Initial Environmental Examination

Project Number: 47229-001
December 2016

IND: Uttarakhand Emergency Assistance Project

Subproject : Srinagar Water Supply System

Submitted by

Project Implementation Unit, Uttarakhand Jal Santhan, Jal Bhawan, Dehradun, Uttarakhand

Asian Development Bank

(Urban Water Supply Sector)
Uttarakhand Emergency Assistance Project (UEAP)
Uttarakhand Jal Sansthan
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GM/AS

Ref: 745 /PIU-UEAP/112/2016-17 Dated: 01 /12/2016

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To,

Country Director,
South Asia Department, India Resident Mission,
4 San Martin Marg, Chanakyapuri
New Delhi – 110021

Sub.: Loan No. 3055 IND – Uttarakhand Emergency Assistance Project (UEAP) – Urban Water Supply (UWS) – Updated Initial Environmental Examination (IEE) Report for Srinagar town.

Dear Ma'am,

Under the Uttarakhand Emergency Assistance Project (UEAP), rehabilitation & upgradation of damaged water supply works in Srinagar town in Uttarakhand are being taken up.

The works under the project are currently being implemented & are in the final stages of completion. As a next step towards modernisation of Urban Water Supply, we propose to take up rehabilitation of house connections along with metering of house connections as a pilot project in Srinagar town of Uttarakhand. In this regard the existing IEE of rehabilitation works in Srinagar has been updated incorporating the component of metering of house connections. It is being proposed that the implementation period of the works shall one year & Operation & Maintenance (O&M) phase shall be 7 year after implementation.

The updated Initial Environmental Examination (IEE) Report as above is being sent for your review & approval please.

Enclosure: As above.

Yours Sincerely

(Ashok Negi)
Dy. Program Manager
PIU- UEAP- UWS

Cc:

1. Program Director, PMU-UEAP, SIIDCUL Building, IT Park, Shastradhara road, Dehradun.
2. Program Manager, PIU-UEAP, UWS, Dehradun.

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Dy. Program Manager
PIU- UEAP- UWS

ADB

Project Number: 3055-IND
November: 2016

IND: Uttarakhand Emergency Assistance Project

Submitted by

Project implementation Unit, Urban Water Supply (UWS), UEAP, Dehradun

This report has been submitted to ADB by the Project implementation Unit, UEAP, Garhwal Mandal Vikas Nigam, Dehradun **and is made publicly available in accordance with ADB's** public communications policy (2011). It does not necessarily reflect the views of ADB.

Asian Development Bank

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Initial Environmental Examination

November 2016

India: Rehabilitation of Water Supply System of Srinagar under Uttarakhand Emergency Assistance Project

Prepared by State Disaster Management Authority, Government of India, for the Asian Development Bank.

This initial environmental (IEE) is a document of the State Disaster Management Authority, Government of Uttarakhand. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

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ABBREVIATIONS

ADB	Asian Development Bank
BOD	Bio Chemical Oxygen Demand
CO	Carbon Mono Oxide
CFE	Consent for Establishment
CH_4	Methane
CFO	Consent for Operation
DO	Dissolve Oxygen
dB	Decibel
IEE	Initial Environmental Examination
EA	Executing Agency
EIA	Environmental Impact Assessment
EC	Environmental Clearance
GoI	Government of India
GoU	Government of Uttrakhand
Ha	Hectare
H_2S	Hydrogen sulphide
HDPE	High Density Poly Ehylene
HFL	High Flood level
HPC	High Power Committee
Km	Kilometer
Leq	Sound level
Mg	Milligram
MFF	Multitranche Financing Facility
MoEFCC	Ministry of Environment & Forests and Climate Change
MLD	Million Litter Per day
Mn	Million
M	Meter
mm	Millimeter
mg/l	Milligram per Liter
m3	Cubic meter
NAAQM	National Ambient Air Quality Monitoring
NOx	oxides of Nitrogen
NA	Not Applicable
OUR	oxygen uptake rate
O & M	Operation and maintenance
PMU	Project Management Unit
PM_{10}	Particle size less than 10 µ
$PM_{2.5}$	Particle size less than 2.5 µ
PVC	Poly Vinyl Chloride
PWD	Public works Division
PIU	Project Implementation Units
RBF	River Bed Filtration
RCC	Reinforced Cement Concrete
RoW	Right of Way
RSPM	Respirable suspended particulate matter
RP	Rehabilitation Plan
SEIAA	State Environment Impact Assessment Authority
SPCB	State Pollution Control Board
UEPPCB	Uttaranchal Environmental Protection and Pollution

	Control Board
SS	Suspended Solids
SBR	Sequential Batch Reactor
SPM	Suspended Particulate Matter
SO_2	sulphur dioxides
ST	Scheduled Tribes
SC	Scheduled Castes
SOP	Standard Operational Procedures
UDD	Urban Development Department
UPJN	Uttaranchal Peya Jal Nigam
UJS	Uttaranchal Jal Sansthan
U.P	Uttar Pradesh
UPCL	Uttaranchal Power Corporation Limited
USDMA	Uttarakhand State Disaster Management Authority .
($\mu g/m^3$	Micro Gram Per Cubic Meter
%	Percentage

WEIGHTS AND MEASURES

Cm	-	centimeter
Crore	–	100 lakhs = 10,000,000
Lakh	–	100 thousand = 100,000
Km	–	Kilometer
Kph	-	Kilometer per hour
Lpd	–	liters per day
M	–	Meter
mg/l	–	milligrams per liter
Mm	–	Millimeter
MSL	-	Mean sea level
µ	-	10^{-6} meter
µg/m^3	–	micrograms per cubic meter
µS/cm	-	micro Siemens per centimeter
NTU	-	Nephalo turbidity unit
Ppm	–	parts per million

NOTE{S}

In this report, "$" refers to US dollars.
“INR” and “ ” refer to Indian rupees

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Executive Summary

1. Uttarakhand lies in the northern part of India amidst the magnificent Himalayas and dense forests. The State is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and shares international borders with Nepal and China. The State is comprised of 13 districts divided into two regions and also called administrative divisions; the Kumaon and Garhwal.

2. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. Infrastructure facilities like roads, power supply, communication, buildings, and water supply had been affected severely. Though the state government had taken up many steps to temporarily restore the facilities, it is envisaged to take up permanent measures to restore and rehabilitate the facilities.

3. The disaster impacted supply of water in terms of quantity and quality. There is a gap quantity of 8.4 MLD at delivery to the users after the disaster and it has also caused increase in turbidity. This is due to the damage of the supply infrastructure including RBF, pumps, reservoirs and distribution network.

4. To address the impact, new intake works (6 tube wells) with pumping station at higher level will be constructed. Raw water transmission main from proposed pump house to water treatment plant to be laid. Rehabilitation and augmentation of raw water pumping station, lift arrangement for motors at existing raw water puming station, rehabilitation and augmentation of CWPS and rahbilitation of three water treatment plants at Srinagar.The proposal also includes rehabilitation of office building at WTP site. Around 19 KM of ERW MS transmission mains to be re-laid in Srinagar and about 4 KM of MS ERW water supply transmission main to be re-laid in Srinagar including Pauri Town. Around 12 KM of distribution mains to be re-laid in Srinagar for areas near ITBP premises where huge silt deposition has been occurred during flash flood. 500KL & 1000KL capacities new storage reservoirs need to be constructed. One existing 950KL CWR needs to be rehabilitated. Around 500 house service connections need to be provided. The proposed works as stated above are under implementation. After the implementationof scheme under UEAP the service level shall improve to 135 lpcd level however it has been observed that present water connection are un-metered therefore it is difficult to assess the consumption and recovery of water charges further more in some areas the house connections are through drainage or sub lanes and are damaged therefore, supplying contaminated water. To improve the above system it is proposed for “Replacement of connection pipes for proper piping arrangement from water mains to consumer household upto the AMR meter and installation of AMR meter for proper consumer connections including remote reading of volumetric water consumptions.
5. IEE for the subproject was published in ADB website in November 2014. Due to change in scope of work of the subproject IEE of the subproject was again published in August 2015. Updated IEE submitted due to change in scope of work (3 RBF has been replaced by 6 tube wells) was approved by ADB in March 2016. Due to further change in scope (Replacement of connection pipes for proper piping arrangement from water mains to consumer household upto the AMR meter and installation of AMR meter for proper consumer connections including remote reading of volumetric water consumptions) this IEE has been updated to comply with the Environmental Assessment and Review

Framework (EARF) which is in consistent with the ADB's Safeguard Policy Statement (SPS) 2009.

6. Consistent with the Environmental Assessment and Review Framework, the proposed subporject were screened using ADB rapid environmental assessment (REA) checklist-of water supply. The environmental screening revealed that no protected or sensitive areas were traversed. All impacts are site specific; few are irreversible and can be readily mitigated supporting an environmental "Category B" classification.

7. IEE was conducted based on preliminary Detailed Design Report (DPR). The IEE covers all activities proposed under the project. The core zone of impact is taken as direct impact of the new construction or reconstruction or rehabilitation of the project component. IEE also covers the direct impact of the sub-project component. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio economic aspects.

8. **Baseline environmental data**. The pristine environment and sparse population suggest that most part of the State have a very good air quality while noise level is calm except in central part of the Srinagar town.The baseline of air quality, noise soil, surface water and ground water quality generated in April 2016 has been considered in this report. Secondary data for ecology collected from authentic sources has been used for preparation of this IEE

9. **Seismicity**. The State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the region is classified under high seismic zone IV.

10. **Forest.** Uttarakhand is ranked 9th in all-India in terms of forest covered area with 24,495 km^{2}of forestland The district of Pauri Garhwal, Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total. The State Govt. of Uttarakhand has declared the oak tree (*Quercus* sp.) as a *Kalpvriksha* or wish fulfilling divine tree often treated as the signature plant of the Kumaon Himalayas as numerous logos and insignias with a stylized version of the deodar inscribed on them.

11. **Sensitive Ecosystem.** The subproject location does not fall within any sensitive ecosystem. Neither the project component have direct intervention not indirect intervention with sensitive ecosystem.

12. **Significant Environmental** Impacts **and Proposed Mitigation Measures.** No environmental impacts related to siting were identified in the environmental examination. All components of subproject are existing, no components of subproject is located inside or near a cultural heritage site, protected area, wetland, mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity. There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact.The potential significant environmental impacts identified and assessed are related to construction time impacts.

13. **Information Disclosure, Consultation, Participation, and Grievance and Redress Mechanism.** Wide stakeholder consultation and participation was observed during the environmental examination of UEAP. Project affected communities, government institutions, and non-governmental organizations. Highlight of all consultations were

documented and applicable recommended measures particularly in minimizing shifting of structures, potential conflict with migrant workers, and competing demand for local resources were incorporated in the design and the environmental management plan. This IEE report will be disclosed in the ADB website pursuant to the Bank's *Public Communication Policy* and in the SDMA website.

14. **Environmental Management Plan**.The Environmental Management and Monitoring Plan (EMMP), to form part of the bidding documents, adopted the procurement package scheme and facilitate subsequent compliance monitoring by the contractor.

15. **Conclusion.** The environmental status of the proposed Rehabilitation of Water Supply System of Srinagar has been assessed. The overall conclusion is that if the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some benefits from recommended mitigation and enhancement measures, and major improvements in quality of life and individual and public health once the scheme is in operation. All required issues have been assessed to be best of our knowledge and no further studies are required to comply with ADB procedures or the laws of Government of India.

I. INTRODUCTION

A. Project Background/Rationale

1. Recent disaster of unprecedented floods in June, 2013 in the state of Uttarakhand, devastated many towns and villages on the banks of rivers Bhagirathi, Pindar, Mandakini, Alaknanda and Sarju. Infrastructure facilities like roads, power supply, communication, buildings, and water supply had been affected severely. Though the state government had taken up many steps to temporarily restore the facilities, it is envisaged to take up permanent measures to restore and rehabilitate the facilities.

2. Uttarakhand being a tourist and pilgrimage State, attracts a large number of tourist and pilgrims. A major disaster during 15-17 June 2013 resulted in severe damages in several parts of Uttarakhand, which has a mountainous terrain and a fragile geology. Several towns have been washed away by the unprecedented flash floods and landslides, and a large number of houses, public buildings, roads, bridges, urban, rural, and tourism infrastructure, power generation and distribution facilities have been damaged. The impact on the affected population due to the loss of connectivity has been manifold.

3. Based on the request of India, a Rapid Joint Damage and Needs Assessment (RJDNA) was undertaken by Asian Development Bank (ADB) and the World Bank. ADB agreed to assist the Government of India (GOI) with reconstruction and rehabilitation efforts for which the Uttarakhand Emergency Assistance (Sector) Project (UEASP) has been formulated as a multi-sector emergency loan in sector loan modality. The executing agency (EA) for the UEASP will be Government of Uttarakhand (GOU) and State Disaster Management Authority (SDMA). The primary implementing agencies (IA) will be Public Works Department (PWD) for roads, bridges, urban roads, and trekking routes including eco-trails Department of Tourism (DOT) for tourism infrastructure, Uttarakhand Civil Aviation Development Authority (UCADA) for helipads; and Uttarakhand Jal Sanstahan (UJS) for urban water supply, or any successor hereto. Some other state agencies such as Forest Department, Kumaon Mandai Vikas Nigam Limited, and Garhwal Mandai Vikas Nigam Limited are likely to be entrusted with some works under UEASP under these primary IAs.

B. The Uttarakhand Emergecy Assistance Project (UEAP)

4. In the month of June 2013 a severe flood and rain event occurred in Uttarakhand causing extensive damage to the state. The major affected areas are of Roads and bridges, Water Supply other infrastructure and livelihood. To assist in the rehabilitation works ADB decided to assist the Government of Uttarakhand in rehabilitating the various sectors. As part of this, ADB has provided a loan (No. 3055-IND) to the government of India. For smooth functioning of the various works **Uttarakhand Emergency Assistance Project (UEAP)** is devised.

C. The Uttarakhand Emergecy Assistance Project (Ueap) – Urban Water Supply

5. The UEAP will support the Government of India (GoI) and the Government of Uttarakhand (GoU) in their efforts to rehabilitate and reconstruct the damaged water supply system in 9 selected towns of Uttarakhand. The investment program will support:

(i) Water supply; and (ii) Planning and design, institutional and policy development, capacity building and creating awareness.

