth, short life cycle and enormous production of seeds. 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 such as Mangifera indica, Azadirachta indica, Albizia lebbeck, Delonix regia, Ficus religiosa, etc. A list of flora of the study area is discussed as

S. No.	Species	Family	Habit
1	Alternanthera paronychioides	Amaranthaceae	Herb
2	Alternanthera pungens	Amaranthaceae	Herb
3	Amaranthus spinosus	Amaranthaceae	Herb
4	Colocasia esculenta	Araceae	Herb
5	Ageratum conyzoides	Asteraceae	Herb
6	Grangea maderaspatana	Asteraceae	Herb
7	Parthenium hysterophorus	Asteraceae	Herb
8	Cassia tora	Fabaceae	Herb
9	Cannabis sativa	Cannabaceae	Herb
10	Chenopodium album	Chenopodiaceae	Herb
11	Argemone mexicana	Papaveraceae	Herb
12	Cynodon dactylon	Poaceae	Herb
13	Eleusine indica	Poaceae	Herb
14	Eragrostis tenella	Poaceae	Herb
15	Saccharum spontaneum	Poaceae	Herb
16	Physalis minima	Solanaceae	Herb
17	Adiantum sps.	Adiantaceae	Herb
18	Pteris sps.	Pteridaceae	Herb
19	Calotropis procera	Asclepiadaceae	Shrub
20	Cassia occidentalis	Fabaceae	Shrub
21	Croton bonplandianum	Euphorbiaceae	Shrub
21	Abutilon indicum	Malvaceae	Shrub

#### TABLE 3.10: LIST OF FLORA SPECIES OBSERVED IN THE BUFFER ZONE

#### 22 Nyctaginaceae Shrub Bougainvillea spectabilis 23 Shrub Ziziphus mauritiana Rhamnaceae 24 Datura innoxia Solanaceae Shrub 25 Solanaceae Solanum virginianum Shrub 26 Verbenaceae Shrub Lantana camara 27 Berberidaceae Berberis vulgaris Shrub 28 Rutaceae Shrub Murraya koeniggi 29 Euphorbiaceae Tree Jatropha curcas 30 Mangifera indica Anacardiaceae Tree 31 Tree Lagerstroemia indica Lythraceae 32 Ulmus wallichiana Ulmaceae Tree 33 Cinnamomum tamala Lauraceae Tree 34 Judlandaceae Tree Juglaus regia 35 Sapindaceae Tree Acer oblongum 36 Moraceae Tree Ficus religiosa 37 Ficus racemosa Moraceae Tree 38 Cassia fistula Fabaceae Tree 39 Ricinus communis Euphorbiaceae Tree 40 Albizia lebbeck Fabaceae Tree 41 Tree Bauhinia acuminata Fabaceae 42 Lauraceae Tree Quercus leucotricophera 43 Meliaceae Tree Melia azedarach 44 Leucaena leucocephala Fabaceae Tree 45 Fabaceae Tree Bauhinia variegate 46 Terminalia bellerica Combretaceae Tree 47 Terminalia chebula Combretaceae Tree 48 Fabaceae Tree Delonix regia 49 Pinus roxburgii Pinaceae Tree 50 Celtis australis Cannabaceae Tree 51 Tiliaceae Tree Grewia optiva 52 Ulmaceae Holoptelea integrifolia Tree

Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand

Fauna of the study area: Area does not support any significant wild mammalian species. Two Schedule- I species (Leopard and Asiatic Black Bear) are found in the study. Saryu River flows near to the project site, river supports many aquatic wildlife including fish species, phytoplankton and zooplankton. As far as

the reptile community was concerned, Indian cobra, garden gecko and house lizard are recorded from the study area. Area does not support any healthy wild mammalian species and after a potential search, neither any direct sighting nor the indirect evidences were found in whole study area. A list of wild fauna of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The conservation value at regional level of identified fauna was gathered from the Wildlife protection Act, 1972 moreover, global conservation status of species was estimated from Red data book of IUCN was used. No established habitats of any mammals or birds are noticed in

river bed and along the banks.

**Mammals:** There are two Schedule-I species (Leopard and Asiatic black bear) found in the study area and for that conservation plan has been prepared. Small mammals like Indian palm squirrel (Funambulus palmarum) and field mouse (Apodemus sylvaticus) are noticed in vicinity of village. Inquiry from village people regarding wild animals reveals that Rhesus macaque (Macaca mulatta), Indian hare (Lepus nigricollis), fruits bat (Pteropus conspicillatus), Goral (Naemorhedus goral) Yellow throated marten (Martes flavigula) etc. are often seen in the area. Many domesticated mammal species are reported from buffer zone during the field survey. Common grazing animals like cow, goat etc. can be noticed in open grass fields.

**Avifauna:** Water birds like White throated kingfisher (Halcyon smyrnensis), Pied kingfisher (Ceryle rudis), Indian Cormorant, Redstart etc are noticed. House crow (Corvus splendens), Common Myna (Acridotheres tristis), Gracula religiosa), Red-rumped Swallow (Cecropis daurica), Hoopoe (Upupa epopsceylonensis) Warblers and Tits are of common occurrence.

**Reptiles**: The reptilians species commonly reported are Agama (Laudakia tuberculata) in settlement area, Garden lizard (Calotes versicolor) and Eutropis macularia along shady places in agricultural field or where growth of bushes is noticed. Among poisonous snakes Indian Cobra (Naja naja) is commonly noticed in field and reported to be seen by farmers.

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

#### TABLE 3.11 LIST OF FAUNA SPECIES OBSERVED IN THE CORE ZONE

Vernacular Name	Botanical Name	Family
Cheer	Pinusrox burghii	Pinaceae
Utis	Alnusnepalensis	Betulaceae
Tooun	Toonaciliata	Meliaceae
Khanor	Aesculusindica	Sapindaceae
Siris	Albizziachinensis	Leguminosae
Siris	Albizzialebbek	Leguminosae
Kala Siris	Albizziaprocera	Leguminosae
Dhau, Chhal, Bakli	Anogessiuslatifolia	Combretaceae
Neem	Azadirachtaindica	Meliaceae
Kachnar	Bauhinia variegata	Fabaceae
Katai	Flacourtiaindica	Salicaceae
Kathsagun	Haplophragmaadenophyllum	Bignoniaceae
Kathbilava	Buchananialatifolia	Anacardiaceae
Kamhar	Gmelinaarborea	Lamiaceae
Kubbhi	Careyaarborea	Lecythidaceae
Kumia	Ficusracemosa	Moraceae
Kusum	Schleicheraoleosa	Sapindaceae
Kooda	Holarrhenaantidysenterica	Apocynaceae
Kekra	Phoebe lanceolata	Lauraceae
Bel	Aegle marmelos	Rutaceae
Pangar	Aesculusindica	Sapindaceae
Utis	Alnusnepalensis	Betulaceae
Genthi	Boehmeriaregulosa	Urticaceae
Semal	Bombaxceiba	Bombaceae
Bottle brush	Callistemon citrinus	Myrtaceae
Devdaar	Cedrusdeodara	Coniferae
Kharak	Celtisaustralis	Ulmaceae
Safeda	Eucalyptus globulus	Mrtaceae

Timal	Ficusauriculata	Moraceae
Bargad	Ficusbengalensis	Moraceae
Bedu	Ficuspalmata	Moraceae
Pipal	Ficusriligosa	Moraceae
Jacrada	Jacaranda mimosifolia	Bignoniaceae
Akhrot	Jugansregia	Juglandaceae
Jhingan	Lanneacoramandelica	Anacardiaceae
Shuru	Litseaumbrosa	Lauraceae
Ruin	Mallotusphilippinenisis	Euphorbiaceae
Dhenk	Melia azedarach	Meliaceae
Poplar	Poplusciliata	Salicaceae
Aloocha	Rrunuscommunis	Rosaceae
Aroo	Prunuspersica	Rosaceae
Phaja	Prunusgranatum	Punicaceae
Mehal	Pyruspashia	Rosaceae
Ban	Quercusincana	Fagaceae
Burans	Rhododendron arboreum	Ericaceae
Gadhbains	Salix tetrasperma	Salicaceae
Ritha	Sapindusmukorossi	Sapindaceae
Khinna	Sapium insigne	Euphorbiaceae
Jamun	Syzygiumcuminii	Myrtaceae
Kakru	Toonaserrata	Meliaceae
Jamal ghota	Jatropha curcas	Euphorbiaceae
Mango	Mangifera indica	Anacardiaceae
Saoni	Lagerstroemia indica	Lythraceae
Tezapatta	Cinnamomumtamala	Lauraceae
Apple	Pyrusmalus	Rosaceae
Himalayan maple	Acer oblongum	Sapindaceae
Peepal	Ficusreligiosa	Moraceae
Indian fig	Ficusracemosa	Moraceae
Golden shower	Cassia fistula	Fabaceae
castor oil	Ricinuscommunis	Euphorbiaceae
Indian siris	Albizia lebbeck	Fabaceae
white orchid-tree	Bauhinia acuminate	Fabaceae
Banjh oak	Quercusleucotricophera	Lauraceae
chinaberry tree	Melia azedarach	Meliaceae
Wild Tamarind	Leucaenaleucocephala	Fabaceae
orchid tree	Bauhinia variegate	Fabaceae
Beleric	Terminalia bellerica	Combretaceae

Shilikha	Terminalia chebula	Combretaceae
Gulmohar	Delonixregia	Fabaceae
Himalayan white pine	Pinuswallichiana	Pinaceae
Honeyberry	Celtisaustralis	Cannabaceae
Bhimal	Grewiaoptiva	Tiliaceae
Ayar	Andromeda ovalifolia Wall	Ericaceae
Kharsu	Quercussemecarpifolia	Fagaceae
Chimula	Rhododendron campanulatum	Ericaceae
Tiloj/Moru	Quercushimalayana	Fagaceae
Mehal/ Pear	Pyruspashia	Rosaceae
Bhojpatra	Betulautilis	Betulaceae
Rai	Piceasmithiana	Pinaceae
Khumani	Prunusarmeniaca	Rosaceae
	SHRUBS	
Kaphal	Myricaesculenta	Myricceae
Basinga	Adhatodavasica	Acanthaceae
Ramban	Agave americana	Cactaceae
Kubash	Artemesia vulgaris	Compositae
Kashmoi	Berberisaristata	Berberidaceae
Rubber tree	Calotropisgigantea	Asclepiadaceae
Bhang	Cannabis spinarum	Cannabaceae
Karonanda	Carissa spinarum	Apocynaceae
Bindu	Colebrookeaoppositifolia	Lamiaceae
Makhoi	Coriarianepalensis	Coriariaceae
Ruinish	Cotoneaster acuminata	Rosaceae
Datura	Daturastromonium	Solanaceae
Sihanru	Debregeasiahypoleuca	Urticaceae
Martoi	Desmodiumtiliaefolium	Leguminosae
Dhaul	Erythrinasuberosa	Leguminosae
Kala bansa	Eupatorium adenophorum	Asteraceae
Shuru	Euphoribiaroyleana	Euphorbiaceae
Phiunli	Hypericumoblongifolium	Hypericaceae
Shunjai	Jasminauhumile	Oleaceae
Nashpati	Pyruscommunis	Rosaceae
Chichiri	Plectranthuscoesta	Labiatae
Bhekal	Princepiautilis	Rosaceae
Gingaru	Pyracanthacrenulata	Rosaceae
Tung	Rhusparviflora	Anacardiaceae
Kunja	Rosa brunonii	Rosaceae

Rubber Bush	Calotropisprocera	Asclepiadaceae
BhansiaBamar	Cassia occidentalis	Fabaceae
Ban Tulsi	Croton bonplandianum	Euphorbiaceae
Atibala	Abutilon indicum	Malvaceae
Bhringraj	Eclipta alba	Nyctaginaceae
plum	Ziziphusmauritiana	Rhamnaceae
thorn-apple	Daturainnoxia	Solanaceae
dwarf wild brinjal	Solanumvirginianum	Solanaceae
Jaundice Berry	Berberis vulgaris	Berberidaceae
Kandali	Urticamairea	Urticaceae
GarhRingal	Chemmobambusafalcata	Poaceae
	HERBS	•
Aghada	Achyranthesaspera	Amaranthaceae
Gunriya	Ageratum conzoides	Asteraceae
Prickly poppy	Argemonemexicana	Papaveraceae
Meen	Arisaemaflavum	Araceae
Pati	Artemisia capillaris	Compositae
Kunjha	Artemisia vulgaris	Asteraceae
Silphara	Bergenialigulata	Saxifragaceae
Kura	Bidensbipinnata	Asteraceae
Chakunda	Cassia tora	Asteraceae
Brahmi	Centellaasiatica	Apiaceae
Kanjalu	Cestrum verutum	Solanaceae
Malo	Bauhinia vahlii	Leguminosae
Bathwa	Chenopodium album	Chenopodiaceae
Trivagandha	Chromolaenaodorata	Asteraceae
Kauniabali	Clematis montana	Ranunculaceae
Pindalu	Colocasiaaffinis	Araceae
Gokhru	Echinopsechinatus	Araceae
Horse weed	Erigeron bellidioides	Compositae
Bhumla	Fragariaindica	Compositae
joyweed	Alternantheraparonychioides	Amaranthaceae
khutura	Alternantherapungens	Amaranthaceae
Kantachaulai	Amaranthusspinosus	Amaranthaceae
Taro	Colocasiaesculenta	Araceae
Janglipudina	Ageratum conyzoides	Asteraceae
mukhtari	Grangeamaderaspatana	Asteraceae
Carrot Grass	Partheniumhysterophorus	Asteraceae
Charota	Cassia tora	Fabaceae
bhang	Cannabis sativa	Cannabaceae