6. The Project Management Unit (PMU) of Uttarakhand Emergency Assistance Project (UEAP) created for implementation of the said project under the Government of Uttarakhand (GoU) and the Project Implementation Units (PIU), Uttarakhand Jal Sansthan (UJS) will be provided with necessary consulting services under the proposed loan to strengthen their project design, management and implementation capabilities including mainly engineering design and construction supervision. The work in this Project is of emergency nature and has to be finished within stipulated time, so as to provide drinking water to affected population. The Executing Agency (EA), State Disaster Management Authority (SDMA) will work closely with the Implementing Agency (IA) Uttarakhand Jal Sansthan

7. Total 09 towns, 06 towns of Garhwal Region (Srinagar, Devprayag, Rudraprayag, Gauchar, Karnprayag and Uttarkashi and 03 towns of Kumaun Region (Dharchula, Bageshwar & Kapkot) were selected for implementation of Assistance Project. For the additional metering works Srinagar town of Garhwal region has been proposed. Location of Srinagar town is shown in **Figure 1**

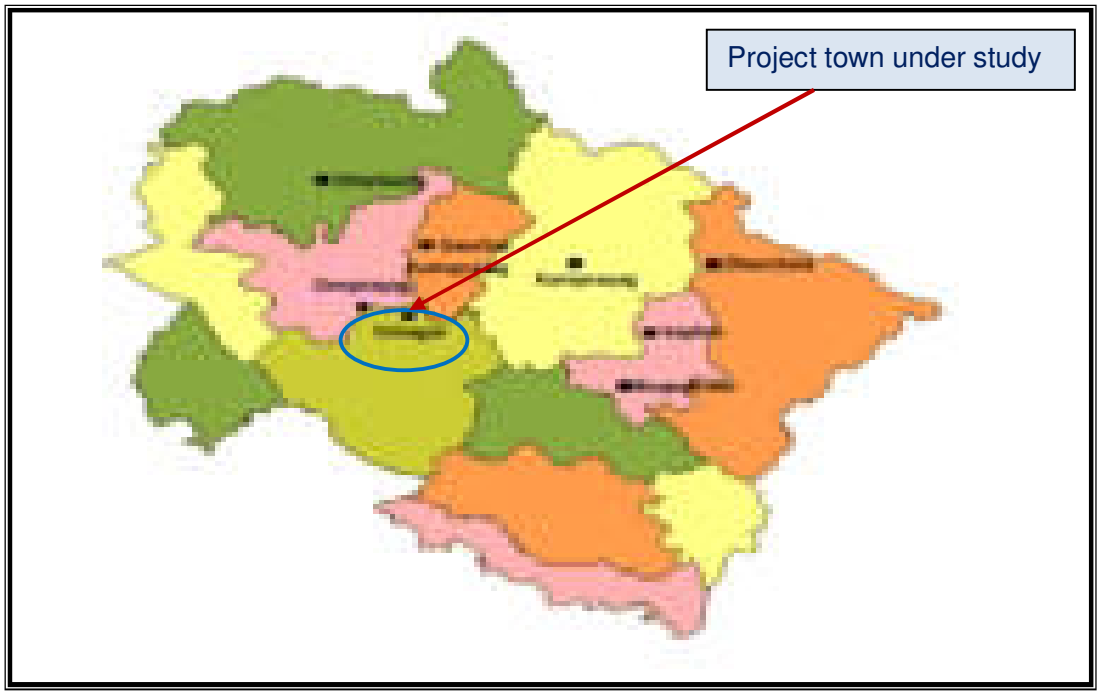


Figure 1: Location of the Project Town (source: www.Uttaranchal.org)

D. Purpose of the Environmental Assessment

8. The purpose of the study is to identify the environmental issues to be considered at project planning and design stage, assesses environmental consequences due to project intervention and suggests mitigation measures to minimise the adverse environmental impacts, if any, associated with construction and operation.

9. Consistent with the Environmental Assessment and Review Framework, the proposed subporject were screened using ADB rapid environmental assessment (REA) checklistof water supply. The environmental screening revealed that no protected or sensitive areas were traversed. All impacts are site specific; few are irreversible and can be readily mitigated supporting an environmental "Category B"[1] classification as per ADB Safeguard Policy Statement (2009).

10. Initial environmental examination (IEE) has four basic objectives; (i) asses relevant potential impacts and risks associated with the proposed rehabilitation of Water Supply system, (ii) assess the compliance with ADB environmental safeguard requirements and applicable environmental laws, (iii) incorporate mitigation measures in the project design, (iv) preparation of environmental management and monitoring plan.

E. Updated IEE and Extent of IEE

11. IEE was conducted based on preliminary Detailed Design Report (DPR). The IEE covers all activities proposed under the project. The core zone of impact is taken as direct impact of the new construction or reconstruction or rehabilitation of the project component. IEE also covers the direct impact of the sub-project component. Assessment is carried out for all components of environment covering terrestrial and aquatic ecology, soil, water, noise and socio economic aspects. IEE for the subproject was published in ADB website in November 2014. Due to change in scope of work of the subproject IEE of the subproject was again published in August 2015.. Updated IEE submitted due to change in scope of work (3 RBF has been replaced by 6 tube wells) was approved by ADB in March 2016. Due to further change in scope[2] (Replacement of connection pipes for proper piping arrangement from water mains to consumer household upto the AMR meter and installation of AMR meter for proper consumer connections including remote reading of volumetric water consumptions) this IEE has been updated to comply with the Environmental Assessment and Review Framework (EARF) which is in consistent with the ADB's Safeguard Policy Statement (SPS) 2009.

F. IEE Content

12. The IEE has been largely structured as per SPS, 2009 ADB's Environmental Assessment Guidelines (2003) and environmental safeguards- A Good Practice Source Book (December 2012). This includes following eight chapters including this introduction Chapter.

Chapter 1- Introduction
Chapter 2- Policy, Legal and Administrative Framework
Chapter 3- Description of Project
Chapter 4- Description of Environment
Chapter 5- Anticipated Impacts and Mitigation Measures
Chapter 6- Information Disclosure, Consultation, and Participation
Chapter 7- Grievance Redress Mechanism
Chapter 8 - Environment Management Plan and
Chapter 9 Conclusion and Recommendation

[1] *A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE) is required.*

[2] *Refer Updated sub-project appraisal report submitted by UJS on 28th October 2016 and approved by ADB on 4th November 2016*

G. Methodology

13. The following key steps were followed in this study:

- review of legal requirements,
- reconnaissance survey for identification of key issues data requirement and preliminary consultation,
- primary and secondary data collection,
- impact assessment,
- consultation with stakeholders,
- identification of impacts and mitigation measures,
- and institutional review
- Prepare Environment Management Plan
- Integration of safeguard measures with bid document

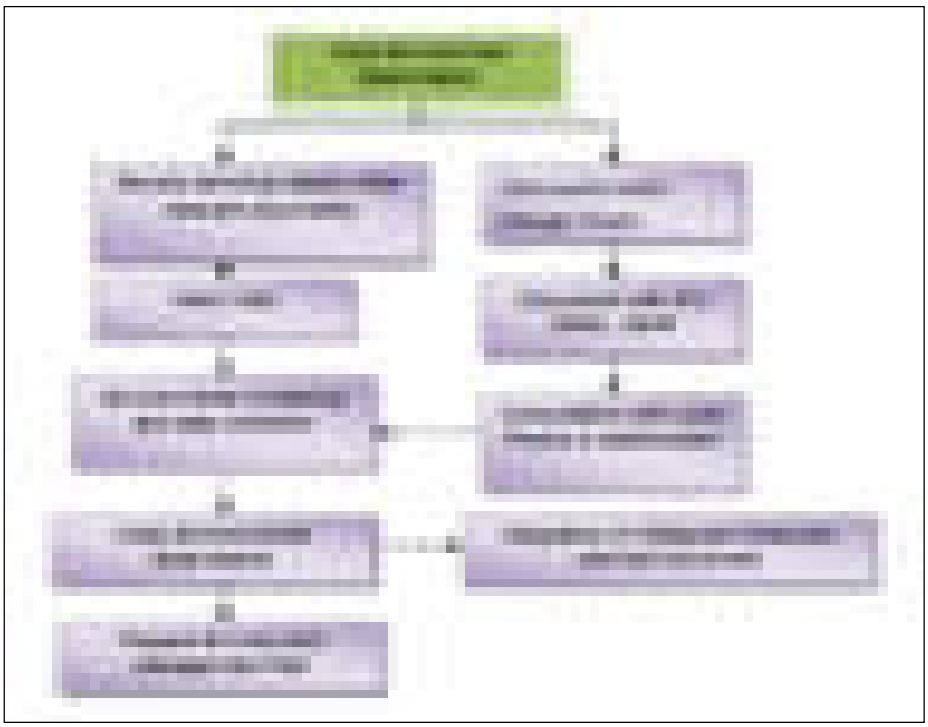


Figure 2: Methodology for IEE preparation

H. Public Consultation

14. Extensive consultations were held with all stakeholders' that includes: local residents, Gov't. Departments / agencies, other water users, and NGOs with intent to collect baseline information, for better understanding of the potential impacts and appreciate the perspectives/concerns of the stakeholders. Key information gathered were integrated in project design and used in formulating mitigation measures.

I. Scope of the Study for this Subproject

15. This report contains the Initial Environmental Examination (IEE) for the rehabilitation of water supply system of Srinagartown in Pauri Garhwal district of Uttarakhand state in India (Figure 3). It discusses the potential environmental impacts and mitigation measures relating to the location, design, construction and operation of physical works proposed under the subproject in package UK/UEAP-WSS- GW / 02

Package UK/UEAP- WSS- GW / 02 consists of following components -

To restore the water supply to the consumers as per standard level, the existing system needs rehabilitation and augmentation, which are outlined below:

- Rehabilitation of raw water pump house
- Replacement of damaged raw water Pumps and Motors.
- Providing and fixing trolley / lifting arrangement for Raw water pump house and clear water pump house (conversion of old DG room)
- Supply and installation of New Raw Water Pumps in Raw water Pump House
- Rehabilitation of 6 MLD Water Treatment Plant.
- Rehabilitation of 2.0 MLD Water Treatment Plant.
- Rehabilitation of 3.75 MLD Water Treatment Plant.
- Supply and Installation of Clear Water Pumps in 6 & 3.75 MLD Treatment Plant Pump Houses.
- Construction of 6 nos tube wells near the banks of River Alaknanda.
- Supply and installation of Submersible pumps for tube wells.
- Construction of 500KL RCC Sump and Clear Water Pump House at Tube well site.
- Supply and laying Clear Water Transmission Main from Proposed Pump House.
- Supply and installation of clear water pumps at Tube wellsite.
- Construction of Office Cum Staff Quarters building at existing WTP premises.
- Supply and laying Clear Water Transmission Mains from existing WTP to various reservoirs.
- Construction of New Clear Water Storage Reservoirs of 500KL & 1000KL Capacities.
- Supply and laying of distribution pipelines.
- Supply and Installation of Sluice valves.
- Supply and Installation of Air valves.
- Supply and Installation of Bulk Water Meters.
- Supply and Installation of Scour Valves.
- Construction of RCC Valve Chambers and Thrust Blocks / Anchor Blocks.
- Providing and fixing House Service Connections.
- The road restoration in the town is arising out of the works of water supply pipelines only. These restorations will be incidental to the locations some where it will require to cut black top and some places it will be side of the road.
- Installation of 6 tubewells on the bank of river Alaknanda
- Replacement of connection pipes for proper piping arrangement from water mains to consumer house up to the AMR meter
- Supply and installation of AMR water meter for Domestic & Non-Domestic water connections in Srinagar.

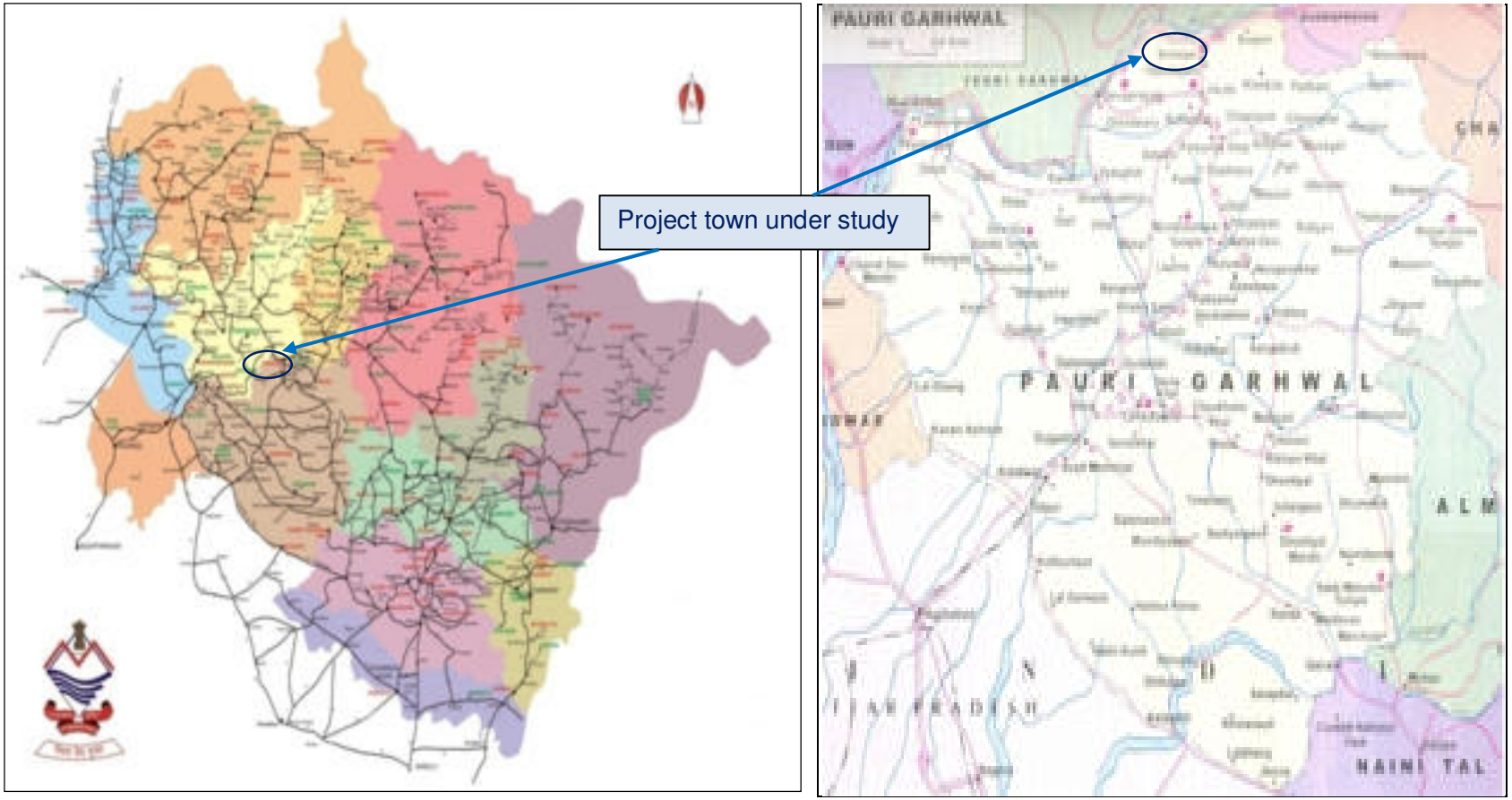


Figure 3: Location of the project town in Uttarakhand state **Location of the project town in Pauri Garhwal district**

II. Policy, Legal and Administrative Framework

16. The legal framework of the country consists of several acts, notifications, rules and regulations to protect environment and wildlife. In 1976, the 42nd Constitutional Amendment created Article 48A and 51A, placing an obligation on every citizen of the country to attempt to conserve the environment. Specifically for the UEAP, the following environmental laws and regulations are applicable:

Table II-1: Applicable Environmental National and State Requirements for UEAP

Sl. No.	Clearances	Acts/Rules/Notifications/Guidelines and Application to Water Supply Projects	Concerned Agency	Applicable to Contract package	Responsibility	Status of Compliance
A. Pre-construction Stage						
1	Environmental Clearance	**EIA Notification, 2006 amended till date, promulgated under Environment (Protection) Act 1986** It delineates the steps required for obtaining Environmental clearance. As per the notification, a list of projects in the Schedule of the notification, requiring Environmental Clearance from regulatory agencies at the State or Central government level has been provided.It also provides for categorization of projects into category A and B, based on the threshold limits of the project as provided in the schedule of the notification.	State Environmental Impact Assessment Authority (SEIAA). If not constituted then MoEFCC.	No	IA / PMU	Not required
2	Forest Clearance for felling of trees and acquisition of forest land for widening.	**Forest Conservation Act (1980) and Rules 2003 & 2004:** This act provides guidelines for conservation of forests and diversion of forest land for non-forest use. The law also states guidelines on de-reservation of various categories of forests for diversion of forest land. This law describes the penalty for contravention of the provisions of the Act. Restriction on the dereservation of forests or use of forest land for non-forest purpose. i) If the forest land exceeds 20 hectare then prior permission of Central Government is required; ii) if the forest land is between 5 to 20 hectare, then permission form the Regional Office of Chief Conservator is required; iii) If the forest land is below or equal to 5 hectare the State	District Level Committee constituted by the State Govt.	No (No felling of trees or diversion of forest land required)	IA / PMU	Not Required

		Government can give permission. If the construction area is more than 40% forest, permission to undertake any work is needed from the Central Government, irrespective of the size of the area. MoEF issued soecific guidelines in July 2013 for state of Uttarakhand for expediting forest cleatrances to carry out the emergency work in forest areas (excluding works in national parks and sanctuaries) vide no 11-298/2013-FC Dated 24.07.2013				
3	Wildlife department clearences	**The Indian Wildlife (Protection) Act, 1972, as amended till 2006** This Act provides guidelines for protection of [Wild animals, birds and plants] and for matters connected therewith or ancillary or incidental thereto. It also states the norms for hunting of wild animals, prohibition of picking, uprooting, etc., of specif ied plants. The Act deals with the declaration of area as Sanctuary, National Park, and closed area and also states the restriction of entries in the sanctuary. The 2002 Amendment Act which came into force in January, 2003 have made punishment and penalty for offences under the Act more stringent.	National Board for Wildlife	Not Applicable to contract package All activities of project are well outside from the boundary fence of the wildlife sanctuary. The nearest wildlife sanctuary is Kedarnath Wildlife Sanctuary which is about 100 km away from the project components)	IA/PMU	Not required
4	Clearences required for using biological resources	**Biodiversity Act 2002 and Biodiversity Rules 2004:** The Act essentially controls access to indigenous biodiversity resources. No agency/person shall, without previous approval of the National Bio-diversity Authority, obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.	Uttarakhand Biodiversity Board.	Not Applicable for the subproject	IA/PMU	Not required
5	Permission to carry out construction activities in the sites of Archaeological Importance	**The Ancient Monuments and Archaeological Sites and Remains Act, 1958, and the rules, 1959:** The Act provides guidance for carrying out activities, including conservation, construction and	State Level Committee constituted by the Central Govt.	No	IA/PMU	Not required

		reuse in and around the protected monuments Project site is not an ASI protected monument and there are no any monuments of this nature within the jurisdiction.				
B. Implementation Stage						
6	Permission for Sand Mining from river bed	**Mines and Minerals (Regulation and Development) Act, 1957 as amended in 1972** **EIA notification amended on15 , January 2016**	River Board Authorities/ Department of Mining Govt. of Uttarakhand District Environment Impact Assessment Authority	No	Contractor	Contractor will obtain the consents from appropriate authority
7	Consents to establish & operate Water Treatment Plants	**Water (Prevention and Control of Pollution) Act, 1974 and as amended in 1978, 1988 and 2003;** **Water (Prevention and Control of Pollution) Cess Act was enacted in 1977;** **The Air (Prevention and Control of Pollution) Act, 1981 as Amended in 1987 and Air (Prevention and Control of Pollution) Rules, 1983** The Water (Prevention and Control of Pollution) Act was enacted in 1974 to provide for the prevention and control of water pollution, and for the maintaining or restoring of wholesomeness of water in the country. The Water (Prevention and Control of Pollution) Cess Act was enacted in 1977, to provide for the levy and collection of a cess on water consumed by persons operating and carrying on certain types of industrial activities. This cess is collected with a view to augment the resources of the Central Board and the State Boards for the prevention and control of water pollution constituted under the Water (Prevention and Control of Pollution) Act, 1974	Uttarakhand Environmental Protection and Pollution Control Board – Dehradun	**No**	IA/PMU	Not required due to minor maintenance and repairing work caused by the Disaster of June, 2013.
8	Authorization for Disposal of Hazardous Waste	Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and Hazardous Waste (Management, Handling	Uttarakhand Environmental Protection and Pollution	No	Contractor	

		and Transboundary Movement) Fourth Ammendments Rules, 2010	Control Board – Dehradun			
9	Consent for Disposal of Sewage from Labour camps	Water (Prevention and Control of Pollution) Act 1974	Uttarakhand Environmental Protection and pollution Control Board – Dehradun	No	Contractor	
10	Use of Fly ash within 100 kms around Thermal Power plants	Fly Ash Notification, 1999 as amended 03.11.2009	MoEFCC	No	Contractor	
11	Pollution Under Control Certificate	Central Motor and Vehicle Act 1988 and Central Motor and Vehicle Rules,1989 amended till 2013	Department of Transport, Govt. of Uttarakhand	Yes	Contractor	
12	Installation of Generators	The Air (Prevention and Control of Pollution) Act, 1981 as Amended in 1987 and Air (Prevention and Control of Pollution) Rules, 1983	UEPPCB	No	Contractor	
13	Employing Labour/ workers	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 & The Building and Other Construction Workers Related Laws (Amendment) Bill, 2013	District Labour Commissioner	Yes	Contractor	
14	Permission for extraction of boulder and sand from river beds	Mines & Minerals (Regulation and Development) Act, 1957 and its amendements in1958, 1972, 1986, 1994,1999 & 2010	Department of Mines and Geology. Government of Uttarakhand	Yes	Civil Work Contractors	
15	License for Storing Diesel and other explosives	Petroleum Rules, 2011. Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and Hazardous Waste (Management, Handling and Transboundary Movement) Fourth Ammendments Rules, 2010	Commissioner of Explosives and UEPPCB – Dehradun	No	Contractor	

III. DESCRIPTION OF THE PROJECT

A. Project Location

17. The sub project is the rehabilitation of water supply system of Srinagar town in Pauri Garhwal district of Uttarakhand state in India (Figure 2). Srinagar is a town and a municipality at Pauri Garhwal district. Srinagar is located at 30.22°N 78.78°E.[1] at the left bank of Alaknanda river. It has an average elevation of 560 metres (1,837 feet). It is the largest city in the Garhwal Hills. It is reached by national highway NH58 from Rishikesh, Srinagar is about 100 km from Rishikesh which is the last city on the plains of Uttarakhand and from where the mountains start.Today the town is an important cultural and educational centre. Being placed in central Garhwal at a moderate height, it is an important Valley Bazar in the hills. It has a number of temples and monuments and places for tourists to stay.

B. Proposed Category of the Project

18. Pursuant to the requirements of the ADB Safeguard Policy Statement (2009) proposed rehabilitation of water supply system in Srinagar was screened to identify significance of potential impacts, determine the environmentally sensitive component, establish the needed level of assessment, and prescribe the information disclosure and consultations requirement to be complied by the Uttarakhand-Jal Sansthan. Consistent with the Environmental Assessment and Review Framework, the subproject was screened using the ADB rapid environmental assessment (REA) checklist- Water supply.

19. The environmental screening revealed that no protected or sensitive areas were traversed. There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact. All being hill town, the most significant environmental impacts are potential increase in erosion, siltation, and landslide.

20. Existing water supply system in Srinagar is proposed to be rehabilitated post disaster and no additional infrastructure is proposed. All impacts are site specific, and all impacts can be readily mitigated supporting a Category B classification.

C. Background of the Proposed Sub-project

21. The water supply system of Srinagar is severely damaged during the floods in June, 2013 affecting the supply to the Public. The raw water pumping station and 6 tube wells based on river bank filtration method*[1] were completely submerged. The tube wells along with the generator set were completely silted and are presently inoperable. In addition, the scheme is quite old and facing production problems due to high turbidity in monsoons and inadequate quantity for pumping from the river in summer. As per the damage assessment report of UJS, the average per capita supply is about 85 lpcd after damages due to floods, on temporary restoration of the scheme. The current service is much lower than the desired level (135 lpcd).

Figure – 4: Project Location in Srinagar

Plate -1 Srinagar project town

Table 0-1: Demand and Supply Gap Parameters

S.No.	Parameter	Demand	Supply before damage	Supply after damage	Gap/ Need for the project
1	Surface water quality after treatment	As per CPHEEO permissible limit is 10 NTU. No turbid appearance.	Turbid water even after treatment in monsoon, as reported by public.	Turbid water even after treatment in monsoon, as reported by public.	More efficient Treatment units
2	Water Production	13.5 mld (year 2013)	11.42 mld	9.25 mld (Surface water).	4.25MLD gap
3	System Leakage	15 %	25% (assumed)	25% (assumed)	More hydraulically efficient
4	Delivery	13.5 mld (year 2013)	8.5mld	5.10 mld	8.40 mld gap
5	Per Capita Demand	135 lpcd	104 lpcd	85 lpcd	Rehabilitation of distribution
6	UFW	20%	45%	45%	More hydraulically efficient
7	Reservoir capacity	6.60 ML	3.83 ML	3.83 ML	2.2 ML gap
8	Distribution Lines	50.75 km	32.5	28.5 km	Approx 22km of distribution line.
9	Supply hours	24 hours per day	7-8 hours per day	4-6 hours per day	Requirement of new system to increase supply
10	Coverage	100 % coverage	85%	70%	Requirement of new system to increase
11	Power Availability	20 hours per day	16 hours per day	10-12 hours per day	Dedicated power supply required

(Source: Project report of the project)

Main reasons of Gap:

Impact due to floods

- Motors for raw water pumps were submerged.
- During monsoons, submergence of raw water pumps.
- Tube wells based on river bank filtration technology were damaged.
- The present system is restored and being managed on ad-hoc basis and may not withstand any similar flooding in future.
- In the town, certain areas are still silted up and regular water supply is not available to the residents of this area.

Other Reasons

In addition to the above, the following are the other reasons, which need attention, while taking up the proposed project.

- Water resource constraint
- During summer, water level in the river reduces and the existing centrifugal pump sets are inefficiently operated due to higher suction lift resulting in reduced discharge. Water availability is limited at 9.25 mld at the WTPs against present required demand of 13.5 mld.
- Deterioration of Existing facilities
- The current WTPs design capacity is 11.75 mld but running at 9.25 mld due to deterioration of the plants and machineries.
- The existing distribution system is very old primarily laid during 1979 to 1990s, leading to leakages and transmission losses.
- The Clear Water Reservoirs (CWR) are old. Oldest was constructed during year 1989. The available capacity is 3.83 ML against requirement of 4.8 ML.

Inappropriate planning

- No initiative for augmentation of surface water abstraction.
- The distribution network is deficient in effective hydraulics.

Poor O&M

- High transmission loss
- The efficiencies of pumping machinery and transformers are deteriorated

Funds constraint

- Low budget allocation for water supply rehabilitation and augmentation

D. Description of key rehabilitation and reconstruction activities

22. To restore the water supply to the consumers as per standard level, the existing system needs rehabilitation and augmentation, which are outlined below:
    - Rehabilitation of raw water pump house
    - Replacement of damaged raw water Pumps and Motors.
    - Providing and fixing trolley / lifting arrangement for Raw water pump house and clear water pump house (conversion of old DG room)
    - Supply and installation of New Raw Water Pumps in Raw water Pump House
    - Rehabilitation of 6 MLD Water Treatment Plant.
    - Rehabilitation of 2.0 MLD Water Treatment Plant.
    - Rehabilitation of 3.75 MLD Water Treatment Plant.
    - Supply and Installation of Clear Water Pumps in 6 & 3.75 MLD Treatment Plant Pump Houses.
    - Construction of 6 nos tube wells near the banks of River Alaknanda.

- Supply and installation of Submersible pumps for tube wells.
- Construction of 500KL RCC Sump and Clear Water Pump House at Tube well site.
- Supply and laying Clear Water Transmission Main from Proposed Pump House.
- Supply and installation of clear water pumps at Tube wellsite.
- Construction of Office Cum Staff Quarters building at existing WTP premises.
- Supply and laying Clear Water Transmission Mains from existing WTP to various reservoirs.
- Construction of New Clear Water Storage Reservoirs of 500KL & 1000KL Capacities.
- Supply and laying of distribution pipelines.
- Supply and Installation of Sluice valves.
- Supply and Installation of Air valves.
- Supply and Installation of Bulk Water Meters.
- Supply and Installation of Scour Valves.
- Construction of RCC Valve Chambers and Thrust Blocks / Anchor Blocks.
- Providing and fixing House Service Connections.
- The road restoration in the town is arising out of the works of water supply pipelines only. These restorations will be incidental to the locations some where it will require to cut black top and some places it will be side of the road.

Supply and installation of New Raw Water Pumps in existing Pump House

23. To Supply raw water to existing treatment plants during high flood period during which low level pump house will be under shut down, 3 Nos of Pump with motors each for separate WTPs is proposed under this project without stand by provision since these Pumps operate only in occasional period and for less duration only during high flood period.