Bathu	Chenopodium album	Chenopodiaceae				
Satyanashi	Argemone Mexicana	Papaveraceae				
Doob	Cynodon dactylon	Poaceae				
Jangalimarua	Eleusineindica	Poaceae				
Bharbhusi	Eragrostistenella	Poaceae				
Kussa	Saccharumspontaneum	Poaceae				
Rasbhari	Physalis minima	Solanaceae				
Marchya	Galinsogaparviflora	Rosaceae				
Bhumla	Frageriavesica	Asteraceae				
Hattajuri	Heliotropiumstrigosum	Boraginaceae				
Kutki	Picorhizascrophulariiflora	Scrophulariaceae				
Amesh	Hippophaerhamnoides	Elaeagnaceae				
CLIMBERS						
Sahansarpali	Asparagus racemosa	Liliaceae				
Malo	Bauhinia vahili	Leguminosae				
Kanguli	Clematis connata	Ranunculaceae				
Besharam	Ipomeapurpurea	Convolvulaceaca				
Dudhi Bel	Vallarissolancaceae	Apocynaceae				
GRASSES						
PhiralNaru	Arundodonax	Gramineae				
Dhub	Cynodon dactylon	Gramineae				
Godia	Chrysopoganfulvus	Gramineae				
CROPS						
Wheat/ Genhu	Triticumaestivum	Poaceae or Gramineae				
Rice/ Chawal	Cryzasative	Poaceae				
Soyabean	Brassica riapus	Brassicaceae				



#### Figure- forest cover map of Uttarakhand

#### FIGURE 3.6: Flora in the Study Area



Pinus roxburghii- Cheer



Achyranthes aspera- Aghada



Asparagus racemosa- Shatavari



Picea smithiana- Kathela

Area does not support any significant wild mammalian species. Two Schedule-I species (Leopard and Asiatic Black Bear) are found in the study. Saryu River flows near to the project site, river supports many aquatic wildlife including fish species, phytoplankton and zooplankton. As far as the reptile community was concerned, Indian cobra, garden gecko and house lizard are recorded from the study area. Area does not support any healthy wild mammalian species and after a potential search, neither any direct sighting nor the indirect evidences were found in whole study area. A list of wild fauna of the study area has been prepared on the basis of local inquiry from the village people and from the available published literatures. The conservation value at regional level of identified fauna was gathered from the

Wildlife protection Act, 1972 moreover, global conservation status of species was estimated from Red data book of IUCN was used. No established habitats of any mammals or birds are noticed in river bed and along the banks.

#### Mammals:

There are two Schedule-I species (Leopard and Asiatic black bear) found in the study area and for small mammals like Indian palm squirrel (*Funambulus palmarum*) and field mouse are noticed in vicinity of village. Inquiry from village peoples regarding wild animals reveals That Rhesus. Detailed study of fauna in core and Buffer zone is mentioned below

#### **Conservation Plan for Schedule – I species:**

Wildlife Protection Act (1972) provide us with Statutory frame work for wildlife conservation and declared that hunting is a crime against while, forestation will be done surrounding the Mine Area for enhancement of habitat protecting the loss of Leopard and Asiatic Black bear diversity due to Habitat loss

Common Name	Scientific name	IWPA	IUCN				
MAMMALS							
Squirrel	Funambulus pennant	IV	DD				
Rat	Rattusrattus	V	LC				
Wild pig	Susscrofacristatus	III	LC				
Yellow throated marten	Martesflavigula	III	LC				
Emithet							
Common langoor	Rousenusiesnenaum						
Indian Porcupine	Hystrixindica	IV					
	iiysii kunaica	1.	LC				
Indian Leopard	Pantherapardus	I	NT				
Asiatic black bear	Ursusthibetanus	I	VU				
Jungle Cat	Felis. chaus	II	LC				
Himalayan goat	Naemorhedusgorl	I	NT				
Barking Deer	Muntiacusmuntjak		LC				
Golden jackal	Canis aureus	ш	LC				
	AMPHIBIANS	2000 Contraction (1997)					
Common Toad	Duttaphrynusmelanostictus	IV	NA				
India bull frog	Rana tigrina	IV	DD				
Indian tree frog	Polypedatesmaculatus	IV	NA				
Skipping frog	Bufostomaticus	IV	NA				
Garden lizard	Calotes versicolor	145	NA				
House lizard	Hemidactylus sp.	IV	NA				
	FISHES						
Unera	Labeodero		NA				
Kali Rohu	Labeodyocheilus	555	LC				
Gadera	Nemacheilusrupicola		NA				
Dhaur, Hill Trout	Bariliusbendelisis		LC				
Bhagnera	Garralamta		LC				
	AVIFAUNA	1936 38					
Jungle Myna	Acridotheresfuscus	IV	LC				
Common Myna	Acridotherestristis	IV	LC				
Blyth"s Reed Warbler	Acrocephalusdumetorum	IV	LC				
Clamorous Reed Warbler	Acrocephalusstentoreus	IV	LC				
Common Kingfisher	Alcedoatthis	IV	LC				
House Crow	Corvussplendens	IV	LC				
Grey-hooded Warbler	Seicercusxanthoschistos						
Ashy Drongo	Dicrurusleucophaeus	IV	LC				
Asian Koel	Eudynamysscolopacea	IV	LC				
Cattle Egret	Bubulcus ibis	IV	LC				
Common Rosefinch	Carpodacuservthrinus	IV	LC				
Rock Dove	Columba livia	IV	LC				
Greater Coucal	Centropussinensis	IV	LC				
Oriental Magnie Robin	Copsychussaularis	TV	LC				
Black Drongo	Dicrurusmacrocercus	IV	LC				
Coppersmith Barbet	Megalaimahaemacenhala	IV	LC				
Lineated Barbet	Megalaimalineata	IV	LC				
2011000100012001000			20				

Table 3.12:	Fauna	of the	<b>Buffer</b>	zone
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White Wagtail	Motacilla alba	IV LC			
Common Babbler	Turdoidescaudatus	IV	LC		
Jungle Babbler	Turdoidesstriatus	IV	LC		
House Sparrow	Passer domesticus	IV	LC		
Red-vented Bulbul	Pycnonotuscafer	IV	LC		
Himalayan Bulbul	Pycnonotusleucogen	vs IV	LC		
Alexandrine Parakeet	Psittaculaeupatria	IV	LC		
Spotted Dove	Streptopeliachinensi	is IV	LC		
Red-wattled Lapwing	Vanellusindicus	IV	LC		
Common	n Name	Scientific name			
	INSECTS				
Sprin	gtail	Collembola			
Silver	fishes	Thysanura			
Damse	lflies	Zygoptera			
Dragonfly		Anisoptera			
Termites		Isoptera			
Milkweed bugs		Lygaeidae			
Shield bugs		Pentatomidae			
Red bugs		Pyrrhocoridae			
Ladybird		Coccinellidae			
Clown beetles		Histeridae			
Scarab beetles		Scarabaeidae			
Water scavenger beetles		Hydrophilidae			
Robber flies		Asilidae			
Bee flies		Bombyliidae			
Blow flies		Calliphoridae			
Flesh fly		Sarcophagahaemorrhoidalis			
Flower flies		Syrphidae			
Parasite flies		Bombyliopsisabrupta			
Gossamer-winged butterflies		Lycaenidae			
Hawk moths		Sphingidae			
Butterfly		Rhopalocera			
Tussock moths		Lymantriinae			
Sand wasps		Sphecidae			
Note: LC: Least Concern, NA: Not Assessed, DD: Data deficient, NT: Near threatened					



Martes flavigula- Yellow throated marten



Polypedates maculatus-India Tree Frog Indian Tree Frog



Alcedo atthis-Common Kingfisher



Pycnonotus leucogenys-Himalyan Bulbul



Zygoptera- Damselflies

Lygaeidae - Bugs



Asilidae- Robber flies

Rhopalocera-Butterfly

### Fauna in the Study Area

#### SOCIOECONOMIC SURVEY

#### Introduction

In this part of the EIA report an attempt has been made to assess the Socio-Economic impact of the proposed Soapstone mining project. It is a new project under Category- "B1". As per EIA Notification dated 14th September, 2006 and its amended thereof. The soapstone will be extracted by Open cast semi mechanized method.

#### Socio-economic Impact Assessment -

Economic Impact Assessment (SEIA) refers to the systematic analysis of various social and economic characteristics of the human beings living in the geographical / study area around the proposed project location. SEIA is carried out separately but concurrently with Environment

Impact Assessment (EIA) study. The SEIA focuses on the likely effects of the project on social and economic well-being of the community. The impact(s) may be direct or indirect, positive or negative. In this Chapter of the EIA Report an attempt has been made to assess the composite Socio-Economic Impact of the project.

#### Various steps taken to prepare the SEIA report were as follows

- Literaturere view
- Identification of habitations in the study area with the help of Google earth
- Visit to project site
- Collection of secondary data
- Planning and designing of the field survey for collection of primary data
- Formulation of Data collection tools(Schedule/Questionnaire)
- Field testing of Schedule/Questionnaire through a pilot survey
- Briefing of field staff
- Conduct of field work in sample villages and households
- Scrutiny of filled-in-schedules
- Data processing and tabulation
- Data analysis and preparation of report

#### Approach

Research approach plays an important role to decide suitable methodology. It helps to develop research design and increase the effectiveness of research study. In the present study inductive approach has been adopted, which is a bottom top approach. Under this approach first data is collected both from primary and secondary sources. After scrutiny, tables are generated in pre designed formats. Subsequently, draft report is prepared after detail analysis of data. The final report is prepared after incorporating the comments and suggestions of the client.

#### **Objectives of Socio-Economic Impact Assessment**

The prime objective of the current study is to assess the likely impact of the project on socio economic characteristics of people living in the study area. Further, it is to be gauged whether the impact would be direct or indirect and whether the said impact would be positive or negative.

Lastly, it is to be comprehended if the impact is negative and how the same could be mitigated.

#### Scope

The Scope of the study is as follows:

a) Collection of baseline data of the study area.

b) Collation of data, analyses and generation of tables.

c) Comprehension of socio-economic status of the people living in the study area.

d) Identification and inventory of probable impacts of the project on social and economic aspects in the study area.

e) Assessment of the probable impacts of the project on the people living in the study area.

f) Suggestion of mitigation measures in case of adverse impact.

#### Methodology

For composite Socio-Economic Impact Assessment of projects, ECO lab carries out systematic analysis of the various socio-economic characteristics, both in terms of quality and quantity. Accordingly, both qualitative and quantitative data was collected from secondary sources. The secondary data was collected from the published data / information of the Census Authority. Records of the state and district administration were also referred to. For collection of primary data, a sample survey was conducted in the study area which spans a radius of 10 km from the periphery of the boundary of the project site. In each selected habitation, a specified number of representative households were selected for collection of information through face to face interviews with head of the household or any responsible member of the family.

#### **Census and Sample Survey**

To assess the likely impacts of the project, Census data (viz. Population Census Abstract and Amenities- 2011) of all the habitations identified were taken into consideration to prepare the data base. It is treated as a census survey because all habitations located in the area were considered for the collection of information. Sample Survey was conducted for substantiating of socio-economic data got through the Census. Further, in selected habitation a household survey was conducted by drawing representative sample of households. Since, collection of information from all the households in a habitation is time consuming and expensive, the sample survey approach was adopted for collection of information from the selection of villages and households in the village(s) / town(s).

#### □ Sample Design

Two-Stage Sampling Design was adopted in the study area. The First Stage Units were Census village(s) / town(s) and the Ultimate Stage Units were households in the selected village(s) / town(s).

#### □ Method of selection of First Stage Units

Probability Proportional to size without replacement and vicinity to the project site was taken into consideration while selecting the habitations from the list of Census village(s) / town(s).

#### □ Method of selection of Ultimate Stage Units

The ultimate stage sampling unit is households. The households for survey are selected by simple random sampling technique.

#### □ Sample Size

While deciding the sample size the following factors were taken into account: Confidence

 $\Box$  Level (95%, Table value: 1.96); Degree of precision ( $\Delta$ ): 0.5; Variation in population / Standard Deviation ( $\sigma$ ); The sample size at each level (village and household) was decided by using the formula n =  $\sqrt{\{(1.96*\sigma) / \Delta\}}$ ; where n=Sample Size, 1.96 is the Table Value of Confidence Limit,  $\sigma$  = Standard Deviation and  $\Delta$  = Degree of Precision.