Table III-2: Proposed Raw Water Pumps in existing raw water Pump House

Sl. No.	Pump discharge in Cum/hr	Head in m	HP	Type of Pump	Hours of operation of each in 24 hours	Pumping to
1	270	50	75	Horizontal split casing Centrifugal (1W + 1S)	24	6 MLD WTP
2	90	50	25	-do-	24	2 MLD WTP
3	240	50	50	-do-	24	3.75 MLD WTP

(Source: Project report of the project)

6 MLD Water Treatment Plant

24. The rehabilitation/upgradation works identified for the WTP can be summarized as follows:

- Providing Alum dosing system with dosing tanks, mixers.
- Introduction of PVC tube settlers in settling tanks.
- Providing actuators to the associated filter valves for automation of filter backwashing.
- Providing field instruments for filters such as Loss of head indicator, Rate of flow transmitter, Pressure transmitter for air line, Backwash tank level transmitter.
- Providing Chlorination system for disinfection.
- Repair/ Replacement of valves which are not in working condition
- Leak arresting in units such as in Settling tanks
- Providing flow meter at treated water outlet
- Providing level transmitter at Clear water reservoir
- Providing online analyzers for monitoring of pH, turbidity, residual chlorine, nitrates, chlorides, sulphate, fluoride, iron, calcium
- Plastering and painting of various units

2 MLD Water Treatment Plant

25. The rehabilitation/upgradation works identified for the WTP can be summarized as follows:

- Providing Alum dosing system with dosing tanks, mixers.
- Replacement of asbestos sheets in Pre-settling tanks by PVC tube media.
- Replacement of filter sand in the Rapid sand filters
- Providing actuators to the associated filter valves for automation of filter backwashing.
- Providing field instruments for filters such as Loss of head indicator, Rate of flow transmitter, Pressure transmitter for air line, Backwash tank level transmitter.
- Providing Chlorination system for disinfection.
- Repair/ Replacement of valves which are not in working condition
- Leak arresting in units such as in Settling tanks
- Providing flow meter at treated water outlet
- Providing level transmitter at Clear water reservoir
- Providing online analyzers for monitoring of pH, turbidity, residual chlorine, nitrates, chlorides, sulphate, fluoride, iron, calcium
- Plastering and painting of various units

3.75 MLD Water Treatment Plant

26. The rehabilitation/upgradation works identified for the WTP can be summarized as follows:

- Providing Alum dosing system with dosing tanks, mixers.

- Replacement of inlet and outlet pipes of Pre-settling tanks.
- Replacement of filter sand in the Rapid sand filters
- Providing actuators to the associated filter valves for automation of filter backwashing.
- Providing field instruments for filters such as Loss of head indicator, Rate of flow transmitter, Pressure transmitter for air line, Backwash tank level transmitter.
- Providing Chlorination system for disinfection.
- Repair/ Replacement of valves which are not in working condition
- Leak arresting in units such as in Settling tanks
- Providing flow meter at treated water outlet
- Providing level transmitter at Clear water reservoir
- Providing online analyzers for monitoring of pH, turbidity, residual chlorine, nitrates, chlorides, sulphate, fluoride, iron, calcium
- Plastering and painting of various units

Clear Water Pumps

27. Clear Water Pumps of 6MLD and 3.75 MLD WTP Pump houses are proposed to be replaced since these are very old and outlived their life. All clear Water pumps will be in 1 Working + 1 Standby arrangement.

28. Following pumps are proposed to be installed at clear water pumping stations which is outlined in the below table:

Table III-3: Duties of Proposed Clear Water Pumps

Sl. No.	Pump discharge in LPM	Head in m	HP	Type of Pump / Nos	Hours of operation of each in 24 hours	Pumping to
	For 6.0 MLD WTP Pump House					
1	700	400	125	Horizontal split casing Centrifugal, 2 nos (1W + 1S)	24	Birla Campus & Base Hospital
2	700	320	120	-do-	24	Chauras Campus
3	700	480	150	-do-	24	Khola Tank
4	2000	75	50	-do-	24	850KL Tank
5	750	250	100	-do-	24	2.0 MLD for Pauri
6	750	250	75	-do-	24	1.5 MLD for Pauri
	For 3.75 MLD WTP Pump House					
7	2000	205	150	-do-	12	950 KL Tank
8	1100	260	100	-do-	12	Dang Tank
9	2000	75	60	-do-	12	180 KL Tank

(Source: Project report of the project)

6 nos tube wells (in place of 3 Infiltaration well)

29. Srinagar town is suffering from an acute shortage of drinking water. The traditional systems of harvesting drinking water from shallow sub-surface capillaries are unable to meet the needs of the ever growing population and every summer season water crisis is clearly evident in the town. During project preparation, three RBF wells are proposed to be constructed near Govt. ITI College Premises. But during construction of the infiltration wells hard rock was encountered at a depth of 13m. 6 nos. of tube wells has been proposed by the High Power Committee of USDMA vide minutes of meeting ref 336/PMU/2015 dated 18.12.2015, inplace of earlier proposed 3 nos of infiltration well on the bank of river Alaknanda due to encounter of rock at 13m depth. Closure and reclamation of the area dug for the construction of the infiltration well is recommended before starting the construction of the tube wells.

30. Water quality of the near by tubewells in the same location were collected from the UJS[3]. Test results indicate the fact that the water is fit for drinking . But chlorination has been recommended as it will be supplied through public water supply system so that it should meet the user end chlorine concentration.

Sump and Clear Water Pump House at Infiltration Well

31. From Tube Wells (TW-1, TW-2 , TW-3,TW-4 ,TW-5 and TW-6), water will be pumped to a proposed 500KL clear water sump through submersible pumps, since submersible pumps cannot pump water directly up to various clear water reservoirs due to high head of pumping. 1.5 hour detention time is considered to arrive at the capacity of the proposed sump from which water will be further pumped to various CWRs through centrifugal pumps which are proposed to be installed at clear water pump house which is proposed to be constructed next to the proposed sump.

Clear Water Transmission Main from Proposed Pump House

32. 300mm dia ERW MS Pipeline is proposed to be laid up to the proposed CWR of capacity 500KL at Dang for a length of around 600 Meters, again from the same CWR pipeline is proposed to be laid up to the proposed CWR of capacity 1000KL at Old Jalkal for a length of 2400 Meters.

Clear Water Pumps

Table III-4: Duties of Proposed clear water Pumps for Tube well Pump House

Sl No.	Location	Location	Type of Pump	Discharge (LPM)	Head (M)	HP	Hours of Pumping
1	For Clear Water Pump House	Nr. Govt. ITI College	Horizontal split casing Centrifugal (1W + 1S)	4800	170	185	24

(Source: Project report of the project)

Office cum Staff Quarters Building

33. The office building cum quarters for UJS officials is also to be constructed in this project as the existing building got damaged due to heavy rain.

[3] Refer appendix 3

34. The building would be of two storeys' (G+1) and of total plinth area of 200 sq. m. (100+100). The preliminary design of building is based on Seismic Zone-5 and assumed SBC of 8 t/m2. The specification of building is as per Delhi Plinth Area specification for normal building. The structure shall be constructed only after reconfirming the actual SBC value at the required location.

Clear Water Transmission Mains

35. The existing clear water transmission mains are damaged due to flood and land slips at few locations in the Pauri rising main and few transmission mains are leaking extensively since these pipelines are old. Hence, relaying of transmission mains / rising mains considered and only limited to damage repair at few locations to bring back the water supply system for normal functional and to supply water to the public as per the required standards.

Clear Water Reservoirs

36. The present storage reservoirs capacities in the town is 3915KL and present & at design year the required storage capacities will be 920 KL and 1270 KL to store the water at 8 hours of the daily demand. Hence, 500KL and 1000KL CWRs are proposed for construction at Dang village and Old Jalkal respectively.

Distribution Pipelines

37. The Town distribution pipelines are very old and leaking extensively which needs total replacement of distribution pipeline. But this project is taken up to provide the relief only on emergency basis, entire replacement of distribution pipeline s is not considered but limited to repair work where the pipeline is damaged and new laying at ITBP area where existing distribution networks are buried under the silt.

Valves, Water Meters

38. For ease of O&M sluice valves for controlling of water supply, scour valves for cleaning the pipeline periodically, Air valves to expel Air from the pipeline and improve the carrying capacity of the pipeline, water meters to measure the quantum of water produced and utilized are considered to be installed under this project. The below table shows the location and diameter of valves which are considered under this project.
House Service Connections

39. Wherever new distribution pipelines are proposed to be laid as a replacement to damaged / buried distribution pipelines due to flood, house service connections need to be provided from the distribution main up to property limit for which provision has been made in this DPR to provide around 500 house service connections in the town as per the attached drawing.

Rehabiltation of House connections and water metering

40. The proposed works as above are under implementation. After the implementation of scheme under UEAP the service level shall improve to 135 lpcd level however it has been observed that present water connection are un-metered therefore it is difficult to assess the consumption and recovery of water charges further more in some areas the house connections are passing through drainage or sub lanes and are damaged therefore, supplying contaminated water. Hence it is essential to lay branch line and meter all the water connections to ensure supply of potable water. Current Scenario of Water Connections are- Buried Corroded old pipes crossing drains., Leakage and contaminated drinking water, Leakages reduce the pressure in line and consumer dissatisfaction,

Difficult to check connection points, Longer time to repair connections, Consumer dissatisfaction for non volumetric water billing, No Map of connections from water mains, Leakages affect whole distribution system, More cost of water production.

41. To improve the above system it is proposed for "Replacement of connection pipes for proper piping arrangement from water mains to consumer household upto the AMR meter and installation of AMR meter for proper consumer connections including remote reading of volumetric water consumptions". The scope of works include the replacement of house connection pipes and supply and installation of AMR water meter on existing house connections along with operation and maintenance for 7 years. General arrangement shall be as under.
    - AMR meters shall be installed during the contract period of one year for existing connections & as per demand for new connections during the contract period of one year.
    - For period beyond the contract period, meter installation and related cost to such new connection will be borne by the consumers as per policy of Uttarakhand Jal Sansthan (UJS) and according to their tariff. Meter security and water security to such new connection will be borne by the consumers as per policy of Uttarakhand Jal Sansthan (UJS) and according to their tariff.

    - Under UEAP, ADB shall provide the assistance for Procurement/ supply and installation of AMR meters along with the related cost of connections, up to 1 year (within the contract period) however shall not provide funds for O&M period & beyond, it is to be borne by UJS similar to the policy applied in other projects of UJS.

    - Meter rent and volumetric water consumption charges will be recovered from the consumer by the UJS as per UJS tariff. Operation and maintenance cost for metering shall be recovered through the meter rent received through water charges as per policy.

    Proper IEC will be done by UJS to solicit the acceptance of the public so that this new system becomes sustainable

Road Restoration works

42. Road restoration works are also necessary as during course of transmission and distribution pipeline laying, roads will be damaged. The roads are under the control of Nagar Palika and B.R.O.

43. The roads under control of B.R.O. shall be restored by the B.R.O. whereas Nagar Palika Roads will be restored under this project.

44. The road restoration work will include, laying of W.B.M., premix carpeting, seal coat, etc. all complete as per the MoRTH specifications.

Electrical rehabilitation and augmentation measures

45. The proposed power requirement is presented in the load schedule. The proposed maximum demand for the Srinagar WTP, till the year 2025, is estimated to be 1.475 MVA. This future power requirement is much larger than the present MVA (refer consumer no JSP1, JSP2, meter no 2271397, 2270413 vide bill for the month for July 2013). Refer Load Schedule (Appendix 12)

46. In 33/11kV outdoor switchyard of utility, installation of a bus coupler on 11 kV network on the secondary side of the power transformer will surely improve the flexibility and reliability of this substation.

47. It is proposed to replace the existing GOD/ABS arrangement at WTP with the ring main unit (a compact and advanced version of HV panel/switchboard) of recognised make in consultation with the utility. It will result in optimum utilisation of space and will restrict the time and money consumed during preventive and breakdown maintenance activities as well.

E. Implementation Schedule

48. The project has already achieved 83% progress as of 31st October 2016. All the remaining components along with the new component of the subproject will be completed within by December 2017)

Project Implementation Schedule

Project Activity	Start	Completion	Total duration of the project activity
Sub-Project Appraisal Report	September 2013	December 2013	4 Months
Detailed Project Report and Bidding Document	March 2014	May 2014	3 Months
Bid invitation, evaluation and award	June 2014	August 2014	3 Months
Clearances and handover of site to contractor	August 2014	September 2014	1 Month
Construction	September, 2014	December, 2017	40 months

(Source: Project report of the project)

Figure 5: Proposed water meter connections in Srinagar

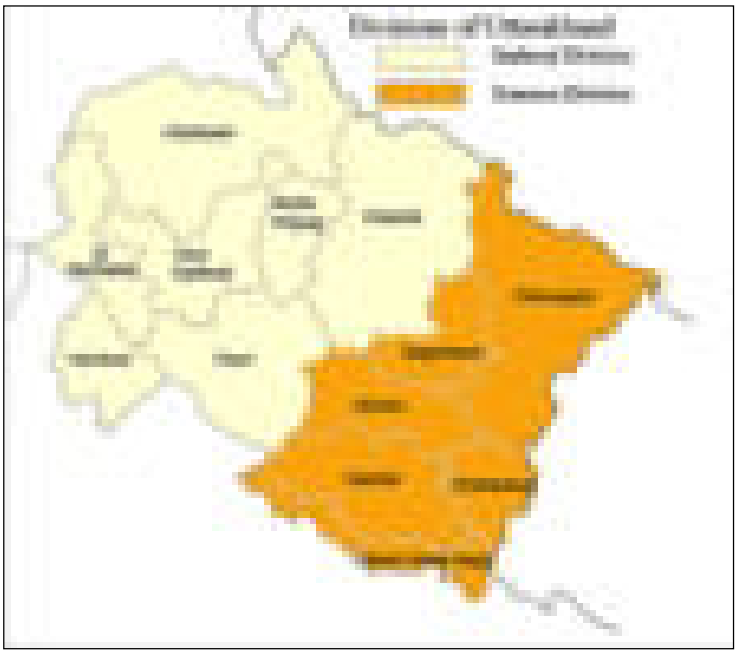
IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

49. This section presents a brief description of the existing environment, including its physical, ecological resources, and socio-economic development of Sub project of Srinagar. Broad aspects on various environmental parameters such as geography, climate and meteorology, physiography, geology, seismology, ecology, socio-cultural and economic development parameters that are likely to be affected by the proposed rehabilitatio of water supply system in Srinagar are presented.. Secondary information was compiled from relevant government agencies like the Forest Department, Wildlife Department, State Environment Protection, and Pollution Control Board and Metrological Department.

Geography

50. Uttarakhand lies in the northern part of India amidst the magnificent Himalayas and dense forests. The State is bordering Himachal Pradesh in the north-west and Uttar Pradesh in the South and shares international borders with Nepal and China. The State is comprised of 13 districts, these are; Pithoragarh, Almora, Nainital, Bageshwar, Champawat, Uttarkashi, Udham Singh Nagar, Chamoli, Dehradun, Pauri, Tehri Garhwal, Rudraprayag, and Haridwar. Geographically, the state lies in the northern Himalayas between 28°53'24" to 31°27'50" North latitude and 77°34'27" to 81°02'22" East longitude. The State has an area of 53,484 sq. km. and a population of about 8.48 million as per census 2001.



Districts of Uttarakhand *(source: www.davishunter.com)*

51. Uttarakhand is divided into two regions and also called administrative divisions, basically following terrain: the Kumaon and Garhwal. The Kumaon division located southeast of the state and composed of Almora, Bageshwar, Champawat, Nainital, Pithoragarh, and Udham Singh Nagar. The Kumaon region is part of the vast Himalayan track and and the sub-mountains of Terai and Bhabhar. The region is drained by Gori, Dhauli, and Kali from the Tibetan mountains, and Pindari and Kaliganga which ultimately joins Alaknanda River. The

Garwhal division is composed of Chamoli, Uttarkashi, Rudraprayag, Tehri Garhwal, Pauri, Dehradun, and Haridwar districts.and is entirely on rugged mountain ranges dissected by valley, and deep gorges. The Alaknanda River, the main source of the Ganges, traces its headwaters in this region.

52. The State is part of the Western Himalaya is further divided into four zones namely, the Tarai-Bhabar-Shivalik (Sub-Himalayas), Lesser-Himalayas, Greater-Himalayas, and Trans Himalaya (Tethys).

Topography,

53. Topography - Srinagar is located on the hills and surrounded area is covered with forest. The project influence area is built on slope of hill.

Geology

54. The area is covered by soil/ slope wash and river borne deposit resting over Garhwal group of rocks. The river borne material consists of boulders of quartzite, gneisses, metabasics and schists mixed with silt, sand, cobbles and pebbles. The Garhwal group of rocks consists mainly of quartzite. The general trend of bend is NE-SW to E-W with moderate to steep deeps on both sides.

Soil

55. The soils of the study area are basically the product of fluvial process of the river Alaknanda and its tributaries. The alluvial soil of the area is dry, porous, sandy, faint yellow and consists of clay and organic matter. Soil quality analyses of primary data generated indicate that Soils of the area are slightly alkaline. The pH value of the soils varies depending upon the type of forests. The soil of is sandy loam. The pH values on all sites and depths ranged 7.1 to 9.5. Organic matter content varies from 0.6 to 0.8 % by mass.(Refer table IV-1)

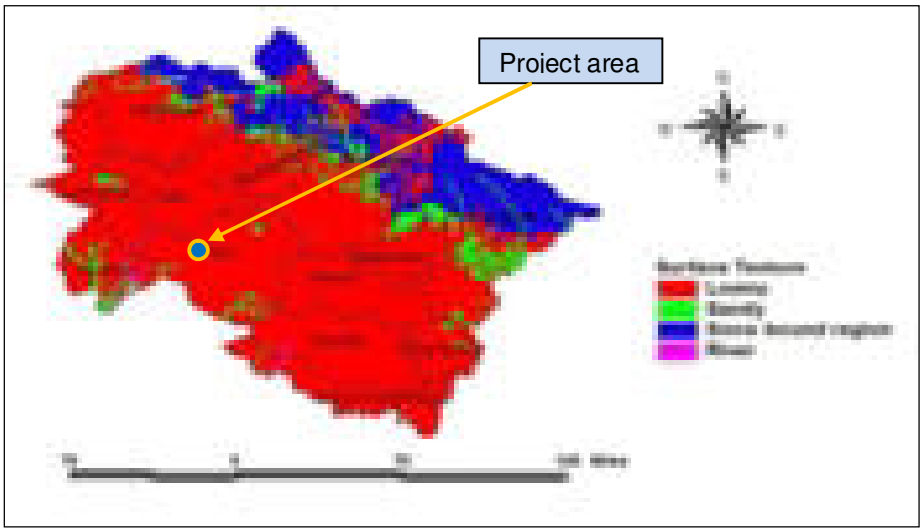


Figure 6: Soil map of Uttarakhand showing project area
(source: PURANIK et al., Curr. World Environ. Vol. 10(1), 288-295 (2015)

Table IV-1: Soil quality of Srinagar (April 2016)						
S.No.	**Test Parameters**	**Unit**	**Near Intake Well/ WTP**	**Construction of Resevoir**	**Disposal of silt from RBF Construction Site**	**Within the City limits where pipe laying**
1	pH	-	8.17	8.35	9.5	7.18
2	Conductivity	uS/cm	534.19	485.23	450.18	354.75
3	Moisture	% by mass	7.32	9.7	6.78	8.7
4	Sodium as Na	mg/Kg	312.17	230.62	230.81	215.6
5	Potassium as K	mg/Kg	199.21	95.3	92.28	95.3
6	Total Kjeldahi Nitrogen	% by mass	732.17	721.5	739.7	695.79
7	Phosphorus	mg/Kg	71.21	69.23	65.17	68.13
8	Organic matter	% by mass	0.87	0.623	0.851	0.625
9	Calcium (as Ca)	% by mass	0.415	0.401	0.411	0.312
10	Magnesium (as Mg)	mg/Kg	193.21	168.15	175.2	169.19
11	Cat ion exchange capacity	Meq/100gm	16.21	16.7	16.8	16.88
12	Water Holding Capacity	% by mass	17.21	19.62	19.12	14.1
13	Bulk Density	gm/cc	1.12	1.1	1.11	1.14
14	Soil- Grain Size Analysis/ Texture (% by mass)					
(a)	Sand	% by mass	75.25	72.15	71.3	76.35
(b)	Silt	% by mass	16	14.2	18.25	18.3
(c)	Clay	% by mass	8.75	13.65	10.45	5.35

(Source: Primary data generated by collecting samples from site by Arihant Analytical laboratory on 16.04.16 and 17.04. 16 and analysed by Arihant Analytical laboratory, Sonepat)

B. Climate and Meteorology

56. The State of Uttarakhand, with its highly varying topographical features, has shown an equally variegating climatic condition, ranging from hot and sub-humid tropical in the southern tract of Bhabhar to temperate, cold alpine, and glacial climates in the northern part of the high mountains.

57. Factors such as elevation, slope, proximity of glaciers, forests, mountain peaks and ridges and direction of mountain ranges together give rise to the great variations in climatic conditions, even at the micro and local levels. These attributes determine the temperature range as well as the distribution of rainfall.

58. However, the overall climatic condition in the State is governed by the southwest monsoon. It has a sub-tropical to temperate climate, with three pronounced seasons; summer, winter, and monsoon. The hilly terrain of the Himalayan region has snow cover and is severely cold during winter with snowfall normally occurring during the months of December to March. The

climatic conditions of Almora, Nainital, Pithoragarh, Chamoli, Uttarkashi, Pauri and Dehradun are humid and cold.

59. The Garhwal region has a sub-temperate to temperate climate with maximum temperature recorded in the month of June is 45°C at Kotdwar while in the higher reaches at Dudhatoli it only rises to 25°C. Temperature descends to a minimum of 1.3°C in January, and means monthly temperature for the region ranges from 25°C to 30°C.

C. Ambient Air Quality

60. The pristine environment and sparse population suggest that most part of the State have a very good air quality. Any point or non-point pollution sources of air pollution were not observed throughout the survey period. It was observed that the traffic on the roads is too low to cause unbearable air pollution due to vehicular exhaust. Finally, there are no industries recorded in or along the subproject area and hence any other source of atmospheric air pollution is not expected.

61. The baseline data on ambient air quality generated by collection of representative samples from four locations. The sampling locations were selected considering representative of residential, commercial, institutional, industrial and sensitive locations.

62. The air quality results reveal the fact that all the parameters with respect to the air quality are within the permissible limitsof the national standards[4] of residential areas because there are no major sources of pollution in the region (Refer table IV-2)

Table IV-2: Ambient air quality of Srinagar (April 2016)

S.No.	Test Parameters	Unit	Near Intake well/WTP	Construction of Reservoir	Within the city limits (Near NIT)	Residential Area Near River Bed Filtration
1	Particular Matter, ($PM_{2.5}$)	ug/m³	47.11	46.25	48.12	48.72
2	Particular Matter, (PM_{10})	ug/m³	87.21	87.29	90.17	93.29
3	Sulphur Dioxide (as SO_2)	ug/m³	12.11	12.32	14.71	13.17
4	Oxide of Nitrogen (as NO_2)	ug/m³	19.21	19.21	20.27	19.87
5	Carbon Monoxide (as CO)	mg/m³	<0.2	<0.2	<0.2	<0.2

(Source: Primary data generated by collecting samples from site by Arihant Analytical laboratory on 16.04.16 and 17.04. 16 and analysed by Arihant Analytical laboratory, Sonepat)

D. Ambient Noise Level

63. Generally, noise pollution is not a problem in the state except in the urban areas like Dehradun.. Traffic, industrial, and festival/cultural noises, along with noise generated from construction activities, DG sets etc., are the most prominent sources of noise in the urban areas. Overall noise level in the town is calm except on the busy roads of Srinagar.

[4] CPCPB National Ambent air quality Standards(NAAQS) 2009

64. During the construction period, a temporary increase in the noise levels are expected as there will be movement of construction machineries and construction activities to be done in the proposed rehabilitation of water supply system. Suitable noise barriers in the form of vegetation and timely scheduling of construction activities will help minimize these effects better.

65. The baseline data on ambient noise quality generated by collection of representative samples from five locations. The sampling locations were selected considering representative of residential, commercial, institutional, industrial and sensitive locations. It was observed that ambient noise scenario in residential, commercial, and sensitive areas in the study area are quite low in general.

66. The noise quality results reveal the fact that all the day time noise levels are slightly higher and the night time noise is also slightly higher than the permissible limitsof the national standards[5] of residential areas because there are no major sources of pollution in the region (Refer table IV-3)

Tabel IV-3: Ambient noise quality of Srinagar (April 2016)

S.No.	Test Parameters	Unit	Near Intake Well/ WTP	Construction of Reservoir	Within the city limits (Near NIT)	Residential Area Near River Bed Filtration	Near Construction Camp
1	Lmin	dB(A)	36.6	37.4	35.1	38.1	37.5
2	L10	dB(A)	53.77	56.47	56.07	65.16	59.3
3	L50	dB(A)	46.3	48.9	50.35	55.75	51.35
4	L90	dB(A)	37.41	38.5	37.73	39.05	38.76
5	Leq	dB(A)	50.04	52.57	52.32	61.33	55.43
6	Lmax	dB(A)	55.9	59.3	57.2	70.4	62.5
7	Leq-Day	dB(A)	51.42	53.94	53.55	63	56.78
8	Leq-Night	dB(A)	38.48	39.15	41.63	43.64	1.05

(Source: Primary data generated by collecting samples from site by Arihant Analytical laboratory on 16.04.16 and 17.04. 16 and analysed by Arihant Analytical laboratory, Sonepat)

E. Hydrology

67. Uttarakhand has tremendous water resources such as glaciers, lakes, rivers and other water bodies. Most of these have tourism importance like Milam, Pindari, Sunder Dhunga and Heeramani Glaciers; Seven Lakes in Nainital; and some wetlands. However these water bodies are located far from the Project area.

68. Generally, there has been an overall decline in water resources in the State. Hydrological studies over the last decades confirm the diminishing water resources and the worsening crises (Rawat et. al) as caused by the following factors which have resulted in the decrease in underground seepages. These have directly contributed to the reduction of water availability in and reduction of discharge in nallas as well as extensive disappearance of springs—the region's primary source of drinking water.

[5] The Noise Pollution (regulation and control) rules, 2000 and its amendment in 2010 and 2012

- There has been a diminishing regulatory effect of glaciers of the Great Himalayan zone.
- There is a long-term decreasing trend of stream discharges.
- The capacities of the lakes have dwindled.
- Surface runoff on the hillsides has shown high increase.
- There has been an increase in floodwater and decrease in base flow water in channels and rivers.
- Extensive soil erosion and landslips are recurring phenomena in the region.

69. The Sub-project is located on the Alaknada River is Srinagar (see ***Appendix -I***. Rapid Environmental Assessment Checklist).

Drainage

70. The region of Uttarakhand is well drained by numerous rivers and rivulets locally known as Gad, Gadhera and Naula. The water resources of this region are of singular importance not only for the region but also for the whole Gangetic plains of north India. There are three main river systems are: (i) the Bhagirathi – Alaknanda basin – Ganges basin, (ii) The Yamuna – Tons basin, and (iii) the Kali basin.

71. The Ganges system drains the major part of the region covering the whole of the Garhwal, except the western part of Uttarkashi district, and the western part of Garhwal Himalayas from an altitude of 7,138 m meet at Devprayag and flow as the Ganges thereafter. The Bhagirathi is the main stream while the Alaknanda, Saraswati, Dauli Ganga, Berahi Ganga, Nandakini, Mandakini, Madhu Ganga, Pindar, Atagad, Bhilangana, Jad Ganga, the Kaldi Gad and the Haipur are the main tributaries to the Alaknanda and/or Bhagirathi, ultimately contributing to the waters of Ganges. The Nayar, which drains more than a half area of the Garhwal district, is an important tributary of the Ganga. The Yamuna-Tons system is also located in the Garhwal region. The Yamuna river rises at Yamunotri and is joined by important tributaries such as the Giri and more importantly, the Tons, which is its biggest tributary with 2.7 times greater volume of water than the Yamuna. The River Yamuna flows out of the hill areas through the Doon valley and the Shivaliks, into Haridwar district, being joined in the Doon valley by several streams.

72. The project area is part of Bhagirathi – Alaknanda basin – Ganges basin. Main drainage system of the project area is the Alaknanda river (Refer figure 7)

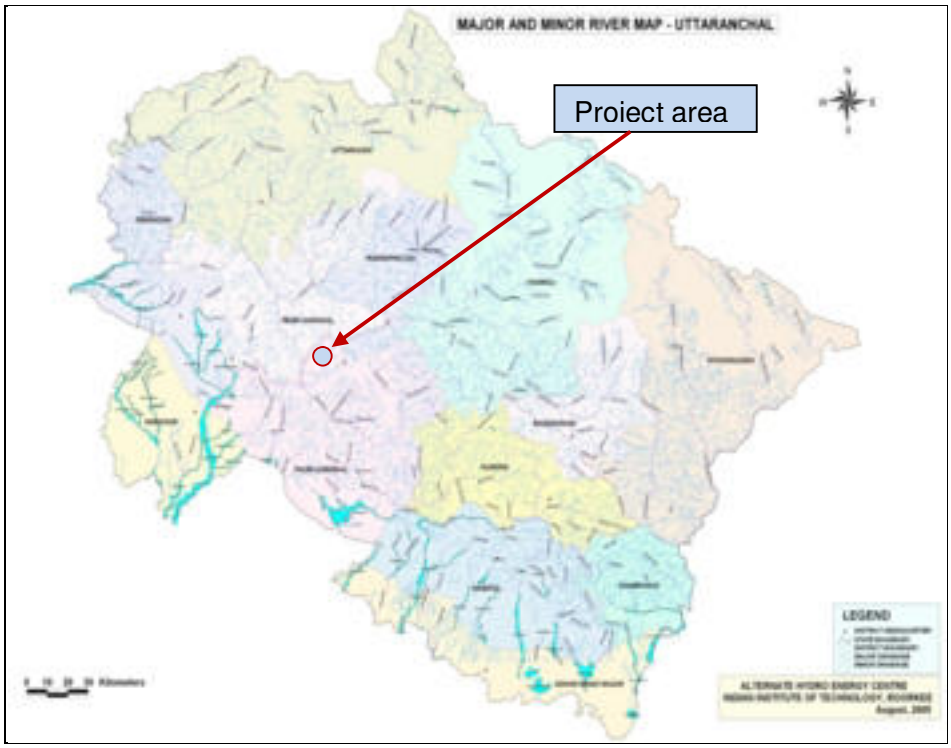


Figure 7: Location of the project area in river map of Uttarakhand

(Source: http://www.ahec.org.in/wfw/maps.htm)

Surface Water Quality

73. The Srinagar City situated on the bank of Alaknanda River. The raw and treated water quality during construction will be monitored. Construction debris will be disposed away from the source and WTP premises on daily basis to avoid any contamination..