#### □ Survey Instruments

□ The following Schedules / Questionnaires were developed for collection of primary data from the households and villages / towns:

□ Probability Proportional to size without replacement and vicinity to the project site was taken into consideration while selecting the habitations from the list of Census village(s) / town(s).

□ Questionnaire / Schedule for Village / Town Particulars

□ Questionnaire / Schedule for Household Details and Project Perception

 $\Box$  Each of these data instruments has segment blocks and there are both open-ended and closed

ended questions

#### Method of selection of first stage unit (village)

Probability Proportional to Size (PPS) and vicinity to the project site was adopted to select the villages from the list of villages the size being number of households in a given village.

#### Selection of ultimate stage units (households)

After completing listing of each structure in a village a list of households was prepared. The sample households were selected by adopting Systematic Sampling method. This method was adopted since the sampling frame i.e. the complete list of households was readily available. Under this method every kth unit was selected. The value of k was determined from the population size (N) and sample size (n) and k was taken as the integer nearest to and sampling interval. The above procedure ensured each element in the population equal probability of selection. Number of households selected for survey in each village was12.

#### Respondents

The head of the selected household was the respondent for face to face interview and subsequent collection of information.

#### **Tools for data collection**
The following schedules/questionnaires were developed to collect information from the head of the households during field survey. Questionnaire 1A: Village Questionnaire the Village Questionnaire was developed for collection of village particulars from the Sarpanch or other village officials. The Household Questionnaire was developed to collect information on various parameters from the selected households in a village. Each questionnaire was divided into several blocks. There were open ended questions. In the household questionnaire an attempt was made to collect information about the perception of the local people about the upcoming Soapstone mining project.

# **STUDY AREA**

## **Bageshwar District (Project District)**

Bageshwar is a town and a municipal board in Bageshwar district in the state of Uttarakhand, India. It is located at a distance of 470 km from the National Capital New Delhi and 332 km from the State Capital Dehradun. Bageshwar is known for its scenic beauty, Glaciers, Rivers and Temples. It is also the administrative headquarters of Bageshwar district. Situated on the confluence of Saryu and Gomati rivers, Bageshwar is surrounded by the mountains of Bageshwar and Nileshwar to its east and west and by the Suraj Kund in the north and Agni Kund in the south. Bageshwar was a major trade mart between Tibet and Kumaun, and was frequented by the Bhotia traders, who bartered Tibetan wares, wool, salt and Borax in exchange for Carpets and other local produces in

## **Population Profile**

The description of the project district is presented in Table No. 3.13 (i) . According to the 2011 census of India, Bageshwar has a population of 2,59,898.

S. No	District/Tehsil	Households	Population					
			Total	Male	%	Female	%	Sex
			%					Ratio
1	Bageshwar	57,941	2,59,898	1,24,326	47.84	1,35,572	52.16	1090

Table No. 3.13 (i): Demographic details of Project District and Tehsil

Source: Census of India, 2011

# Table No. 3.13 (ii)

provides detailed information about the SC, ST population in Bageshwar district as well as on the Project area. The total SC population in Bageshwar district is 72,061 which is 27.72% of the total population, while ST population is 1982, which is 0.76% of the total population.

Table No. 3.13 (ii): Caste wise distribution of population

Sl. No.	District/Project Area	Schedule Caste (SC)		Schedule Tribes (ST)	
		Total	% of SC	Total	% of SC
1	Bageshwar	72,061	27.72	1,982	0.76

## Source: Census of India, 2011

## Literacy Rate

# **District Bageshwar:**

The literate population in Bageshwar district is 1,79,483, out of which male & female are 97,546 and 81,937 respectively. The male literates represent 54.35% while female represent 45.65% of the total population. The details of literacy rate and literate people in Bageshwar district and Project area are provided in **Table No. 3.13 (iii)**.

Table No. 3.13 (iii): Literacy Rate of Project District and Project Area

S. No.	District/Tehsil	No of Literate			Literacy Rate %		
		Total	Male	Female	Total	% SC	
1	Bageshwar	1,79,483	97,546	81,937	54.35	45.65	

# Source: Census of India, 2011

## **Religion and Culture**

Bageshwar is Hindu majority city with approximately 99.1% of district population following Hinduism as their religion. Muslim is second most popular religion in district with approximately **0.6** % following it. In Bageshwar district, Christianity is followed by 0.2 %. **Table No. 3.13 (iv)** shows below the Sub-district wise distribution of villages in the Study Area

# Table No. 3.13 (iv): Sub-district wise distribution of villages in the Study Area

S. No	Name of the sub district	Number of village				
1	Bageshwar	76				
2	Garud	6				
3	Kanda	78				
4	Kapkot	42				
Total 202						
Source : census of India,2011						

# **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 impact of the project. Any attempt to collect base line data while undertaking impact assessment study is faced with recall errors. The present report is provided with following base line data for the study area as a whole. Demographic Particulars of the Study Area is give below in **Table No. 3.14**.

# Table No. 3.14: Demographic Particulars of the Study Area of Soapstone Mining Project at

# Bageshwar, Uttarakhand

Parameters	Values
Household	1454
Total population	7930
Male	4018
Female	3912
Population under 6yrs of age.	2745
Household size	5.4
Proportion of Male	50.51%
Proportion of Female	49.43%

Various amenities available in the study area are given in the Table No. 3.15 below:

<b>Table No. 3.15</b>	Amenities	available ir	ı the Study	Area
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FACILITIES	Types of each facilities	Status
Education Facilities	Primary School	14
	Middle School	10
	Secondary School	7
	Senior Secondary School	2
	College	2

Medical Facilities	Primary Health Center	5
	Primary Health Sub Center	10
	Hospitals	2
	Community Health Center	14
	Register Private Medical	9
	Practitioners	
Drinking Water	Tap	2
	Tank / Tube well	14
	Hand pump	17
Post & Telegraph Facilities	Post Office	5
	Phone Connection	10
	Post & Telegraph office	2
	Commercial Bank	2
	Co-operative Bank	2
	Agricultural Credit Societies	12
	Non-Agricultural Credit	2
	Domestic	5
	Agriculture	3
	Others	3

Source: Census of India, 2011

## **CHAPTER-4**

# ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### **Details of the Investigated Environmental Impacts**

This Chapter provides a brief overview of the potential impacts on various environmental components due to the proposed opencast mining activities. The opencast mining operations in general cause environmental degradation and if adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause irreversible damage to the eco- system. The environmental parameters most commonly affected by mining activities are:

- Topography and drainage;
- Air quality including Climate
- Noise levels
- Water resources and quality;
- Land use Pattern
- Soil quality
- Flora and Fauna
- Socio-Economic conditions
- Occupational Health

Various environmental impacts, which have been identified due to the mining activities, are discussed in the following sections and mitigation measures are suggested.

#### **Impact on Drainage**

The lease area comprises of terraced agricultural field showing undulating topography. Slope of the area varies from low to moderate & general slope of the area is towards north east & south west. The highest level of area is 1403.10mRL towards eastern side along boundary pillar 23-24 while lowest level is 1323.0mRL towards South West flank near pillar 12. One

Seasonal drainage exists towards south east flank of lease area & it is within the area & flows north east to south west direction & another seasonal drainage towards west direction within lease area & meet the river pungar which is the main catchment of the area.

## WATER ENVIRONMENT

## (a) Impact on Water Resources & Surface Water Resources:

The topography of the area will not be largely changed in view of the proposed concurrent reclamation. During the mining activity period, there is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along the soil and interburden dumps.

**Groundwater Resources:** The water table in hills is usually very deep and does not have any relevance with mining activities. However, concurrent restoration to original topography will not disturb the percolating water. The details of the site elevation and working depth are shown in **Table No. 4.1** 

Particulars	Details
Elevation	1403.10mRL to 1323.0mRL
Ground Water Table	±75 to 90m
Ultimate working depth	24m in pit I & 24m in pit II

**Table-4.1 Site Elevation and Working Depth Details** 

## (b) Impact on Water Quality

Mining activities cause adverse impacts due to mine drainage, siltation due to storm water and contaminated water from workshops and domestic sewage water. Various components have been identified for study of impact of the mine operations.

## (c) Impact on Surface Water Quality

As there no perennial and seasonal *nalla* or water body within the leasehold area, therefore no change will be observed due to mining operation.

Due to mining activities it is anticipated that over burden and mineral fines flowing with

water may cause siltation and affect the flow of drainage courses. Mining activity and degradation of land and subsequent flow of water is likely to disturb the drainage course. The quality of water flowing in these drainages will also be polluted. Therefore to safeguard the existing drainages in the area following precautions are proposed:-

- The mining pits will be properly benched; and waste dumps will be properly terraced with retaining walls at the toe so that there is no land slide during the rains.
- Premature backfilling shall be carried out before the commencement of monsoon & all the quantities of interburden & soil shall be filled back in the mining pit, leveled & it shall be used for agricultural purpose
- The benches of mining pits, terraces of waste dumps will have grass plantation during the rains and if possible local cultivators will be allowed to grow vegetables and other seasonal crops so that it will also reduce the land degradation and will provide additional income to the local people. Cultivated land reduces the soil erosion and this aspect will be utilized for reducing the soil erosion and also the effect of siltation on drainages.
- The over burden and mineral is non toxic and not going to have any effect on quality of water flowing in these drainages.
- Check dams will also be constructed so that speed of water flowing during rains does not increase abruptly to cause land slide and degradation of land and these check dams will also works for settlement of the silts before the clean water flows out of the lease area.
- Regular monitoring of quality of water and surface water flow in these drainages are proposed to take care of adverse impact due to mining.

Analysis results of surface water samples collected from rivers and *nallas* in the buffer zone indicatethat the pH, total dissolved solids (TDS) are well below the prescribed limits. No adverse impact was noticed. Backfilling will be done before the onset of monsoon.

# (d) Impact on Ground Water Quality

The proposed bottom level of working pit will not affect the water table. Extraction of water for mining operation is not anticipated. Therefore, project will not affect the ground hydrogeology and water depth. Water for drinking purpose will be supplied from the Uttarakhand Jal Sansthan and naulla's of nearby villages. This water will be supplied by private

tankers. For dust suppression and Plantation the water supplied from nearby private tankers.

# (e)Wastewater Generation, Treatment & Disposal

The total water consumption in the proposed Mine is about **8.62** KLD. The water is used in the following purposes.

- For dust suppression
- For domestic consumption
- For greenbelt development

It is proposed to obtain water for drinking and plantation from Water for drinking purpose will be supplied from the Uttarakhand Jal Sansthan and naulla's of nearby villages. This water will be supplied by private tankers. For dust suppression and Plantation the water supplied from nearby private tankers

There will be no waste water generation from Mining activities. However, a small amount of domestic wastewater generation will happen as a result of water used by humans. The domestic and service building effluents will be disposed through eco-friendly mobile toilet. There will no settlement near the site as the workers will be hired from nearby villages so no significant liquid effluent will be generated.

# (f) Surface Water

There is a possibility of mixing of freshly disturbed material with the rain water. To take care of such happenings, retaining walls have been provided along the backfilled pits and along the soil and interburden dumps.

Monitoring of water will be carried out periodically. Water analysis will be carried out seasonally.

# (g) Ground Water Pollution

Regular monitoring of water levels and quality in the existing open wells and bore wells in the vicinity will be carried out. If found necessary, additional observation wells will be sunk for monitoring the water levels and quality around the mine representing both upstream and downstream conditions. No springs are reported within the site, therefore chances of surface runoff mixing withground water is negligible.

Mostly local labors are employed for mining operation, thus small value of waste water from

domestic source are anticipated. The waste water generated from toilets at site will be routed to septic tanks.

# **IMPACT ON LAND USE**

### Land use Pattern in Core Zone

The proposed opencast mine will result in change of land use pattern of the ML area. The land degradation is expected during mining activities like excavation, overburden dumping, soil extraction etc. Land requirement for the project has been assessed considering functional needs.

The potential adverse impact of opencast mining is the change in land use pattern. So reclamation of mined out land will be given due importance as a step for land resource management.

## **IMPACT ON SOIL**

The quantum of soil removed during the mining will be very less. Soil will lose its compactness. Present, End of the fifth years & Conceptual land use pattern land use pattern is given in mine plan attached as annexure1.

## **IMPACT ON AIR OUALITY**

Proposed mine where PM 10 will be the main pollutants generated in mining activities. The emissions of Sulphur dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) contributed by diesel operated equipment and vehicles movement were considered marginal as branded make and vehicles with PUC certificate will be operated only. Fugitive dust and particulates are major pollutants which will occur in the mining activities. Fugitive emissions will be settled by 70-80% by use of multiple water sprinklers. Prediction of impacts on air environment will be made with proposed production and net increase in PM 10 emissions at the proposed site and at the 10 km radius of study area due to mining activities.

Air pollution sources in the operating mine was classified into two categories

- Impact due to wind erosion & road maintenance
- Loading and unloading of mineral and OB, IB
- Transportation on the mule and haul road

Water tankers with spraying arrangement of sprinklers with high efficiency will be used for regular water sprinkling on the mule and haul roads to ensure effective dust suppression. The trucks and tippers are well maintained so that exhaust smoke does not contribute abnormal values of noxious gases and un-burnt hydrocarbons.

# (a) Emissions Details

Road maintenance due to mining activities, loading - unloading and transportation of ores and overburden, interburden will be the main polluting sources in the proposed mining activities releasing Particulate Matter (PM 10) affecting Ambient Air Quality of the area. Transportation of the ore by tucks on the haul road was calculated by the area source which was combination of line sources with each truck loaded with ore transported over the haul road of the mining area.

# PROPOSED MITIGATION MEASURES FOR DUST SUPPRESSION

The soapstone are available everywhere and is being used from the time immemorial for wide applications in our daily life like infrastructure, building construction, highways, roads, townships, multiplexes, foundations of buildings and industrial units etc. and is an integral part of development. The same are as follows:

# **Control of Fugitive Emissions**

- Use of Personal Protection Equipments (PPE) like dust masks, ear plugs etc. by the mineworkers.
- No Blasting will be done.
- Regular water sprinkling on haul roads & loading points will be carried out.
- Development of green belt/plantation around the lease boundary, roads, dumps etc.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.

# Prevention and control of Gaseous Pollution

- In mining activities, the sources of gaseous emissions would be through truck movements
- Proper maintenance of vehicles improves combustion process & makes reduction in the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.
- All the vehicles used will have PUC certificate.
- Taxi mode of vehicles carrying mined out material while loading and unloading will not beallowed.
- Vehicles carrying mineral will be covered with tarpaulin sheet. This will prevent dustemission.

The sources of pollutants from mining activities are given in Table-4.3

Sr. No.		Source	Type of Pollutant
1	Transport of Overburden or soil for		SPM
	dumping/ backfill		
2	Dumping of		SPM
3	Loading of ore		SPM
4	Transportation of ore		SPM, NOx

**Table-4.3 Sources of Pollutants** 

# **IMPACT ON NOISE ENVIRONMENT**

# Noise Environment

As mining will be done by machine, noise will only be generated due evacuation, transportation activities. The noise generated by the mining activity dissipates within the mine. There is no major impact of the mining activity on the nearby villages. However, pronounced effect of above noise levels is felt only near the active working area.

The impact of noise on the villages is negligible as the villages are far located from the mine workings. Since there is no involvement of machinery, the impact of noise levels will be minimal.

# (a) Noise Abatement and Control

In this mine the noise level will be up to tolerable limit (70 dbA°) and the noise level can be reduced by:

- Proper maintenance, oiling and greasing of transport vehicles at regular intervals will bedone to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads, around office building and mine area will bedone to minimize the propagation of noise.
- Personal Protective Equipments (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Periodical noise level monitoring will be done.

Frequency levels and associated mental and physical response of humans are given in Table- 4.4.

Noise Levels	Exposure Time	Effects
85	Continuous	Safe
85-90	Continuous	Annoyance and irritation
90-100	Short term	Temporary shift in hearing threshold, generally with complete recovery
Above 100	Continuous	Permanent loss of hearing
	Short term	Permanent hearing loss can be avoided
100-110	Several years	Permanent deafness
110-120	Few months	Permanent deafness
120	Short term	Extreme discomfort

# Table-4.4: Noise Exposure Levels & Its Effects

140	Short term	Discomfort with actual pain
150 and above	Single exposure	Mechanical damage to the ear

# **GREENBELT AND PLANTATION**

## **Proposed Plantation at the Mine Site**

The main aim of plantation in the mined out areas is to stabilize the land to protect it from rain wash off and wind erosion. The plantation scheme broadly covers the following areas:

Greenbelt around peripheral portions of the ML and Plantation will be raised along the boundaries of the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, etc. in consultation with the local DFO/Agriculture department. Around 3500 plants will be planted in the plan period.

## Greenbelt Development in ML area

The entire plantation will be done on the periphery of the reclaimed area. Precautionary measures will be taken for care of the forestation made by regular watering in the plantation area, to protect from grazing animals and proper manuring.

**Trees Planted:** (*Prunus persica*) Peach, (*Pyrusbois sieriana*) Pear, (*Prunus armeniaca*) Apricot etc. further trees will be also selected from the plants recommended for afforestation are as per Guidelines for Developing Greenbelts, CPCB, March 2000.

Sl.No.	Species	Family	Habit
1.	Alternanthera paronychioides	Amaranthaceae	Herb
2.	Alternanthera pungens	Amaranthaceae	Herb
3.	Amaranthus spinosus	Amaranthaceae	Herb
4.	Colocasia esculenta	Araceae	Herb
5.	Ageratum conyzoides	Asteraceae	Herb
6.	Grangea maderaspatana	Asteraceae	Herb
7.	Parthenium hysterophorus	Asteraceae	Herb

**Table-4.6: Species Suggested for Plantation** 

Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand

8.	Cassia tora	Fabaceae	Herb
9.	Cannabis sativa	Cannabaceae	Herb
10.	Chenopodium album	Chenopodiaceae	Herb
11.	Argemone Mexicana	Papaveraceae	Herb
12.	Brachiaria ramose	Poaceae	Herb
13.	Cynodon dactylon	Poaceae	Herb
14.	Eleusine indica	Poaceae	Herb
15.	Eragrostis tenella	Poaceae	Herb
16.	Saccharum spontaneum	Poaceae	Herb
17.	Physalis minima	Solanaceae	Herb
18.	Calotropis procera	Asclepiadaceae	Shrub
19.	Cassia occidentalis	Fabaceae	Shrub
20.	Croton bonplandianum	Euphorbiaceae	Shrub
21.	Abutilon indicum	Malvaceae	Shrub
22.	Bougainvillea spectabilis	Nyctaginaceae	Shrub
23.	Ziziphus mauritiana	Rhamnaceae	Shrub
24.	Datura innoxia	Solanaceae	Shrub
25.	Solanum virginianum	Solanaceae	Shrub
26.	Lantana camara	Verbenaceae	Shrub
27.	Berberis vulgaris	Berberidaceae	Shrub
28.	Mangifera indica	Anacardiaceae	Tree
29.	Ficus racemosa	Moraceae	Tree
30.	Cassia fistula	Fabaceae	Tree
31.	Ricinus communis	Euphorbiaceae	Tree
32.	Albizia lebbeck	Fabaceae	Tree
33.	Bauhinia acuminate	Fabaceae	Tree
34.	Butea monosperma	Fabaceae	Tree
35.	Bombax ceiba	Malvaceae	Tree
36.	Azadirachta indica	Meliaceae	Tree
37.	Quercus leucotricophera	Lauraceae	Tree

Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand

38.	Melia azedarach	Meliaceae	Tree
39.	Luecena leucocephala	Fabaceae	Tree
40.	Bauhinia variegate	Fabaceae	Tree
41.	Terminalia bellerica	Combretaceae	Tree
42.	Terminalia chebula	Combretaceae	Tree
43.	Morus alba	Moraceae	Tree
44.	Delonix regia	Fabaceae	Tree
45.	Pinus roxburgii	Pinaceae	Tree
46.	Celtis australis	Cannabaceae	Tree
47.	Grewia optiva	Tiliaceae	Tree
48.	Holoptelea integrifolia	Ulmaceae	Tree

### **BIOLOGICAL ENVIRONMENT**

The baseline flora and fauna has been depicted in Chapter-3. There is no National Parks, Sanctuary, Breeding, roosting places or ecologically sensitive areas within the 10 km periphery of the mine lease area. However, most of the area surrounding to project site are covered with forest land.

No loss of forest resource is envisaged due to the project. No medicinal plants exist in the area.

#### **Impact on Biodiversity**

Present data have been collected through direct inventory as well as various Government Departments such as forests, agriculture, fisheries, animal husbandry and various offices to establish the pre-project biological environmental conditions. There are no endangered species, wildlife sanctuary, wildlife corridors, faunal migratory routes or eco-sensitive area near the whole study area. Save the flora/fauna around the project area, is one of the basic objective of present project. For this, mine owner agency will plant a good roadside plantation along both sideof the mine road.

## **SOCIO - ECONOMIC ENVIRONMENT**

The mine area does not cover any habitation. Hence the mining activity does not involve

any displacement of human settlement. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. Proposed project will provide employment to local population and preference will be given to the local people whenever there is requirement of man power.

# PROBABLE IMPACT ASSESSMENT

# Impact on population composition

The impact of the proposed mining project on population composition will be marginal as there will be no major immigration of people from distant areas. Only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. The PP will ensure that all the unskilled workers deployed for mining activities are local recruits. Further, no mining operation will be carried till it is assured that local people has been recruited and deployed for mining operation.

# Impact on employment generation

The proposed mining project is expected to provide Direct and Indirect employment opportunities to local people of different skills and trades. It is a positive impact that needs to be encouraged. It has been estimated that 31 workers of various categories will be employed directly.

The employment potentiality of the project is expected to ameliorate the economic condition of the families of those persons who will get employed in the proposed mining project. Further, the project will provide indirect employment to people who will be involved in segregation of extracted mining materials, petty business and service oriented industries.

## Impact on consumption pattern

The field survey has revealed that people in the study generally poverty ridden. Increased household income may slightly change and enhance the consumption pattern of few who are burdened with poverty.

## Impact on road development

Movement of trucks and other vehicles to and fro the quarry is expected to increase, when

mining will start. There is mule road connectivity from the quarry to existing road. The existing roads connecting the quarry with the state highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas. It is suggested that concerned department in the Government of the state to undertake widening and strengthening of existing roads connecting the mining sites on priority basis. There should also be budgetary support for road development in and around the mining areas.

# Impact on law & Order

As local people will be employed to run the quarry, 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 is over. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area.

# **OCCUPATIONAL HAZARDS AND SAFETY**

Occupational safety and health is very closely related to productivity and good employeremployee relationship. The factors of occupational health in Mining project are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be asper Mines rules and regulations.

To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safetyetc.
- Safety belts will be provided to workers on working on top benches.
- Training of employees for use of safety appliances and first aid in vocational trainingcenter.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a medical Officer
- First Aid facility is provided at the mine site.
- The mine area will be properly fenced to avoid any inadvertent entry in the

## mining pit.

• Warning boards and working hours will be displayed at conspicuous places.

# PUBLIC HEALTH IMPLICATIONS

With the mitigation measures in relation to air pollution, water pollution, soil contamination and noise pollution proposed to be adopted at the mine along with green belt plantation along the periphery of Mining Lease boundary, it is expected that there will be no impact of mining on the population in the impact zone. However, the following measures shall be adopted:

Health check of all villagers in the immediate vicinity of the mine shall be carried out periodically. Surface water management shall be adopted to ensure that run-off from the mining are does not adversely affect natural water streams or other water bodies.

All water bodies e.g. wells and surface water sources in the vicinity of the mine, shall be periodically tested for any pollution related to mining operations and remedial action taken, if warranted.

Operators of all transport vehicles shall be instructed not to honk unnecessarily and not over speed while passing through villages or near schools.

# CORPORATE SOCIAL RESPONSIBILITY

Corporate Social Responsibility (CSR) refers to responsibility of a company to ensure positive impact on environment, consumers, employees, communities, stakeholders and all other members of public sphere. The CSR activities are increasingly being taken up by the project proponents not only as fulfilling of mandatory provisions but also for the formation and or enhancement of brand image. Besides the above, CSR is seen more as a responsibility towards society rather than a business promotion activity. It is the need of the day for expansion of occupational welfare. The activities to be undertaken for the local people under CSR have already been identified. It is expected that this will improve the socio-economic status of the local people and at the same time the popularity of the mining project will enhance. It is proposed to spend five percent of the total cost of the project for the benefits of the local community under CSR activities. The amount earmarked for CSR activities has been worked out to Rs. 1.62 Lacs. It is proposed to spend the above amount during the first five years of the commissioning of the mining project.

Based on 'Community Needs Survey' conducted in the study area by the Consultant appointed by the company the following activities are proposed to be taken up for the benefits of the local community.

# The list of activities proposed to be taken up is indicated below:

- Health Camps
- Construction of Bus stop shelters
- Distribution of Books and Notebooks among meritorious girl child belonging to Scheduled Caste and Scheduled Tribe population
- Cleaning of Tanks in selected villages
- Repair and Painting of School Building in the project village

# Table 4.7: funds allocation of for the various activities proposed to be taken up underCER programme

# Budget for Corporate Environmental Responsibility (CER)

Yearly CER cost for the project, i.e. 5% of the total project cost

# Rs. 32, 50, 000 x 0.05 = Rs. 1,62,000

S no.	Activity	Quantification	Capital cost
1	Installation of Computer in Primary School	3	1,00,000
2	Distribution of solar lamps	31	62,000
Total			1,62,000

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority and the beneficiaries. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CSR programme.