74. There is very little documentation on the pollution status of rivers except that of the holy river Ganga and some other water bodies where there were at least limited monitoring studies recently. In terms of quality, the surface water of the State is unprotected from untreated wastewater, and runoffs from chemical fertilizers and pesticides. No proper sewage treatment facilities exist in the project area. The increasing pollution of water bodies constitutes the biggest threat to public health. At present, there is limited information available on the quality of fresh water resources in the State.

75. Based on limited records, the water quality of Uttarakhand's rivers, rivulets, and other natural water sources is generally good and no major source of water pollution was found. The hand pumps, natural water seeping out from mountains locally called as "Naula", and natural water springs locally called as "Gadhera" represent the ground water sources in the hills. There are no major sources of water pollution in terms of point or non – point sources aside from natural landslides leading to deposition of debris in streams. The baseline data on water quality were generated by collection of representative samples from 4 locations. Data reveal the fact that surface water quality is fit for Drinking water Source without Conventional treatment but after disinfections (Class A), Outdoor bathing(Organised) (class B) , Drinking

water with conventional treatment Followed by disinfections (class C) as per the CPCB classification of inland surface water bodies[6] .(refer table IV-4)

Table IV- 4: Surface water quality of Srinagar

Test Parameters	Unit	Upstream of intake well	Downstream of intake well	Upstream of RBF	Downstream of RBF
Colour	Hazen	<5.0	<5.0	<5.0	<5.0
Odour	-	Agreeable	Agreeable	Agreeable	Agreeable
Taste	-	Agreeable	Agreeable	Agreeable	Agreeable
Turbidity	NTU	<1.0	<1.0	<1.0	<1.0
pH Value	-	7.42	7.62	7.69	7.78
Total Hardness (as $CaCo_3$)	mg/l	62	70	66	59
Iron (as Fe)	mg/l	<0.1	<0.1	<0.1	<0.1
Chlorides (as Cl)	mg/l	18	14	19	20
Residual free chlorine	mg/l	Nil	Nil	Nil	Nil
Total Dissolved Solids	mg/l	80	93	86	80
Fluoride (as F)	mg/l	<0.01	<0.01	<0.01	<0.01
Total Coliform	per 100ml	Absent	Absent	Absent	Absent

(Source: Primary data generated by collecting samples from site by Arihant Analytical laboratory on 16.04.16 and 17.04. 16 and analysed by Arihant Analytical laboratory, Sonepat)

Ground water quality

76. Water quality of the near by tubewells in the same location were collected from the UJS[7]. Test results indicate the fact that the water is fit for drinking. But chlorination has been recommended as it will be supplied through public water supply system so that it should meet the user end chlorine concentration. Ground water quality has been given in appendix 3 of this report.

F. Disaster risk

Vulnerability of the State

77. The State is prone to severe earthquakes, landslides. In addition, the state is also affected by disaster like floods, epidemics, fire, hailstorm, lightening, road accidents, etc. The state of is highly vulnerable to multihazards viz. earthquake, landslides, flash-floods, avalanches, Dam Burst , drought, but particularly Earthquake, as the state falls in the highest seismic risk zones of the country i.e. Zone V and IV. In the disaster prone map of the country, Uttarakhand has attained its position among first five states in respect of natural hazards, i.e., earthquakes, flash floods triggered by cloud burst, landslides, avalanches and forest fires & frequent droughts in summers. These disasters have caused immense loss of

[6] Inland surface water categories (CPCB,1978)

[7] Refer appendix 3

property, natural wealth, and human lives *(NIDM Uttarakhand National Disaster Risk Reduction Portal, 2014)*

Vulnerability to Earthquakes

78. As per earthquake zoning map of India, the entire State can be divided into two zones, i.e. Zone V and Zone IV. The State has experienced many earthquakes of small and large scale with their epicenters located within the Himalayan region. These earthquakes have demonstrated that the seismic vulnerability of the building stocks in the region is primarily responsible for a large number of human casualties. The State has witnessed two major earthquakes in the recent past i.e. the Uttarkashi earthquake in 1991 and the Chamoli earthquake in 1999. About 768 people died in Uttarkashi and 106 died in Chamoli earthquake. The districts of Bageshwar, Chamoli, Pithoragarh, Rudraprayag and Uttarkashi, which were most severally affected in the 2013 flash flood, also fall within the Seismic Zone V.

79. As shown in the map four of the thirteen districts of the state (Pithoragarh, Chamoli, Bageshwar and Rudraprayag) fall completely in Zone V (representing damage risk of ≥ IX on MSK scale), while five other districts (Uttarkashi, Tehri-Garhwal, Pauri, Almora and hampawat) fall partially in Zone V and partially in Zone IV (damage risk of VIII on MSK scale) and the rest (Dehradun, Haridwar, Nainital and Udham Singh Nagar) fall totally in Zone IV (of the seismic risk map of India).

80. The vulnerability of the region to earthquakes is characterized by the fact that during the last century, the region had experienced 11 earthquakes of magnitude greater than 6.0 on the Richter scale. As per IMD, there have been 65 earthquakes of varying intensity since 1803.

81. The main tectonic elements of the region include the (i) central thrust and (ii) boundary fault. Several NE-SW lineaments are also known from the area and these traverses across different tectonic zones.

82. Seismically, the State constitutes one of the most active domains of the Himalayan region. Several damaging earthquakes are recorded from this region. As such, the project area is classified under high seismic zone IV. The modified mercalli intensity broadly associated with the zone IV is VIII.

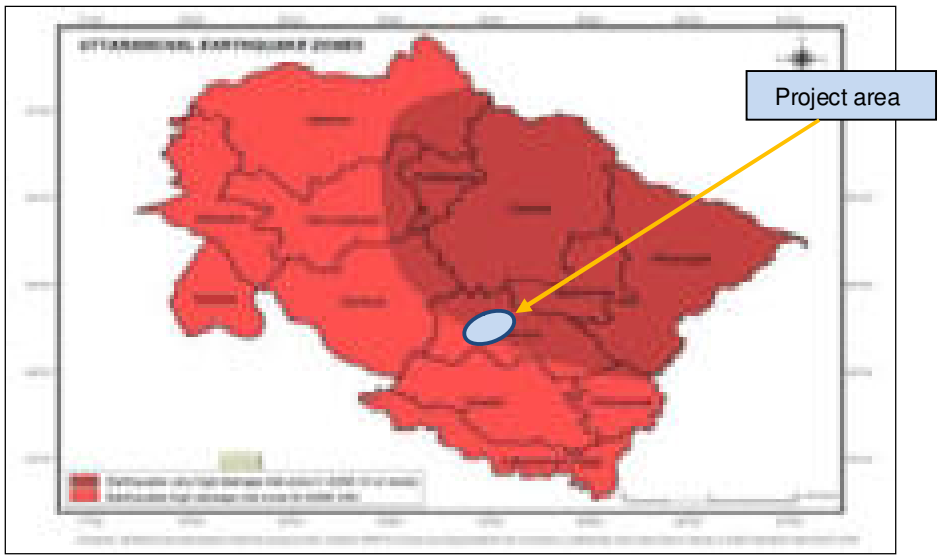


Figure 8: Earthquake zone of project area in Uttarakhand earthquake hazard zonation map *(Source: nidm.govt.in)*

G. Ecology

Forestry

83. According to The India State of Forest report 2015, the recorded forest area of the Uttarakhand state is 34,651 km^2 which constitutes 45.32% of its geographical area. Very-dense forest constitute 8.89%, moderately dense constitutes 25.42%, Open Forest constitutes 11.01% and scrub constitute 0.58% of total forest area.

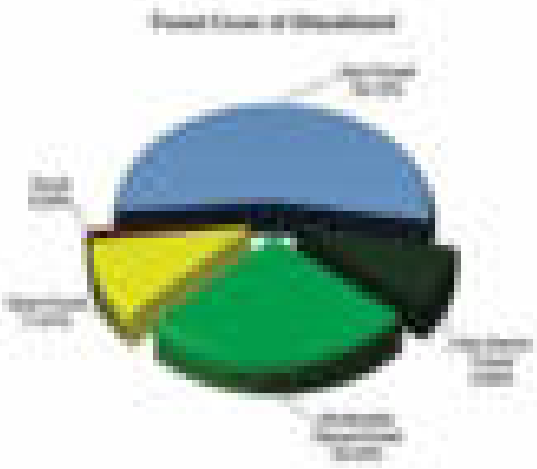


Figure 9: Forest Cover of Uttarakhand (*Indian State Forest Report, 2015)*

84. The distribution of forest cover by district is presented in the succeeding Figure and Table. The Garhwal region has more forest cover with 14,498 km^2 compared to the Kumaon region with 9,742 km^2. However, they are almost equal in terms of distribution over its territory with 45% and 47% of covered with forest. The district of Pauri Garhwal,

Uttarkashi, Nainital, and Chamoli have the largest forest cover accounting for 50% of all the state's total.

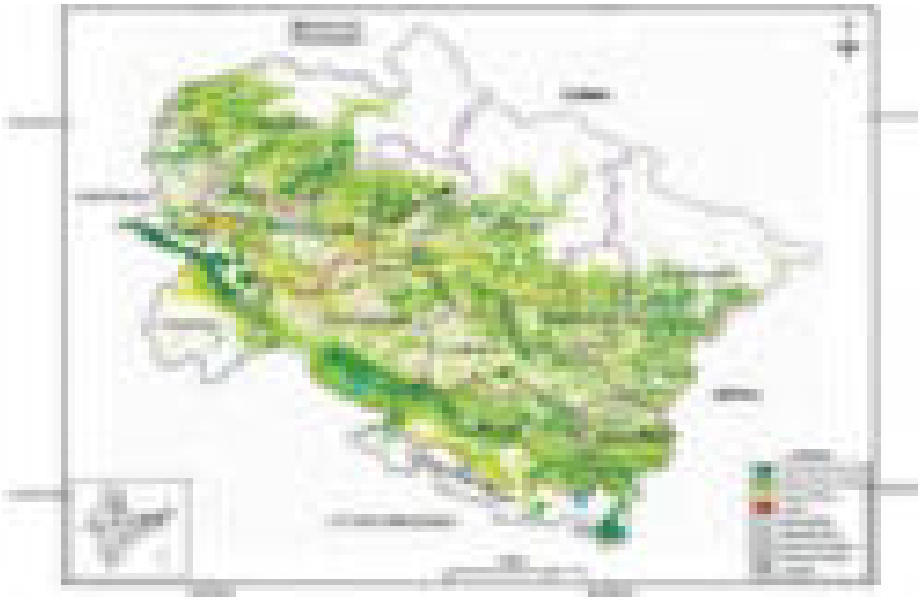


Figure 10: Uttarakhand's Forest Cover Map

Table 0-5 : District-wise Forest Cover, Uttarakhand

Region	District	Geographic Area	Forest Cover			Total Forest	% of GA
			Very Dense	Moderate Dense	Open Forest		
Garhwal	Uttarkashi	8,016	570	1,778	724	3,024	38.72
	Rudraprayag	1,984	241	591	298	1,130	56.96
	Chamoli	8,030	441	1,561	679	2,681	33.39
	Pauri Garhwal	5,329	519	1,954	796	3,269	61.34
	Tehri Garhwal	3,642	296	1,239	621	2,156	59.20
	Dehradun	3,088	620	647	335	1,602	51.88
	Haridwar	2,360	25	301	260	588	24.92
Kumaon	Pithoragarh	7,090	509	1,013	580	2,102	29.65
	Bageshwar	2,246	200	834	329	1,363	60.69
	Almora	3,139	224	929	430	1,583	50.43
	Nainital	4,251	602	1,939	463	3,004	70.67
	Champawat	1,766	348	570	266	1,184	67.04
	Udham Singh Nagar	2,542	157	246	103	506	19.91
Total		**5,3483**	**4,754**	**13,602**	**5,884**	**24,240**	**45.34**
Note	Very Dense Forest – All lands with tree cover of canopy density of 70% and above Moderately Dense Forest – Canopy density between 40%-70% Open Forest – Canopy density between 10%-40%						

(Source: State of Forest Report 2015)

85. Forest type mapping using satellite data has been undertaken by Forest Survey of India with reference to Champion and Seth (1968) classification. As per this assessment, the

state has 34 forest types which belong to eigth forest type groups, *viz.* Tropical Moist Deciduous, Tropical Dry Deciduous, Subtropical Pine, Himalayan Moist Temperate Forests, Himalayan Dry Temperate Forests, Sub-Alpine Forests, Moist Alpine Scrub and Dry Alpine Scrub. Percentage wise distribution of forest in different forest type groups found in the state is given in the pie diagram.

86. A wide variety of tree species is found in the mountains of Uttarakhand and enumerated in the succeeding Table according to altitude location. Some notable tree species are Poplar (*Populus ciliata*) and Eucalyptus (*Eucalyptus citriodora*) due to their fast growing and large market demands, and Khair (*Acacia catechu*) and Seesam (*Dalbergia sissoo*) for their ecological and economic importance. Sal (*Shorea robusta*), which is highly adapted to sandy soil are being used to stabilize river banks and islands in river beds. Oak (*Quercus* sp.) is another important species considered to be amongst the best wood in the world specially for making agriculture implements due to its very heavy hard with twisted fibers. The State Govt. of Uttarakhand has declared the oak tree (*Quercus* sp.) as a *Kalpvriksha* or wish fulfilling divine tree often treated as the signature plant of the Kumaon Himalayas as numerous logos and insignias with a stylized version of the deodar inscribed on them. Deodar grows in the temperate to alpine climate that is found between 3500 and 12000 feet in this region. Finally Chir pine (*Pinus roxburghii*) a source of resin, which is used for producing resin and terpentine.

Table 0-6 : Predominant Top-Canopy (Tree) Species According to Altitude

S. No.	Common Name	English Name	Botanical Name	Altitude (m.)
1.	Kachnar	Orchid tree	*Bauhinia variegata*	600-900
2.	Cheed	Chir Pine	*Pinus roxburghii*	600-900
3.	Shal tree	Shal tree	*Shorea robusta*	600-750
4.	Banj	Oak tree	*Quercus incana*	1700-2000
5.	Kail	Blue pine	*Pinus wallichiana*	1800-2400
6.	Buransh	Rose tree	*Rhododendron arboretum*	200-2100
7.	Deodar	Cedar tree	*Cedrus deodara*	1800-2400
8.	Raga	Himalayan fir-low level	*Abies pindrow*	2100-2900
9.	Raga	Himalayan fir-high level	*Abies spectabilis*	2900-3600
10.	Spruce	Spruce	*Picea smithiana*	2400-2900
11.	Thuner	Himalayan Yew	*Texus baccata*	2400-2700
12.	Surai	Cypress	*Cupressus torulosa*	2300-2400
13.	Pangar	House Chestnut	*Aesculus indica*	1800-2100
14.	-	Strawberry tree	*Cornus capitata*	2000-2300
15.	Bhojpatra	Betula	*Betula utilis*	3000-3500

S. No.	Common Name	English Name	Botanical Name	Altitude (m.)
16.	Buransh	Rose Wood	*Rhododendron arboretum*	1700-2000
17.	Simaru	Rose Wood	*R. campanulatum*	2200-3000
18.	Moru	Oak tree	*Quercus dilatata*	2000-2500
19.	Kharsu/Khoru	Oak tree	*Quercus semicarpifolia*	2200-2400

(Source: State of Forest Report 2011)

87. The proposed subproject is not expected to have any adverse impact on the Forests and does not involve any tree cutting.