#### **CHAPTER-5**

#### ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

#### Site Alternatives under Consideration

The soapstone mineral in Kumaon Himalaya is an alteration a products magnesium bearing minerals, soapstone occurs as pocket type massive and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending about 330°N to 340°N, amount of dip varies 30 degree to 35 degree, direction varies 50°N to 55°N.

Talc is one of the abundant and economically proven mineral resources of Uttarakhand. Occurrences of talc bands, lenses, veins and pockets are known in magnesite, dolomite and chloritic talc schist in different parts of district Bageswar, Pithoragarh, Chamoli and adjoining localities

The haphazard mining of stone being practiced for now long through unregulated, uncontrolled and illegal manner added almost an irreversible damage to the environment, which became a cause of serious concern. Though soapstone is very important mineral source for development, its mining through scientific methods have also become equally imperative. It is for this purpose that "mining plan' is being drawn so that all its aspects are taken care of justifiably, according to law, protecting the environment, removing all adverse impacts and creating a direct and indirect employment opportunities, improving socio-economic conditions of the local inhabitants and all round status of life, achieving thereby a sustainable development. Besides above, the mining is site specific so alternative site is not considered

#### Analysis of Alternative Technology Choice of Method of Mining

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, percentage recovery, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization and automation, workforce requirements wage rates, and land reclamation, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be madein the opening up of a mine.

Surface or open pit mining is used for large, near-surface mineral deposits. Mineral is excavated, loaded into trucks, and hauled to a facility where it is crushed and ground to a uniform size for further

processing. Surface mining requires the removal and disposal of layers of top soil and underlying rock commonly called the overburden. Mining must be planned so that the combine of mining processing and reclaiming the land is taken up concurrently.

The open cast mining method will be adopted because of the following reasons: The opencast mining operations ensure higher mineral conservation.

Taking into consideration the targeted production, the mine will be worked by fully manual opencast method for collection of Minor Minerals of "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha, at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand

The proposed mining method is conventional opencast mining Proposed mining will be started from higher levels to lower levels through phase wiser block wise, going to the maximum depth below ground levels then or observe ground water level whichever is less Length of the block may be decided on the spot convenience. The loading of mineral shall be done manually and transported by truck to the storage points located outside the mine.

# CHAPTER-6 ENVIRONMENTAL MONITORING PROGRAMME

# Introduction

The industrial development of any area needs to be intertwined with judicious utilization of nonrenewable resources of the study area and within the limits of permissible assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged into the environment without affecting the designated use and is governed by dilution, dispersion and removal due to physico-chemical and biological processes.

The Environment Monitoring Programme is required to ensure sustainable development in the study area (10 km) of the project site, hence it needs to be an all encompassing plan for which the plant authorities, Government, Regulating agencies like Pollution Control Board etc. working in the region and more importantly the affected population of the study area need to extend their co-operation and contribution.

# Implementation Schedule of Mitigation Measures

The mitigation measures suggested in Chapter-4 will be implemented so as to reduce the impact on the environment due to the operations of the proposed project. Implementation schedule of mitigation measures is given in **Table-6.1**.

# **Table-6.1 Implementation Schedule**

Sr. No.	Recommendations	Time Requirement	Schedule
1	Air pollution contro	Before commissioning of	Immediate
	measures	respective units	
2	Water pollution contro	Before commissioning of	Immediate
	measures	the	
		mine	
3	Noise control measures	Along with the commissioning of	Immediate
		the mine	

4	Ecological	preservation	Stage-wise implementation	Immediate &
	and up gradat	ion		Progressive

## Administrative Aspects & Environmental Monitoring Program

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. With the knowledge of baseline conditions, the monitoring programme will serve as an indicator for any deterioration in environmental conditions due to operation of the project, to enable taking up suitable mitigatory steps in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring.

Usually, as in the case of the study, an Impact Assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring programme of the environmental parameters is essential to take into account the changes in the environmental quality.

## Institutional Arrangements for Environment Protection and Conservation

The mine will be supervised and controlled by an independent Mines Manager supported by adequate team of technically and statutorily qualified personnel apart from the operating staff of skilled, semi-skilled, unskilled and other categories.

This Environment Cell is responsible for the management and implementation of the environmental control measures. Basically, this department will supervise the reclamation planning & management, air & water pollution control management, dealing with State & Central Statutory agency & Committee.

In case the monitored results of environmental pollution are found to exceed the allowable limits, the Environment Management Cell will suggest remedial action and get these suggestions implemented through the concerned authorities.

The Environment Management Cell wills also co-ordinate all the related activities such as collection of statistics of health of workers and population of the region, afforestation and greenbelt development. The Environment Management Cell will review Corporate Environmental performance along with the reporting of non-compliances.

## **Environment Monitoring Programme**

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, emissions and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. The environmental monitoring will be conducted in the mine operations as follows:

- $\Box$  Air quality;
- □ Water and wastewater quality;
- □ Noise levels;
- $\Box$  Soil Quality; and
- □ Greenbelt Development

The details of post project monitoring is presented in Table 6.1

### **Reporting Schedules**

Project monitoring will be carried during operation phase as per conditions stipulated in environmental clearance letter issued by MoEF, consent issued by SPCB as well as according to CPCB guidelines. The project site is considered as core zone and the area lying within 10 km radius from the mine site is considered as buffer zone, where some impacts may be observed on physical and biological environment. Table-6.2 Post Project Monitoring Programme.

Attributes Sampling			Measurement	Test Procedure
	Network	Frequency	Method	
A. Air Environment		1	•	
Pollutants	6 locations in the	Once in aseason.	Gravimetric -	
PM2.5,PM10	projectimpact area		method	
	(Minimum 3		Gravimetric -	
	Locations in		method	

	-			
SO2	upwind		EPA Modified	Absorption in Potassium
	side, 3 sites in		West & Geake	Tetra Chloromercurate
	Downwind side /		method	followed by Colorimetric
	impact zone and 1			estimationusing P-
	incore zone)			Rosaniline hydrochloride
				and Formaldehyde (IS:
				5182 Part - II).
NO2			Arsenite	Absorption in dil.
			modified Jacob	NaOH and then estimated
			Hochheiser	colorimetrically with
				sulphanilamide and N(I-
				Nepthyle) Ethylene
				diamine Dihydrochloride
				and Hydrogen Peroxide
				(CPCB Method).
B. Water Environment	t	<u> </u>	1	<u> </u>
pH, Turbidity,	Set of grab	Diurnal and	As per IS	Samples for water
Colour, Odour, Taste,	samples duringpre	Season wise	10500	quality should be collected
TDS, TotalHardness,	and post-			and analyzed as per : IS :
Calcium hardness,	monsoon for			2488 (Part 1-5) methods
Magnesium hardness,	ground and			for sampling and testing of
Chloride, Fluoride,	surface Water in			Industrial effluents
Sulphate, Nitrates,	the vicinity.			Standard methods for
Alkalinity, Iron,				examination of water and
Copper, Manganese,				wastewater analysis
Mercury, Cadmium,				published by American
Selenium, Arsenic,				Public Health Association.
Cyanide,Lead,				
Zinc, Chromium,				
Aluminum,Boron,				
Phenolic				

Compounds				
C. Noise				
Noise levels at Day	Mine Boundary	Quarterly /	As per CPCBnorms	As per CPCB
& night time -	, High noise	Half yearly		norms
Leq dB (A)	generating areas			
	within			
	the lease			
D. Soil				
pH, Bulk	3 locations	Yearly/halfyearly	As perUSDA	As per USDA
Density, Soiltexture,	in the project		Method	Method
	impact area			
Nitrogen, Available				
Phosphorus,				
Potassium, Calcium,	,			
Magnesium,				
Sodium, Electrical	1			
Conductivity,				
Organic Matter,				
Chloride				
E. Socioeconomic	I		-	
Demographic	Socioeconomic	Minimum for	Primary	Secondary data
structure	survey is based	two phases of		from census

the project

on

proportionate,

stratified and

random

sampling

method

Infrastructure

resource base

resource base

Health status:

Morbidity

Economic

and

records, statistical

hard books, topo

sheets, health

relevant official

records available

Records

pattern Cultural		with Govt.
and Aesthetic		Agencies
attributes		
Education		

# SUMMARY

In order to maintain the environmental quality within the stipulated standards, regular monitoring of various environmental components is necessary which will complied as per conditions. For this proponent has taken decision to formulate an Environment Policy of the mine and constitute an Environmental Management Cell and committed to operate the proposed mine with the objectives mentioned in approved Environment Policy. EMP may also require measurement of ambient environmental quality in the vicinity of a sit using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. Regular Monitoring of all the environmental parameters viz., air, water, noise and soil as per the formulated program based on CPCB and MoEF & CC guidelines will be carried out every year. The location of the monitoring stations was selected on the basis of prevailing micro meteorological conditions of the area like; wind direction and wind speed, relative humidity, temperature.

\*\*\*\*\*

## **CHAPTER – 7 ADDITIONAL STUDIES**

This chapter contains information of Public Hearing, various risks associated during operational stage of the project, disaster management plan to minimize the risks, onsite & offsite emergency plan and Occupational health & Safety. Social Impact Assessment is part of this chapter.

## PUBLIC CONSULTATION

The Public Hearing for proposed expansion project of **"Bhataura Rankot Soapstone Deposit"**, **Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State-Uttarakhand** will be conducted by UKPCB as per the EIA Notification, 2006 and its amendment therein. Afterwards the findings will be incorporated into the final EIA report

#### **Risk Assessment**

The complete mining operation will be carried out under the management control and direction of a qualified mine manager. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

In order to take care of above hazard/disasters, the following control measures will be adopted:

- All safety precautions and provisions of Mine Act 1951, Metalliferrous Mines Regulations 1961 and Mines Rules, 1955 will be strictly followed during all mining operations;
- Entry of unauthorized persons will be prohibited;
- ✤ Fire fighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use;
- Training programmes for all the employees working in hazardous premises; Under Minesrules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads and loading & unloading points ;
- Increasing the awareness of safety and disaster through competitions, posters and othersimilar drives.

# Blasting

No drilling & blasting is proposed as mineral is very soft in nature.

# Overburden & Interburden

The overburden and interburden dumps may cause landslides. High overburden dumps created at the quarry edge may cause sliding of the overburden and interburden dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and Property. Siltation of surface water may also cause run-off from overburden and interburden dumps.

# Machinery

Machinery is involved, entire operation will be semi mechanized, accident during transport by trucks is often attributable to mechanical failures and human errors.

# Water Logging

Water logging in the mine site can be avoided by adopting following measures:

- Due care will be taken to provide retaining/toe wall around the pits.
- Proper drainage will be maintained to eliminate inundation of working pits during rains fromrun-off water.
- There is no danger of flood or inundation as the ground level.
- Mining operations are not carried below the ground water table; therefore, there will be nodisturbance to ground water quality due to mining activity.

## Natural resource conservation

- ✤ A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be refilled in order to minimize the impact on environment.
- In any case the natural habitats of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation.
- ✤ Water conservation techniques will be employed.
- \* Time to time analysis of the soil, water resources etc will be done in order to analyze

thenegative impacts of mining activities on the environment.

To prepare management plans for village landscapes. Villages to be seen as landscapes ofdiverse elements such as forests, scrub, grassland, streams/river, ponds etc.

# Earthquake Management Plan

Following measures will be undertaken:

- The project site is a hilly area. There will be no drilling and blasting during mining.
- The overall slope angle of the upper pit wall will be kept to 45° & bench height would be 6m.

# **Flood Management Plan**

This is a soapstone mining project and the site is not close by to a water body so water bodies in the area will not be disturbed.

## Natural resource conservation

- ✤ A green belt will be developed so that minimum soil erosion takes place.
- The excavated soil will be spread over the backfilled mined out area in order to minimize theimpact on environment.
- ✤ In any case the natural habitats of the existing flora and fauna will not be disturbed.
- Use of traditional knowledge in all aspects of conservation shall be utilized.
- Water conservation techniques will be employed.
- Time to time analysis of the soil, water resources etc will be done in order to analyze the negative impacts of mining activities on the environment.
- To prepare management plans for village landscapes, villages to be seen as landscapes of diverse elements such as forests, scrub, grassland, streams/river, ponds etc. The dynamics of the village as an ecosystem to be assessed, corridors to be devised between major natural landscape elements, so as to facilitate movement of species.

## **Safety Measures**

# Safety Measures at the proposed Open Cast Mining Project

The opencast mines have been planned for working with shovel tipper system which requires proper benching not only for slope stability but also for movement of tippers and other machinery. The inclination of the quarry sides at the final stage i.e. at the dip most point will not exceed  $45^{\circ}$  to the horizontal. (This angle is measured between the line joining the toe of the bottom most bench to the crest of the top most bench and the horizontal line);

The quarries will be protected by garland drains around the periphery for storm water drainage;

A minimum safe distance of 100-m will be kept between the surface edge of the quarry and the nearest public building, roads etc.

# Measures Suggested to Avoid Accidents due to Blasting

No drilling & blasting is proposed as mineral is very soft in nature.

# Measures to Prevent the Danger of Overburden

To prevent the failure of overburden slopes, especially during the rainy season, proper garland drain & bund are constructed around the dump.

# Measures to Prevent Accidents due to Trucks and Tippers

- All transportation within the main working area should be carried out under the direct supervision and control of the management.
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs should be provided at each and every turning point specially for the guidance of the drivers at night;
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks;
- A statutory provision of the fence, constant education, training etc. Will go a long way inreducing the incidence of such accidents.

# Disaster Management Plan Objectives of Disaster Management Plan

The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation and restoration of production. For effective implementation of the Disaster Management Plan, it should be widely circulated and personnel training should be given.

The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- Effect the rescue and medical treatment of casualties;
- ✤ Safeguard other people;
- Minimize damage to property and the environment;
- Initially contain and ultimately bring the incident under control;
- Secure the safe rehabilitation of affected area;

In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

# **Fire Fighting Facilities**

Sufficient fire extinguishers will be installed at selected locations such as mine office, garage, stores etc.

# **Emergency Medical Facilities**

An ambulance with driver availability in all the shifts, emergency shift vehicle would be ensured and maintained to transport injured or affected persons. Number of persons would be trained in first aid so that, in every shift first aid personnel would be available.

## **CHAPTER 8**

#### ENVIRONMENT MANAGEMENT PLAN

The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during the implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels. The present environmental management plan addresses the components of environment, which are likely to be affected by the different operations in a mine area.

### The aims of EMP are:

- Overall conservation of environment.
- Minimization of waste generation and pollution.
- ✤ Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and population.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and long time impacts.
- Ensure effective operation of all control measures.

## **Air Quality Management**

Over the millennia, the weathering effect, the flow of water at high velocities in rivers and the pressure of water from the high mountainous reservoirs converted and pushed the hard ground underneath into sand, gravel etc. which travelled as sediments with the flow. This sand gets deposited along the river course wherever conditions were favorable. In deep past this settled sand was not extracted in a quantity in which it is deposited, since due to less population the requirement was not enough. Use of Personal Protection Equipments (PPE) like dust masks, ear plugs etc by the mine workers.

✤ Regular water sprinkling on haul roads & loading points will be carried out.

- Development of green belt/plantation around the lease boundary, roads, dumps etc.
- Ambient Air Quality Monitoring will be conducted on regularly basis to assess the quality of ambient air.

# **Prevention and control of Gaseous Pollution**

Proper maintenance of machines improves combustion process & makes reduction in the pollution. Good maintenance and monitoring of fuel and oil will not allow significant addition in the gaseous emission.

# Noise Pollution Control Noise Abatement and Control

- Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce the generation of noise.
- Adequate silencers will be provided in all the diesel engines.
- Plantation along the sides of approach roads and mine area will be done to minimize the propagation of noise.
- Personal Protective Equipments (PPE) like earmuffs/earplugs will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Periodical noise level monitoring will be done.

# Water Quality Management

The water requirement will be around 8.62 About 0.31 KLD for domestic and 1.0 KLD will be required for dust suppression. Water for drinking purpose will be supplied from the Uttarakhand

Jal Sansthan and naulla's of nearby villages. This water will be supplied by private tankers. For dust suppression and Plantation the water supplied from nearby private tankers.

## Waste Management

Nature of waste: The quantum of wastes removed is given in mine plan attached as annexure.

# Selection of Dumping Site:

All the quantities of soil & interburden material to be generated will be used in the purpose of reclamation. The soil and interburden is stacked separately. The interburden and interburden will be

filled back on the pit and later on soil will be spread over the interburden material to restore the maximum original topography of the area. Therefore soil stack and interburden material have not been proposed to be dumped separately.

# **Biological Management Measures**

There is a requirement to establish a stable ecosystem with both ecological and economic returns. Minimization of soil erosion and dust pollution enhances the beauty of the core and the buffer zone. To achieve this, it is planned to increase plantation activities. The basic objectives of plantation are as follows:-

- Improvement of Soil quality
- Quick vegetative cover to check soil erosion
- Improvement in mining site stability
- Conservation of biological diversity
- As dust receptor which likely to produce during mining

# **Greenbelt Development Plan**

Green belt is plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belts have been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution. The greenbelt development plan aims to overall improvement in the environmental conditions of the region. The plan with a five-fold objective addresses issues such as providing sink for air pollutants likely to emit from the project enhancing the forest cover for increasing the biodiversity of the region; providing aesthetic value to the project area enhancing the ecological equilibrium of the area; and to a large proportion in combating soil erosion.

- Afforestation on degraded forest area, forest protection / conservation will becarried out every year by the mine owner.
- This helps in regeneration & establishment of pioneer plant species savingexpose land
   & land cutting
- It will improve the aesthetic beauty of the area.

Plantation will be raised at a spacing of 7.5m along the boundaries of the mining lease by planting the native species around ML area, backfilled and reclaimed area, around water body, roads etc. in consultation with the local DFO/Agriculture department.

The following characteristics should be taken into consideration while selecting plant species for green belt development and tree plantation.

- They should be fast growing and tall trees.
- They should be perennial and evergreen.
- They should have thick canopy cover.
- Plantation should be done in appropriate alternate rows around the proposed site to prevent lateral pollution dispersion.
- The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species should be preferred

The suggestive measures under EMP are given in Table below

## Table 8.1: Key suggestive measures under EMP

Suggestive measure	Impact Predicted	Suggestive measure
--------------------	------------------	--------------------
Disturbance of free	Awareness camps will be conducted for labours to make them	
----------------------------	---	
movement/living of wild	aware about sensitivity/importance of forest life	
fauna	No tract or new road for movement of labours or vehicles be laid	
	in reserve forest area, this will prevent forest fragmentation,	
	encroachment and human – animalencounter	
	Care will be taken that noise produced during vehiclesmovement	
	for carrying materials are within the permissiblenoise level.	
	Higher noise level in the forest area will lead torestless and failure	
	in detection of calls of mates and youngones	
	Care will be taken that no hunting of animals carried out by	
	labours	
	If wild animals are noticed crossing the core zone, it will not be	
	disturbed at all	
	Labours will not be allowed to discards food, plastic etc., which	
	can attract animals near the core site	
	Only low polluting vehicle will be allowed for carrying ore	
	materials. All vehicles allowed in the project site area will have to	
	provide pollution under control certificate at theend of three	
	months	
	No honk will be allowed in the forest area, noise level will be	
	within permissible limit (silent zone-50dB during day time) as per	
	noise pollution (regulation and control), rules, 2000, CPCB norms	
Harvesting of forest flora	No tree cutting, chopping, lumbering, uprooting of shrubsand herbs	
	should be allowed No pilling of ore material should in the reserve forest area	
	Collections of economically important plants will be fully restricted	

## **Occupational Hazards and Safety**

Occupational safety and health is very closely related to productivity and good employer- employee relationship. The factors of occupational health in the proposed RBM Mine are mainly dust and

land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

- Provision of rest shelters for mine workers with amenities like drinking water etc.
- All safety measures like use of safety appliances, such as dust masks, helmets, shoes, safety awareness programs, awards, posters, slogans related to safety etc.
- Training of employees for use of safety appliances and first aid in vocational training center.
- \* Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a medical Officer
- ✤ First Aid facility is provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

#### **Environmental Policy**

The Owner believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection, reclamation of the mined out land, preservation of biodiversity and proper disposal of waste following the best environmental practices during the process of mining of soapstone.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company operations will implement operational and risk management practices that provide for maximum protection of people and the environment. To this end, the owner resolves that company will follow the below mentioned practices:

Operate in accordance with prescribed industry standards while complying with all applicable environmental, health and safety laws and regulations.

Establish and maintain a well-defined environmental, health and safety management system to guide its operations.

- Ensure that all employees, officers and directors understand and adhere to its environmental, health and safety management program.
- Provide operations with the necessary resources, expertise and training to effectively carry out its EHS management programs.
- Engage employees at all levels in programs directed towards minimizing adverse effects on the environment resulting from mining activity.
- Work proactively with governments and the public in the development of cost effective and realistic regulations that promote enhanced environmental, health and safety protection.
- Promote environmental awareness among its employees, their families and the communities in which it operates.
- Require those who provide services and products to practice good environmental stewardship.
- Mitigate its environmental impacts through efficient use of resources, and the reduction finput materials and waste.
- Maintain a high degree of emergency preparedness

## Budget

It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. The total project cost & budget for environmental protection has been formulated approx 702000/-.

## **CER Project Details**

It is proposed to provide financial assistance of Rs 1.62 lakh for the development of social infrastructure of the area. Following measure will be taken to improve the Social infrastructure of the study area:

- Health Camps & medical care facilities for rural population shall be promoted.
- Distribution of Books and Notebooks among meritorious girl child belonging to Scheduled Caste and Scheduled Tribe population.
- Up gradation of toilets of government school in nearby villages.

Repair and Painting of School Building in the project village assisting social forestry programme.

## Table 8.3: CER Budget Allocation

## Budget for Corporate Environmental Responsibility (CER)

Yearly CER cost for the project, i.e. 5% of the total project cost

## Rs. 32, 50, 000 x 0.05 = Rs. 1,62,000

S no.	Activity	Quantification	Capital cost
1	Installation of Computer in Primary School	3	1,00,000
2	Distribution of solar lamps	31	62,000
Total	20		1,62,000

## Conclusion

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As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of **"Bhataura Rankot Soapstone Deposit"**, Area- 6.864 Ha, at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand.

#### **CHAPTER – 9 PROJECT BENEFITS**

#### Improvement in the Physical Infrastructure

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

#### Improvement in the Social Infrastructure

Generation of employment and improved standard of living;

Increased revenue to the State by way of royalty, taxes and duties; and

Superior communication and transport facilities etc.

There will be significant change in the socio-economic scenario of the area.

The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.

The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.

• Overall the proposed project will change living standards of the people and improve the socioeconomic conditions of the area.

#### **Employment Potential**

Future production planning does not indicate some change from present, in the employment. The number of unskilled labour may increase depending on the quantum of overburden removal and mineral excavation. The lessee has employed miners for raising ores & removal of overburden, quarry cleaning & road repairing. The details of employment are given in mine plan.

The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. These will in-turn improves the socio-economic conditions of the area.

The total manpower required for the proposed mining project under various categories is 31 persons and persons will be mainly sourced from local community in and around mining project and few technical persons will be employed during operational phase from local and also from outside area. In addition to the above, contractual labour and indirect employment opportunities will also be getting benefited after installation of mining project.

## Policy and Action Plan on Social Responsibility

A detailed Community Social Responsibility plan has been prepared and the details of thereport are given below.

## **CSR Project Details**

RBM mine has proposed to provide financial assistance of Rs. 1.62 lakh for the development of social infrastructure of the area.

Following measure will be taken to improve the Social infrastructure of the study area:

- ♦ Health Camps & medical care facilities for rural population shall be promoted.
- Distribution of Books and Notebooks among meritorious girl child belonging to ScheduledCaste and Scheduled Tribe population.
- Up gradation of toilets of government school in nearby villages.
- \* Repair and Painting of School Building in the project village assisting social forestryprogramme.

## Conclusion

As discussed, it is safe to say that the project is not likely to cause any significant adverse impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the soapstone mine

## Chapter -10

## **Environment Cost Benefit Analysis**

## **INTRODUCTION**

The soapstone mineral in Kumaon Himalaya is an alteration a products magnesium bearing minerals, soapstone occurs as pocket type massive and sometimes confined to the upper part of the magnesium bearing zones. The mineral body occurs in irregular shape & size. The foliation plane of soapstone trending about 330°N to 340°N, amount of dip varies 30 degree to 35 degree, direction varies 50°N to 55°N.

Talc is one of the abundant and economically proven mineral resources of Uttarakhand. Occurrences of talc bands, lenses, veins and pockets are known in magnesite, dolomite and chloritic talc schist in different parts of district Bageswar, Pithoragarh, Chamoli and adjoining localities

The haphazard mining of stone being practiced for now long through unregulated, uncontrolled and illegal manner added almost an irreversible damage to the environment, which became a cause of serious concern. Though soapstone is very important mineral source for development, its mining through scientific methods have also become equally imperative. It is for this purpose that "mining plan' is being drawn so that all its aspects are taken care of justifiably, according to law, protecting the environment, removing all adverse impacts and creating a direct and indirect employment opportunities, improving socio-economic conditions of the local inhabitants and all round status of life, achieving thereby a sustainable development. Besides above, the process of mining of minor minerals is a constant source of revenue generation to the State Government to Royalty..

## ECONOMIC AND FINANCIAL ANALYSIS

An Economic analysis is conducted from the perspective of the community as a whole. It focuses on "real" resource costs and benefits, including any "external" environmental costs and benefits that affect the broader community.