Biodiversity

88. The State of Uttarakhand is endowed with rich bio-diversity as manifested by its approximately 64 percent forest cover. The State has established six national parks and six wildlife sanctuaries for the conservation of flora and fauna. Such areas include the Nanda Devi National Park, Valley of Flowers, Gangotri National Park, Govind Pashu Vihar National Park, Rajaji National Park, Jim Corbett National Park, Kedarnath Wildlife Sanctuary, Askot Musk Deer Sanctuary, Mussoorie Sanctuary, Binsar Wildlife Sanctuary, Sanadi Sanctuary, and Govind Wildlife Sanctuary—all of which are being looked after by the Uttarakhand government. A positive remark on the State is that it maintains rich wildlife outside their protected areas.

Table IV-7: Wildlife in Uttarakhand

Sl. No.	Protected Areas	Year	Unit	Statistics
1.	**National Parks**			
	(i) Number	2011-12	No.	6
	(ii) Area	2011-12	Sq. Km.	4915
2.	**Wildlife Sanctuaries**			
	(i) Number	2011-12	No.	6
	(ii) Area	2011-12	Sq. Km.	2420
3.	**Important Wild Animals**			
	(i) Tiger	2008	No.	178
	(ii) Leopard	2008	No.	2335
	(iii)Elephant	2008	No.	1346
	(iv) Musk Deer	2008	No.	376
	(v) Black Bear	2008	No.	1935
	vi) Sloth Bear	2008	No.	172
	vii) Brown Bear	2008	No.	14

Source: Wildlife and Protected Areas, ENVIS, 2014

89. The Himalayas represent one of the most fascinating biota (fauna and flora) all over the world, both in terms of quality and quantity. This is evident from the fact that more than50 percent of all biota can be found only in the Himalayan region. Such fact is brought about by the region's uniqueness in terms of favorable climatic conditions, natural habitats, and soil types.
90. The State of Uttarakhand is represented by Biogeographic Zones 2B Western Himalaya and 7B Siwaliks in this region. About 18.7% of the total area under the Forest Department has been clearly earmarked for biodiversity conservation by the creation and management of 12 Protected Areas (PA) and a biosphere reserve in the State.

Table IV-8. National Parks in Uttarakhand

Sl. No.	National Park	Year of Establishment	Area (sq.km)	District
1.	Corbett NP	1936	521	Nainital and Pauri
2.	Nanda Devi NP	1982	630	Chamoli
3.	Valley of Flower NP	1982	87	Chamoli
4.	Rajaji NP	1983	820	Dehradun and Haridwar
5.	Gangotri NP	1989	2390	Uttarkashi
6.	Govind NP	1990	472	Uttarkashi

Source: Wildlife and Protected Areas, ENVIS, 2002
Negi, A.S., Status, Distribution and Management of Mountain Ungulates in Uttaranchal, Envis Bulletin, 2002

Table IV-9 Wildlife Sanctuaries in Uttarakhand

Sl.No.	Sanctuary	Year of Establishment	Area (sq.km.)	District
1.	Govind WLS	1955	521	Uttarkashi
2.	Kedarnath WLS	1972	957	Chamoli
3.	Askot WLS	1986	600	Pithoragarh
4.	Sonanadi WLS	1987	301	Garhwal
5.	Binsar WLS	1988	46	Almora
6.	Musoorie WLS	1993	11	Dehradun

Source: Wildlife and Protected Areas, ENVIS, 2002

91. Variations in the topography of high mountain ranges and deep valleys and altitudes from sea-level portions give the project districts different habitats for a variety of fauna and in turn resulted in the enriched biodiversity in the region. The common wildlife reported from the forests includes Tigers, Panthers, Civet Cats, Leopard Cats, Jungle Cats, Himalayan Silver Fox, and the Jackal. Various species of deer including the Musk Deer and the Barking Deer also roam in the districts. Sambhar and Gural as well as the Bear and the Porcupine are also found in the project area. The flying mammal Bat is also common in the area. Other animals in the region include the Chipmunk, the Rhesus Monkey and the Flying Squirrel. Discussion with local people during the survey process generated reports on the presence of Leopards, Deers, Foxes, and Wild Pigs. Some important information about wildlife of Uttarakhand is given in the Table below.

Table IV-10 List of Major Flora

S. No	Local Name	Scientific Name
Trees		
1	Buransh	*Rhododendron arboretum*
2	Deodar	*Cedrus polycarpos*
3	Chir	*Pinus roxburghii*
4	Surai	*Cupressus tourulose*
5	Padam	*Prunus cornuta*
6	Mehal	*Pyrus pashia*
7	Otis	*Alnus nepalensis*
8	Ayar	*Lyonia ovalifolia*
9	Kafal	*Myrica sapida*
10	Akhrot	*Juglana regia*
11	Bhimal	*Grewia optiva*
12	Ritha	*Sapijdus mukorossi*

13	Tun	*Toona ciliate*
14	Nimla	*Ficus auriculata*
15	Timur	*Zanthoxylum tamala*
16	Kharik	*Celtis eriocarpa*
17	Chamkhirik	*Carpinus viminea*
18	Katmon	*Betula alnoides*
19	Kajal	*Acer acuminatum*
20	Katoj	*Castanopsis tribuloides*
21	Kirmola	*Acer oblongum*
22	Kandru	Ilese dipyrene
23	Banj	*Quercus semicarpifolia*
Shrubs		
1	Kala Hisalu	*Rubus lasiocarpus*
2	Karoz	*Carissa spinarium*
3	Kobra Plant	*Arisama helleborifollium*
4	Kandali	*Urtica parviflora*
5	Satavar	*Asparagus racemosus*
6	Dudhi	*Hollerrhena antidysentricr*
7	Bajradanti	*Potentilla fulgens*
8	Banfasa	*Viola surpans*
9	Bach	*Acorus calamus*
10	Nakol	*Urticor dioica*
11	Patyura	*Pteraacanthus angustifrons*
12	Dudhia	*Taraxacum officinale*
13	Vatula	*Flemingia fruticulose*
14	Belmur	*Flacourtia indica*
15	Nirghesi	*Delphinium denudatum*
16	Silfoda	*Bergenia gossypina*
17	Jula	*Gerbera grassypina*
18	Jatamasi	*Nardostachys grandiflora*
Grasses		
1	Dub	*Cynodon dactylon*
2	Kush	*Sucharum spontanour*
3	Gol ringal	*Chimonobambusa falcate*
4	Tachita	*Apluda muticr*
5	Dev ringal	*Thamnocalamus faclouerі*
6	Jhugra ringal	*Arundinaria jaunsarensis*

Table IV-9 List of Major Fauna

S. No.	Wild Animals		Birds	
	Local Name	Scientific Name	Local Name	Scientific Name
1	Guldar	*Panthera Pardus*	Chir Fijent	Catreus wallichii
2	Kala Bhalu	*Selenarctos thibetanus*	Kalij Fijent	*Lophura Leucomelana*
3	Ghural	*Memorhaedus goral*	Koklaj Fijent	*Pucrassia macrolophus*
4	Kakar	*Muntiacus muntjak*	Kala Irgal	*Letinaetus makavensis*
5	Khirao	*Capricornis sumatraensis*	Karorla	*Urocissa erythsorhyncha*
6	Jangli Suar	*Sus-scrofa cristatus*	Ullu	*Strix aluco nivicola*
7	Chitrola	*Martes flarigula*	Baaj	*Flaco severaus*
8	Langoor	*Presbyits entallus*	Kala Titar	*Francolinus francolinus*

S. No.	Wild Animals		Birds	
	Local Name	Scientific Name	Local Name	Scientific Name
9	Khargosh	*Lepus nigricollis*	Papiha	*Cuculus varius*
10	Sehi	*Hystrix indica*	Tota	*Psittacula humalayana*
11	Gidar	*Canis aureus indicus*	Chakor	*Alectoris graeca chuker*
12	Jangli Billi	*Felis chaus*	Hariyal	*Treron spenura*
13	Gilehri	*Eurambulus pennanti*	Pashchimi Tregopan	*Tragopan meloccephalus*
14	Bandar	*Macaques mulatta*	Bulbul	*Pyconotus cafer*
15			Maina	*Aerioctheres tristis*
16			Fakhta	*Streptobelia orientalis meena*
17			Gidh	*Gyps himalayensis*
18			Kauwa	*Carvus macrornynchos*
19			Saat Bahen	*Teyrdoides striatus*
20			Neelkanth	*Garrulus Lanaclatus*

Biosphere Reserves

92. The Biosphere Reserve is the top category after Wildlife Sanctuary and National Park in the Country. Out of the 14 Biosphere Reserves situated in India, the Nanda Devi Biosphere Reserve (NDBR) established second among the 14 is situated in the State of Uttarakhand. It extends in the three districts of Chamoli (Garhwal), Pithoragarh, and Bageshwar (Kumaon). The Nanda Devi National Park (NDNP) and the Valley of Flowers are UNESCO World Heritage Site declared in 1988. The NDNP is located in the transition range between the Zanskar range and Himalayan foothills with 97 species of plants including many rare and almost extinct plants like Saussurea sudhanshui, Nardostachys grandiflora, Picrorhiza kurroa, Cypripedium elegans, C. himalaicum, Dioscorea deltoidea and Allium stracheyi. There are also 83 animal species including the Bharal (Pseudois nayaur), Himalayan Musk Deer (Moschus chrysogaster), Mainland Serow (Capricornis sumatraensis), Himalayan Tahr (Hemitragus jemlahicus), Goral (Nemorhaedus goral), Snow Leopard (Panthera uncia), Common Leopard (Panthera pardus), Himalayan Black Bear (Selenarctos thibetanus), Common Langur (Presbytis entellus), and Rhesus Macaque (Macaca mullata). Also, there are about 114 avian species and 27 species of butterflies in the NDNP.

93. The Rajaji National Park was established in 1983 protecting sections of the tropical deciduous forest area of the Shivalik Hill range on the Himalayan foothills. The Park covers 820.42 square kms, along the Haridwar, Dehradun and Pauri Garhwal. The park has a vast Sal forest, and mixed forest mostly covered with Acacia catechu and Vetiveria zizanioides. It is refuge to approximately 49 species of mammals, 315 species of birds, 49 species of reptiles, 10 species of amphibians and 49 of Piscean species. This park has the largest population of elephants in Uttarakhand and a large population of tigers and leopards. Noteable animals seen in the par are the Wild Cat, Goral, Rhesus Macaque, Himalayan Yellow Throated Marten, Monitor, Lizard, Indian Hare, Sloth, Himalayan Black Bear, King Cobra, Jackal, Barking Deer, Sambar, Wild boar, Indian Langur, Indian Porcupine and

Pythons. The population of birds consists of the Great Pied Hornbill, Himalayan Pied Kingfisher, Sparrows, Fire Tailed Sunbird and the Peacock (Indian National Bird).

94. The Jim Corbett National Park covers 520 sq kms of Savannah-type grasslands and Sal forests. Declared as a Tiger Reserve in 1973, the Park has a rich diversity including the White Tiger, Throated Martem, Himalayan Palm Civet, Indian Grey Mongoose, Para, Kakka, Ghoral, Bar-headed Goose, Duck, Grepe, Snipe, Turtles, Python, Common Otter, Porcupine, Clack-taped Hare, Chital, Spotted Deer, Viper, Cobra, Krait, King Cobra, Tortoise, Graylag, Sandpiper, Gull, Cormorants and Egrets. There are 488 species of flora found protected in the Park including Sal, Savannah Grass, Anogeissus- Acacia catechu forests, Mallotus philippensis, Jamun and Diospyros tomentosa.
95. The Govind National Park covers an area of 957 sq. kms in Uttarakashi and a sanctuary for the endangered Snow Leopard and some other 15 species of mammals and 150 species of birds that includes the Himalayan Black bear, Brown bear, Musk deer, Bharal, Himalayan Tahr, Serow and Common leopard. The endangered birds found in this region are Monal Pheasant, Koklas Pheasant, Bearded Vulture Himalayan Snow Cock, Golden Eagle, Western Tragopan, Steppe Eagle and Black Eagle. Other varieties of birds include Owls, Pigeons, Minivets, Thrush, Warblers, Bulbul, Cuckoo and Finches.
96. The Valley of Flowers is a World Heritage Site located in Chamoli. There are hundreds of species mostly being Orchids, Poppies, Primula, Calendulas, Iris, Lily, Roses, Violets, Rhododendron, Angelica, Himalayan Fritillary, Daisies and Anemones and also supports a variety of mammals like the Himalayan Tahr, Snow Leopard, Musk Deer, Red Fox, Common Langur (a type of monkey), Bharal, Serow, Himalayan Black Bear, Himalayan Brown Bear, Pica (Mouse hare). A huge variety of butterflies and birds are also found in the valley including Himalayan Golden Eagle, Griffon Vulture, Snow Partridge, Himalayan Snow Cock, Himalayan Monal, Snow Pigeon, and Sparrow Hawk.

Fishery

97. Fish abound in almost all streams of the district and riparian villages find in it an important supplement to their ordinary food. The common species found here are asela or saul, mahasher, kalabans or karaunch and fucta or phar kata. Other species found in the district include gadara, gadiyal or guluwa, tarra, symplu and nama, nawoo or japa. No interference with fishery activities is envisaged by execution of the proposed subprojects.

H. Socio-Economic environment

Social and Cultural Development

98. The State of Uttarakhand occupies a total land area of 53,483 sq. km. which is 1.73 percent of India's total land area. Demographically, the State has a population of 10,086,292 as per the 2011 census consisting of 51 percent males and 49 percent females. Out of these, 7,036,954 people live in rural areas spreading over 16,623 revenue villages settled in 39,967 habitations. The habitation's population is scattered between small streams and rivers and is spread over 20 to 70 degree slopes of the Himalayan and the Lesser Himalayan regions.

99. The State is divided into Garhwal and Kumaon divisions. Administratively, the State is divided into 13 districts, 49 tehsils and 95 blocks. Garhwal division has seven hill districts with one located in the foothills (Haridwar). Kumaon division, on the other hand, has six districts—one in the foothills (Udham Singh Nagar). There are 16,177 villages in the State and 7,227 gram panchayats. Of the total number of villages, 5,868 are not connected to all weather roads.