In Financial analysis, from a private perspective, similar concepts apply as in the economic analysis, but the benefits and costs are estimated in terms of the financial benefits received and costs borne by private producers. Because the financial analysis focused only on the Soap stone dredge owners' private financial prospects and did not take into account externalities or external environmental costs, it is inadequate in determining the efficiency of resource allocation.

## **Quantitative Analysis**

#### **Financial analysis**

The total profit per year that a dredge owner can receive from mining is calculated as follows: Total Profit = Unit Profit x Extract Volume

Unit Profit = Market Value of 100  $\text{m}^3$  of Extracted – Total Costs of Extraction of 100  $\text{m}^3$ The market value of was calculated based on the market price of Soap stone; the cost of Soap stone extraction includes cost of labor, fuels, equipment depreciation, and other costs.

#### **Economic analysis**

The net benefit that a society receives from mining was calculated as follows:

$$NPV = \sum_{i=0}^{n} \frac{Bi - Ci}{(1+r)^i}$$

Where NPV is net social benefit from Soap stone mining;

Bi- is the financial benefits of mining for society through the years;

*Ci*- is the cost of Soap stone mining through the years, including the financial cost (cost of labor, fuel, and equipment that the dredgers have to pay), external costs of riverbank erosion, dike breakage and degradation, agricultural loss, and aqua-resource degradation; and *r*- is the discount rate.

## **Qualitative Analysis**

The analysis is expected to show if the external cost of current mining does outweigh the combined gains/profits of all the individuals involved in mining. It is out of the scope of the report to quantify the Environmental Cost Benefits resulting from the proposed mining activity, thus a general quantitative description is discussed as under:

## **Environmental Costs**

Expenditures incurred to prevent, contain, mitigate or remove environmental contamination throughout the life cycle of a product or an activity. These costs include remediation or restoration costs, waste management costs or other compliance and environmental management costs. The various environmental costs identified, qualitatively for the **Draft EIA "Bhataura Rankot Soapstone Deposit"**, Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand of Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K) are:

 $\checkmark$  On-site effects such as the erosion

- $\checkmark$  Dust and air pollution due to fugitive air emissions
- ✓ Noise pollution due to movement of heavy machinery and transporting vehicles
- ✓ Erosion, soil quality deterioration due to movement of heavy vehicles
- ✓ Spillage of diesel oil from machines and vehicles, which may pollute the soil and may leach to pollute the ground water.
- Presence of water puddles in lease vicinity and haulage road, thus increase in mosquito-related health problems
- ✓ Breakout of epidemics leading to loss of life. Expenditure on control of these breakouts, vaccines, medicines, scientific research and quarantining the area.
- ✓ Off-site effects include the impairment of rural roads, causing damage to the road infrastructure due to heavy loads carried on weak rural roads.

## **Environmental Benefits**

Expenditures saved on safeguard, management or upkeep of environment, through direct or indirect practices, implemented during the course of life cycle of a product or an activity. In the case of Soap stone mining the environmental benefits are:

- 1. The proposition is to mine from area to cater to the increasing demands of the construction industry. This in turns has a number of benefits:
  - Prevention of Loss of life
  - Prevention of Loss of homes or other items of utility
  - Prevention of Agricultural losses
  - Prevention of loss of cattle and aquatic resources.

## Social Benefits and Associated Environmental Benefits

The proposed mining will generate revenue for the government and for the lease holder. It will generate employment for people, who will work as manual labours on site.

Employment will also be generated for machine operators and truck drivers. The benefits of these are as:

- Generation of employment, thus improvement in life style and increase in standard of living.
- Paradigm shift from environment polluting activities such as burning of woods or coal to cleaner or less polluting fuels such as LPG or electricity, resulting in reduced dust, smoke and GHG emissions.

- Education of masses instills the importance and need of preservation of environment, which in long run, will improve the environmental conditions.
- Revenue generation to Government gives them the opportunity to carry out researches on new improved scientific methods for environmental preservation and sustainable development.

#### INFERENCE

The Analysis done for "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha, at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand of Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K) indicates the balance in favour of Environmental Benefits. That is to say, the financial expenditures incurred in preventing, containing, mitigating or removing environmental contaminations occurring as a result of the proposed mining activity are superseded by the expenditures saved (on environment, both short and long term) as a result of project activity.

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# **EXECUTIVE SUMMARY & CONCLUSION**

## **1.0 INTRODUCTION OF PROJECT & PROPONENT**

Mining lease was initially granted to Mining lease was initially granted to Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K) for extraction of soapstone from **"Bhataura Rankot Soapstone Deposit"**, Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand The State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021-01(35)/2021, Dated 07-01-2022, for a period of fifty (50) years

## **1.2 LOCATION**

The Project location & surroundings of the project are described in the Table given below:

Sr. No.	Particular	Detail
А.	Nature of the Project	S "Bhataura Rankot Soapstone Deposit",
1.	ML Area	6.864 Ha
2.	Proposed Production Capacity	maximum proposed production is 15980 TPA (in Vth year)
3.	Lease Period of Mine	Lease was granted for a period of 50 Years.
С.	Method of Mining	
1.	Method	Open-Cast semi-mechanized Mining
2.	Blasting/Drilling	Not proposed
D.	Project Location	
1.	Village	Bhataura Rankot
2.	Tehsil	Bageshwar,
3.	District	Bageshwar,
4.	State	Uttarakhand
5.	Topo Sheet No.	-
6.	Lease Area Coordinates	<b>29°51'48.91''N</b> 79°51'43.99"E (Pillar No. 1, details about other pillars given below column)
Е.	Cost Details	
1.	Project Cost	Rs. 3250000.
<b>F.</b>	Water Demand	
1.	Requirement	<b>8.62</b> KLD
2.	Source of water	Nearby villages & natural springs.

Table:- Details of the Project Location & Surroundings

G.	Man Power Requirement	31
H.	Environmental Setting	
1.	Nearest Village	Bhataura Rankot -500m away
2.	Nearest Town	Bageshwar-8.17 km away
3.	Nearest National /State Highway	NH-309A, 3.2 Km South
4.	Nearest Railway Station	Kathgodam Railway Station, towards SSW direction (approx. 72.6 Km*)
5.	Nearest Airport	Naini Saini, Pithoragarh Airport, towards SE direction (47.12 km*)
6.	EcologicalSensitiveAreas(Nation alPark,WildLifeSanctuaries,Biosp hereReserveetc.) within 10kmradius	None
7.	Water bodies within 10 km radius of the mine site.	Sarju river-7.27 Km NNE, Pungar Nadi-1.41 NNW, Lohar nadi-10 Km WNW, Gomati nadi – 9.71 Km WSW, Surju river – 8.42 Km SSW, Bhadrapati river- 8.08 KM SE.
8.	Archaeological Important Place	None
9.	Seismic Zone	V

## Geo coordinates

Pillar No	N	E
1.	29°51'48.91"N	79°51'43.99"E
2.	29°51'46.53"N	79°51'42.99"E
3.	29°51'45.91"N	79°51'42.29''E
4.	29°51'45.65"N	79°51'43.20"E
5.	29°51'45.15"N	79°51'43.31"E
б.	29°51'44.83"N	79°51'43.79"E
7.	29°51'42.20"N	79°51'42.86"E
8.	29°51'42.11"N	79°51'43.43"E
9.	29°51'42.99"N	79°51'43.90"E
10.	29°51'42.92"N	79°51'44.17"E
11.	29°51'41.98"N	79°51'43.58"E
12.	29°51'39.80"N	79°51'43.12"E
13.	29°51'39.38"N	79°51'46.50"E
14.	29°51'38.12"N	79°51'47.32"E
15.	29°51'37.85"N	79°51'48.12"E
16.	29°51'38.96"N	79°51'50.99"E
17.	29°51'38.44"N	79°51'52.52"E
18.	29°51'36.52"N	79°51'53.19"E
19.	29°51'36.32''N	79°51'54.08"E
20.	29°51'37.73"N	79°51'53.99"E
21.	29°51'38.28"N	79°51'54.80''E
22.	29°51'40.81"N	79°51'54.23"E
23.	29°51'40.91"N	79°51'53.25"E

24.	29°51'43.20"N	79°51'53.36"E
25.	29°51'45.59"N	79°51'52.66"E
26.	29°51'46.27"N	79°51'48.77"E
27.	29°51'45.41"N	79°51'46.53"E
28.	29°51'43.90"N	79°51'47.35"E
29.	29°51'43.86"N	79°51'44.23"E
30.	29°51'45.51"N	79°51'45.11"E
31.	29°51'46.44"N	79°51'47.63"E
32.	29°51'48.50"N	79°51'47.36"E



Figure: 1.1 - Project Location



Figure: 500 M Study area



Figure: 10 KM Study area

## **1.3 LEASEHOLD AREA**

The proposed project of Bhataura Rankot Soapstone Deposit by Shri Pushkar Lal Shah is located at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand (Area-6.864Ha). The State Govt. willing to grant Mining Lease vide G.O./LoI No. 2455/VII-A-1/2021-01(35)/2021 dated 07.01.2022, for a period of 50 years It has been proposed to collect approximately maximum proposed production is 15980 TPA (in Vth year) soapstone will be extracted by Open-Cast semi-mechanized Mining. There is no National Park, Sanctuary, Elephant/Tiger Reserve, eco-sensitive area, Interstate boundary, migratory routes within 10 km of the project site.

s.	Year	Production
No.		(Tonnes)
1.	1 <sup>st</sup> Year	6739
2.	2 <sup>nd</sup> Year	8221
з.	3 <sup>rd</sup> Year	11080
4.	4 <sup>th</sup> Year	13520
5.	5 <sup>th</sup> Year	15980
Maximum Proposed Production per		
year: 15980 tonnes (in 5 <sup>th</sup> year)		

## **1.4 ESTIMATION OF THE RESERVE**

Total demarcated Area- 6.864 ha

Area found suitable for mining- 6.864 Ha.

Geological Reserves-469369 tons

Mineable reserve at maximum allowable depth i.e. 24m Depth= 251277 tonnes As per the data collected & slice wise mineral assessment annual production quantity i.e. 15980 tonnes/annum at the end of fifth year (Maximum): rest of material available is planned as residue/waste material including Mining loss. (accordingly planned & backfilling & Plantation work).

## **1.5 PROJECT DESCRIPTION (Technology & Process)**

It will be opencast semi mechanized mine. The overburden & interburden shall be removed by means of excavator. The soapstone shall be extracted with the help of excavator as well as manually with the help of hand tools like crow bar; chisels, pickaxe, hammers, spade. Different grade of soapstone will be stacked separately near the mining faces. No drilling & blasting shall be required during the operation because soapstone is a soft mineral. The soapstone shall be dressed manually & stacked separately. No further beneficiation shall be undertaken during first five years. The different grade of soapstone will be filled into 50 kg plastic bags & transported the road side by mules.

The salient points of proposed method of mining are given below:-

- Mining shall be carried out in two pits.
- It will be open cast semi-mechanized method of working mine.
- Average thickness of soil has been considered as 0.20 m. & it shall be stacked separately.
- All the top soil, overburden & interburden shall be removed by means of excavators.
- Both height & width of benches shall be kept 6m and 8m.
- Face slope of benches shall be 68 with 38 overall pit slope.
- Backfilling will be undertaken after winning the soapstone up to full economical depth.
- The interburden and top soil will be temporarily dump separately towards the slope of working pit and shall be used for backfilling from third year onwards. Interburden shall be filled into

## 1.6 WATER SUPPLY

The water requirement will be around 8.62 About 0.31 KLD for domestic and 1.0 KLD will be required for dust suppression. Water for drinking purpose will be supplied from the Uttarakhand Jal Sansthan and naulla's of nearby villages. This water will be supplied by private tankers. For dust suppression and Plantation the water supplied from nearby private tankers

S.NO.	Ригрозе	Manpower/Area	Water Demand (KLD)	Source
1.	Drinking	Manpower (31) 31*10L =310 lpcd	0.31	Uttarakhand Jal Sansthan
2.	Plantation	3500 trees *2L =7000L	7.0	Private tanker
3.	Dust Suppression	Length= 100m Width= 5m Area= 100x5 =500m <sup>2</sup> 500*2L =1000 lpcd	1.0	Private Tanker
4.	Toilet	Manpower (31) 31*10L =420 lpcd	0.31	Private tanker
Total		020	8.62	

## **1.7 BASE LINE DATA**

This section contains the description of baseline studies of the 10 km radius of the area surrounding **"Bhataura Rankot Soapstone Deposit"**, **Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand** 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. Environmental data has been collected in relation to proposed mining for:-

- (a) Air
- (b) Noise
- (c) Water
- (d) Soil
- (e) Ecology and Biodiversity
- (f) Socio-economy

Baseline status		
The minimum and maximum level of PM10 recorded within the		
study area was in the range of $62.3\mu g/m3$ to $78.61 \ \mu g/m3$ with		
the 98 <sup>th</sup> percentile 78.2 $\mu$ g/m3. The minimum and maximum		
level of PM2.5 recorded within the study area was in the range of		
24.33µg/m3 to 38.57µg/m3 with the 98th percentile 38.16		
$\mu$ g/m3. The minimum and maximum concentration of SO2		
recorded within the study area was 6.2 $\mu$ g/m3 to 9.6 $\mu$ g/m3 with		
the 98th percentile 9.4 $\mu$ g/m3. The minimum and maximum level		
of NO2 recorded within the study area was in the range of was		
16.7 $\mu$ g/m3 to 19.2 $\mu$ g/m3 with the 98th percentile 18.9 $\mu$ g/m3.		
The results thus obtained indicate that the concentrations of		
PM10, PM2.5, SO2 and NO2 in the Ambient Air are well within		
the National Ambient Air Quality (NAAQ) standards for		
Industrial, Residential, Rural and other areas.		
The ambient noise level in study area during the day time varies		
from 44.46 to 39.42 dB(A) during day time and 42.63 to 35.66		
dB(A)during night which is within the specified limits of CPCB.		
Overall all the samples collected from the study area were found		
to be fit for consumption, Most of ground water samples are well		

	within the permissible limits, as per IS-10500. Most of the heavy		
	metals in all samples are below detectable limits.		
Soil Quality	In the study area, variations in the pH of the soil were found to be		
	slightly basic (7.16 to 7.56). Electrical conductivity (EC) is a		
	measure of the soluble salts and ionic activity in the soil. In the		
	collected soil samples the conductivity ranged from 268-333		
	μmhos/cm.		
	The soils with low bulk density have favorable physical condition		
	where as those with high bulk density exhibit poor physical		
	conditions for agriculture crops.		
	Based on the results, it is evident that the soils are not		
	contaminated by any polluting sources		
Ecology and Bio-	Based on the field studies and review of published literature, it is		
diversity	observed that there are two Schedules-I species present in the		
	study area of the mine lease area i.e. Indian Leopard and Asiatic		
	Black Bear. There are no wildlife sanctuaries and National Parks		
	within the study area of 10-km radius.		
Socio-economy	The implementation mining project will throw opportunities to		
	local people for both direct and indirect employment.		
	The study area is still lacking in education, health, housing, water,		
	electricity etc. It is expected that same will improve to a great		
	extent due to proposed mining project and associated industrial		
	and business activities.		

## **1.8 OVERALL JUSTIFICATION FOR THE IMPLEMENTATION OF THE PROJECT**

## **1.8.1 Sustainable Mining**

- Proposed mining project is an open cast mining where no drilling or blasting is required.
- The mining will commence from the higher levels and will advance towards lower levels. I
- Intermittent backfilling will commence from the higher levels and subsequently advance towards the lower elevation so that terraced agriculture fields would undertake in such a manner that original land use will be restored i.e. before the onset of monsoon will be handed over to cultivators for cultivation.

- The final backfilling will be started once the ultimate benches are formed and pit reaches the optimum economic depth. All recovery of the mineral will be of the saleable grade.
- Plantation will be raised in 7.5m barrier zone along the boundaries of the mining lease area by planting the native species around ML area, backfilled and reclaimed area, around water body, roads etc. in consultation with the local DFO/Agriculture department
- The mining will be carried out by using mechanized (OTFM) using EMM and Loaders etc.
- Mining at any case will not be carried out below the water table.
- Mining operation will be carried out in the day time only.
- The mine owner will carry out mining work as per UPMMCR, 1963 and under all the rules and regulations, term and condition laid down therein.
- No mining operation shall be carried out on at or to any point within a distance of 50m from any of railway line, reservoir, canal or other public works, such as roads and buildings or inhabited site.
- In order to reduce the noise pollution in the vicinity only PUC certified vehicles will be allowed for the transportation of minor mineral.
- Regular water sprinkling on haul roads & loading points will be carried out.
- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Adoption of Best Available Technology and Best Management Practices with more environmental friendly process; and With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

## **1.8.2 ENVIRONMENTAL BENEFITS**

✓ This activity promotes the emergence of the primary succession species; hence it is silvicultural operation extremely important for maintaining ecology and environment of the area.

#### **1.8.3 SOCIAL BENEFITS**

- ✓ Generates employment to the locals engaged directly in extraction of sand as well as indirectly transportation and sale of mineral.
- ✓ Leads to improvement in lifestyle and standard of living.
- ✓ Earns huge sum of revenue in the form of mineral royalty or dead rent for the State Exchequer.

#### **1.9 SOCIO-ECONOMIC PROFILE**

The implementation of the **"Bhataura Rankot Soapstone Deposit"**, will generate both direct and indirect employment. Besides, it will provide a check on existing system of mining operation. Since the quarries will be allotted on lease basis, mining operation will be legally valid and it will bring income to the state exchequer. It will also reduce flooding of river banks, destruction of standing crops, land and property to a great extent. The project will also provide impetus to industrialization of the area. At present agriculture is the main occupation of the people as more than half of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

#### **1.10 ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

Proper environmental management plan is proposed for **"Bhataura Rankot Soapstone Deposit"** to mitigate the impact during the mining operation.

- i. Care will be taken that no labour camps are allowed on river bed.
- **ii.** Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- **iii.** No lighting will be allowed in the area.
- **iv.** Prior to mining, short awareness program will be conducted for labours to make them aware to way of working.
- **v.** If some causality or injury to animal occurs, it will be informed to forest department and proper treatment will be given.

- **vi.** No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- vii. Maintenance of roads will be done from time to time.
- viii. Corridor movement of wild mammals (If exists) will not be disturbed.
  - **ix.** Care will be taken that noise produced during vehicles movement for carrying sand is within the permissible noise level.
  - **x.** No pilling of RBM material will be allowed in adjoining area.
  - **xi.** If wild animals are noticed crossing the river bed, they will not be disturbed or chased away, instead the labours will move away from their path.

## 1.11 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

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 will 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 for eco-friendly mining:

- **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 in 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.
- **d.** Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.
- **e.** Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every six months for first two years, thereafter once a year.

f. Plantation/afforestation as will be done as per program i.e. along the road sides and near civic amenities, which will be allotted by Government bodies as it is not feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every two years for evaluation of success rate. For selection of plant species local people will also be involved.

## 11.13 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

The EMP Cost is approx 7,02,000/-

## **11.14 MONITORING SCHEDULE AND PARAMETERS:**

S No	Description of Parameters	Schedule and Duration of Monitoring/Execution
1	Air Quality: a) In the vicinity of the mine b) In the vicinity of the transportation	24 hourly samples twice a week for one month in each season except monsoon season
	Network c) Dust suppression on roads	Regularly in non- monsoon months and whenever occurrence of fugitive dust takes place
	d) Scraping/ bulldozing of road to shift accumulated dust to the sides	Fortnightly
2	Water Quality near or around the site: a) Surface water quality b) Ground water quality	Once in a season for 4 seasons in a year
3	Ambient Noise Level	Twice a year for two years & then once a year
4	Soil Quality	Once in two years on project monitoring area
5	Inventory of Flora(tree plantation, survival etc) & Fauna	Once in two years on project monitoring area
6	Socio-economic condition of local, population, physical survey	Once in 3 years

## **Table 11.3 Monitoring Schedule and Parameters**

## **1.12 BENEFITS OF MINING**

## Improvement in the Social Infrastructure

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.
- There will be significant change in the socio-economic scenario of the area.

- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall the proposed project will change living standards of the people and improve the socio-economic conditions of the area.
- The project will provide employment to the local people

## 1.13 CONCLUSION

This Project will provide several benefits to the near **"Bhataura Rankot Soapstone Deposit"**, Area- 6.864 Ha, at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand by a proper planning and management. This project will employ most of the worker from nearby villages. Only supervisor Staff will be hired from outside. There will not be any increase in population due to the project. However, few people from other area may migrate in this area for business opportunities. During the operation of this project no adverse impact on the surrounding environment. So project is beneficiary for the surrounding village.

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#### Chapter -XII

#### **Disclosure of Consultants Engaged**

**Natureanalytica Envirocare Solutions Pvt. Ltd. (NESPL)** is a specialized consulting firm offering wide range of services in the field of Environmental studies, Environmental monitoring & analysis, Biodiversity studies, Socio-economic services, Legal advisory services in enviro-legislative issues, health and safety, Mining and Enviro-engineering services and Client's based research and development activities. NESPL is based in Udaipur, Rajasthan, India and having the network of associated Environmental laboratories & consulting organization fulfilling the all accreditations, recognitions and certifications requirements as required by statuary bodies and desired by our valued customers.

NESPL was set up to meet the requirements of nation in view of the new challenges, covering all aspects of Environment and Safety Management. Having gained extensive experience, it provides consultancy services to a very large customer base. We have a dedicated team of Experts, Professional Researchers, Scientists and Engineers to provide sustainable solutions to corporate in the field of Environment from start till end as per specific project requirements.

Our team of experts & professionals are committed to find best & sustainable solutions in the field of environment while maintaining quality standards and following the guidelines of all statuary bodies.

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NESPL is dedicated to provide eco-caring services for sustainability of Nature. We work with our clients to develop sustainable, practical and ethical solutions to the environmental challenges they face and add value to our client's businesses by delivering excellence and innovation.

NESPL has got accreditation of EIA consultant with Quality Council of India (QCI) /National Accreditation Board of Education and Training (NABET) (Certificate No.- NABET/EIA/2225/IA 0099, Valid till 15/06/2025.

#### DECLARATION BY EXPERTS CONTRIBUTING TO EIA REPORT

I, hereby certify that I was a part of the EIA team in the following capacity that developed the draft EIA for Environment Clearance for Draft EIA "Bhataura Rankot Soapstone Deposit", Area- 6.864 Ha , at Village: Bhataura Rankot Tehsil & District-Bageshwar, State- Uttarakhand of Shri Pushkar Lal Shah R/o-Village-Numaishkhet, Tehsil & Distt- Bageshwar (U.K)

#### EIA coordinator:

Name

: Dr. O P Shukla

Signature

ACO Period of involvement Contact Information

: Natureanalytica Envirocare Solutions Pvt. Ltd. : July 2022 to till date : <u>info.natureanalytica@gmail.com</u>

we

S.	Functional	Name of the	Involvement		Signature and data
No.	Area	experts	Period	Task	Signature and date
1	SHW	Dr. O. P. Shukla	July 2022 to till date	Involved in the preparation of final EIA/EMP report. Input in EIA/EMP report regarding Solid waste generation and their management.	German
	Team Member	Manisha Tanwar	July 2022 to till date	Assistance in preparation of final EIA/EMP report and suggesting mitigation measures.	Manyly
2	WP	Dr. O. P. Shukla	July 2022 to till date	Estimating water requirements based on population, suggesting wastewater treatment/disposal schemes.	German
3	АР	Rashmi Shrimali	July 2022 to till date	Involved in the preparationEIA/EMP report.Impactassessment,mitigation&environmentalmanagementplanpreparation.	Jastin

4	AQ	Rashmi Shrimali	July 2022 to till date	Analysis of collected baseline data, Processing of micrometeorological data and suggesting mitigation measures.	fartin
5	SE	Juned Khan Komal	March 2023 to till date	Baseline socio economic survey (Interviews, Questionnaires, focused group discussion) Input in EIA/EMP report regarding social impact study from relevant source of secondary data and their ground validation.	Act-
	Team Member	Priyanka Mishra	March 2023 to till date	Assistance in collecting secondary data and inputs in EIA report.	Privanka
6	LU	Juned Khan Komal	March 2023 to till date	Development of landuse maps of study area using GIS / related tools, site visit for ground truth survey, finalization of landuse maps	12 per
7	EB	Manisha Tanwar	July 2022 to till date	Generating the ground truthing ecological assessment with secondary data from different departments, earmarking rare and endangered species	Manyly
8	NV	Prakash Mal Jain	March 2023 to till date	Analysis of collected baseline data Input in EIA/EMP report regarding Noise pollution control measures.	l'Jain
	Team Member	Dr. O.P. Shukla	March 2023 to till date	Assistance in collecting baseline data and suggesting mitigating measures.	Growene
9	RH	PK Srivastava	March 2023 to till date	Identification of hazards materials, Fire accidents from Diesel storage and lethality damages, preparation of emergency preparedness plan.	Adum

	Team Member	Rashmi Shrimali	March 2023 to till date	Assistance in preparation of final EIA/EMP report and preparation of emergency preparedness plan, suggesting mitigation measures.	fastin
10	Geo	Manoj Nandwana	March 2023 to till date	Descriptionandassessment of Geology andimpact evaluationMitigation measures andremediation plan.	manna
11	HG	Manoj Nandwana	March 2023 to till date	DescriptionandassessmentofHydrogeology and impactevaluationMitigation measuresandremediation plan	renhour
12	SC	Sonali Singh	March 2023 to till date	Soil Quality monitoring network designing. Identification & assessment of quantum of soil pollution and its Mitigation measures.	Sonale fingh
	Team Member	Rashmi Shrimali	March 2023 to till date	Inputs in EIA report regarding soil quality management & mitigation measures for soil pollution.	fastin