(Source: devbhoomi.uk.govt.in)

100. The schedule caste and schedule tribe population in the State is significant, averaging 17.9 percent and three percent respectively. The population density is 159 persons per sq.km.—considerably lower than the national average of 324 persons per sq.km. Rural population constitutes about 74% while urban population composes the remaining 26% of State's total populations. About 70% of the State population lives below the poverty line which is way above the national average of 46%. Literacy rate in the State is 71.6%.

101. The State recorded 19.2% decadal growth during the 1991-2001 census period which is close to the national growth rate of 21.3 %. The district of Nainital registered the highest decadal growth rate with 32%, followed by Udham Singh Nagar with 27.8%.

Land Use and Land Use Pattern

102. The land use pattern of Uttarakhand is strongly governed by the following: elevation, climate, mountainous terrain, lithological type, topography, surface hydrology, sunlight in the fields of forestry and agriculture, alpine meadows, sparse vegetation (scrub), grazing land, barren land, and human settlement. The human settlements are mainly located in the shallow water zones or around the localities nearer to springs.

103. Forest is the main land use in the State and nearly 64 % of the geographical area is under the varying forest densities (cover). Tree line is clearly demarcated above 2900 m elevation. Agriculture is confined to areas of low reliefs which are underlined by weak rock formation (i.e. schists, phyllites, weathered gneisses, and crushed quartzite). The cultivated land, approximately 11.5 % of the total geographical area, is either terraced/semi-terraced or plain. Other land use categories such as meadows, grazing lands, and scrubs do not exhibit definite relationship with lithology. It is also observed that the south-facing hill slopes are covered by lush green forests.

Table 0-12 : Land Utilisation in Uttarakhand

Sl. No.	Land-use	Period / Year	Unit	Statistics
1.	Total Reported Area	2010-11	Hectare	5,672636
2.	Forest Area	2010-11	Hectare	3484803
3.	Culturable Waste Land	2010-11	Hectare	310390
4.	Fallow Land	2010-11	Hectare	127793

	(i) Current Fallow	2010-11	Hectare	43295
	(ii) Fallow Land other than Current Fallow	2010-11	Hectare	84498
5.	Barren & Uncultivable Land	2010-11	Hectare	224764
6.	Land under Non-agricultural Uses	2010-11	Hectare	217648
7.	Permanent Pasture & Other Grazing Land	2010-11	Hectare	198526
8.	Land under Misc., Tree Crops and Groves not included in Net Area Sown	2010-11	Hectare	385548
9.	Net Area Sown	2010-11	Hectare	723164

Source: Uttarakhand at a Glance 2012-13, Govt. of Directorate of Economics and Statistics

Health

104. The Infant Mortality Rate is 36 and Maternal Mortality Ratio is 359 (SRS 2007 - 2009) which are higher than the National average. The Sex Ratio in the State is 963 (as compared to 940 for the country). Comparative figures of major health and demographic indicators are as follows :

Table IV-13 Demographic, Socio-economic and Health profile of Uttarakhand State as compared to India figures

Indicator	Uttarakhand	India
Total Population (In Crore) (Census 2011)	1.01	121.01
Decadal Growth (%) (Census 2011)	19.17	17.64
Crude Birth Rate (SRS 2011)	18.9	21.8
Crude Death Rate (SRS 2011)	6.2	7.1
Natural Growth Rate (SRS 2011)	12.8	14.7
Infant Mortality Rate (SRS 2011)	36	44
Maternal Mortality Rate (SRS 2007-09)	359	212
Total Fertility Rate (SRS 2011)	NA	2.4
Sex Ratio (Census 2011)	963	940
Child Sex Ratio (Census 2011)	886	914
Schedule Caste population (In Crore) (Census 2001)	0.15	16.67
Schedule Tribe population (in crore) (Census 2001)	0.02	8.43
Total Literacy Rate (%) (Census 2011)	79.63	74.04
Male Literacy Rate (%) (Census 2011)	88.33	82.14
Female Literacy Rate (%) (Census 2011)	70.70	65.46

Source: RHS Bulletin, March 2007, M/O Health & F.W., GOI

105. The health infrastructure of the State is described in succeeding Table. There are only 14 Obstetricians / Gynecologists and 20 Pediatricians in the State. Such numbers are way below the estimated State requirement of 59 each. Some of the essential requirements of the new State include basic primary health care, pre and post-natal care, and nutritional status and preventive care. Accessibility to health services with the aid of improved road conditions is essential to put progress in the health indicators of the State.

Table IV-14 Health Infrastructure of Uttarakhand

Indicators	Required	In position	Shortfall
Sub-centre	2341	1848	493
Primary Health Centre	351	257	94
Community Health Centre	87	59	28
Health worker (Female)/ANM at Sub Centres & PHCs	2105	2016	*
Health Worker (Male) at Sub Centres	1848	184	1664
Health Assistant (Female)/LHV at PHCs	257	88	169
Health Assistant (Male) at PHCs	257	29	228
Doctor at PHCs	257	205	52
Obstetricians & Gynecologists at CHCs	59	14	45
Pediatricians at CHCs	59	20	39
Total specialists at CHCs	236	51	185
Radiographers at CHCs	59	17	42
Pharmacist at PHCs & CHCs	316	292	24
Laboratory Technicians at PHCs & CHCs	316	81	235
Nursing Staff at PHCs & CHCs	670	243	427

(Source: RHS Bulletin, March 2012, M/O Health & F.W., GOI)

I. Cultural and Archeological resources

106. The State of Uttarakhand has a great range of cultural practices. Festivals and cultural activities are being celebrated throughout the year in the State. The major fairs and festivals of the Garhwal region include the Hatkalika Fair, Tapkeshwar Fair, Surkhanda Devi Mela, Kunjapuri Fair, Lakhawar Village Fair, and Mata Murti Ka Mela. On the other hand, major fairs and festivals in the Kumaon region consist of Uttarayani Mela, Shravan Mela (Jageshwar), Kartik Poornima at Dwarahat, Kasar Devi fair, and Nanda Devi melas.
107. Living in the mountains mostly in places that are not easily accessible the people of the district have been able to preserve their culture, folklore, folksongs and folkdances, the last, a distinctive feature of the district, being seasonal, traditional and religious, some of the better known being described below - The Thadiya dance, which is accompanied by song, is performed on Basant Panchami, the festival celebrating the advent of spring, the Mela, another dance, is perform on Deepawali and the Pandava during the winter after the harvesting of the crop and depicts the principal events of the Mahabharata. Other folk dances are Jeetu Bhagdawal and Jagar or Ghariyali. These dances enact mythological stories, the participants, both men and women, put on their traditional colorful dress and dance to the tune of drums and Ransinghas. Another dance perform during the fairs and accompanied by song is the Chanchari in which both men and women participate. Folk songs are usually traditional and are sung particularly by the woman, who works very hard in the fields from morning till night in all kind of weather. During the month of Chaitra the women of the village

gather at a central place and sing traditional song which generally relates deeds of heroism, love and the hard life which they have to lead in the hills. In the district, fairs, festivals, religious and social gatherings are the main occasions for recreation and amusement. On special occasions people arrange Swangs (open air dramatic performances) particularly depicting scenes or legends connected with Shiva and Parvati.

108. The houses in the district have not been build according to any town planning scheme but have been up haphazardly in clusters on level ground at places where water springs are accessible or on the bank of the river in the valley. The houses are build of stones and are generally double storeyed, a few having three to five storeys, the very low rooms on the ground floor, which are usually 1.8 mrts. high being used for housing the cattle. Each house has in front of it a courtyard called a Chauk. A mud or stone staircase or a wooden ladder leads to the upper storey, the roof being of wood. The height of the upper storey is generally 2.1 mtrs. and the roof is usually a sloping structures of timber covered with Patals (quartzite slabs), the well off use corrugated galvanized iron sheets. Generally the upper storey has a Verandah in front of the upper rooms.
109. The houses in the higher regions are two to three storeyes with balconies all round and paved courtyard in front where people do their threshing, weaving, spinning and other house hold works. A few houses have five or six storeyes, the topmost being used as the kitchen. At times the cattle sheds are made at some distance from the villages. The houses are built in rows of half a dozen or so and strikingly picturesque in their fort like appearance.

110. The staple grains consumed by the people of the district are wheat, rice, maze, mandua and jhanjora, the last three being coarse grains generally eaten by the poorer sections. The pulses consumed are urad, gahat, bhatt, soontha, tur, lopia and masor. The hindus of the district mostly vegetarian by habit and preference and although the Muslims, Christians and Sikhs are generally non vegetarian, those not able to afford eating meat daily due to want of fund or local unavailability often resulting to a vegetarian diet.
111. There is no Archaeological Survey of India (ASI) listed heritage sites within the study area.

J. Economic Development

Transportation and Communication

112. Transportation system is a key factor in the socio-economic development of any State. Roads are logically the critical inputs to the growth of all the sectors. Aside from road systems, the State of Uttarakhand is connected to other states via rail and air transportation systems. Dehradun, Haridwar and Kathgodam are the major railway stations connected to various parts of the country. Jolly Grant near Dehradun is the lone airport present in the State. As per statistical data from 2013, Uttarakhand has a total road network of 28,198.92 km of which 2,773.82 km comprises the National Highway (1,150.82 km with State PWD and 1623.00 km with BRTF); 3,788.20 km comprises the State Highway; 3,289.74 km covers the MDR; 2,945.04 km comprises the ODR and 15,402.12 km of Village Road.
113. Density of road length per 100 sq. Km. is 45 km which is very low compared to the national average of 97 km. Only about seven percent of the roads in the State are built in two-lane standards while 50 percent are paved. About a third of the higher class paved roads are in poor condition and over 70 percent of the light-vehicle roads need to be repaired or rehabilitated. Due to the lack of road connectivity, vast areas of the State are inaccessible. Such problem influences the population to chunk in far flung areas of the State remaining to be under-developed and devoid of educational and health facilities and employment opportunities.
114. The road density per 100 sq. km. of the total area in Garhwal region is 30 km whereas road density in Kumaon region is 37 km. In terms of population, Garhwal region has 234 km of

roads per lakh and the corresponding figure in Kumaon is 266 km. Motor vehicles has increased with the annual growth rate of 11 percent accounting to 44,7000 vehicles in 2003. PWD is the principal agency responsible for the management of roads in the State.

Table IV-15. Transportation of Uttarakhand state.

S.No.	Category of Roads	Year	Total Length (In km)	
1	Border Roads Organization (BRO)	2013	1,623.00	
3	National Highway (NH)	2013	1,150.82	
3	State Highway (SH)	2013	3,788.20	
4	Major District Roads (MDR)	2013	3,289.74	
5	Other District Roads (ODR)	2013	2,945.04	
6	Village Roads (VR)	2013	11,158.36	
	Villages Roads (PMGSY)	2013	4,243.76	
	Total		28,198.92	
Postal and Communication Services				
1	Post Offices	2011-12	No.	2718
2	Telephone Exchanges	2011-12	No.	477
3	Telegraph Offices	2011-12	No.	2
4	PCOs	2011-12	No.	8429
5	Telephone Connections (Including WLL) by BSNL	2011-12	No.	278751
6	Mobile phone by BSNL	2011-12	No.	1360674

Industrial Development

115. The State has very few industrial units mainly because of lack resources. In the hilly terrains, industries promoted include food processing, fruit processing, medicinal/herbal plants, and horticultural/floriculture-based industries. In the plain districts of Haridwar, Udham Singh Nagar, and other places, capital intensive and high-value addition industries are being encouraged by the government.
116. In recent years, Uttarakhand has emerged as one of the most attractive industrial destinations in India. In this regard, the government is encouraging private participation in all industrial activities in the State. The New Industrial Policy announced in 2003 by the State government puts in place the regulatory framework for Uttarakhand's industrialisation. The New Industrial Policy indicates that private resources may be tapped while promoting integrated Industrial States in Uttarakhand. The State government provides assistance in establishing small and medium sized agro parks, food parks, and the likes which in turn are expected to provide common infrastructure facilities for storage, processing, grading, and marketing.
117. Main and traditional business of the state is, Handicrafts, Handlooms, Wool Based Industry, Khadi and Village Industries. Hydro Power, tourism are the backbone of economic development in the state. No recognizable industry is located along the project corridor.

Agriculture, Forestry and Fishery

118. Agriculture is the main economic activity in the State as per latest land-use statistics. The total reported area for agricultural activity is 55.66 lakh hectares. In the hills, the major crops grown include wheat, paddy, mandua, ramdana and potato whereas in the plains the major crops are wheat, paddy, pulses, and sugarcane.
119. The pattern of land ownership is unlike that found in the rest of India. Most of the Uttarakhand farmers are owner-cultivators. Tenant farming and sharecropping are rare while landholdings are generally small and limited to family farms' approximately 50 percent of all landholdings are less than 0.5 hectares in size and 50 percent under one hectare. As such, the zamindari system of big landholders is limited to the plains. Both the geography and the Pahari cultural heritage have played roles in maintaining a traditionally more equitable, if impoverished, land distribution in Uttarakhand.
120. Agriculture in Uttarakhand is very complex and is interlinked with crop husbandry, animal husbandry and forestry to form a production system. Agriculture is the main source of employment in Uttrakhand and around 58 per cent of workers earned their livelihood from this sector in 2011. Like all India scenario, proportion of workers was the highest in agriculture followed by other workers and household industry workers. Contribution of agriculture to the Net State Domestic Product (NSDP) during the year 2001-02 was about 30 percent and its share showed a continuous decline having a percentage of 24.89 (2004-05), 17.80 (2009-10), 14.97 (2011-12), 14.71 (2012-2013) and 14.73 (2013-2014). Agriculture in the State is characterized by the following:

    i. Out of 7.93 lakh hectare of agriculture land, hilly region covers 56.8 percent and plain region covers 43.2 percent.
    ii. The cropping intensity in Uttarakhand is 163.79, which is much higher than country's average of 129.
    iii. Both rain-fed and irrigated agriculture is practised in the State. Cereals are emphasised in the irrigated agriculture and two crops are taken in an agriculture year. In the rain-fed system millets, pulses and tuber crops are grown.
    iv. Monocropping is a common practice in the irrigated areas whereas mixed cropping is common in rainfed areas.
    v. 85 percent of the gross cultivated area is used only for growing food grains where value addition is low.
    vi. More than 62 percent of the State Net Domestic Product comes from the three major towns of Dehradun, Nainital, and Haridwar.

121. In the mountain regions and the Himalayan agriculture specifically, farmers deviate substantially from the kinds practiced in less precipitous altitudes. Hill farmers have adapted to the difficult geography, and the terrain has likewise influenced cultural modes in mountain societies. Patterns of land ownership, subsistence versus surplus production, and level of market penetration have also been decisively affected. However, traditional Himalayan agricultural systems and knowledge-base are being steadily eroded by market pressures, bringing both economic and cultural changes in Uttarakhand. Age-old self-reliance has given way to dependency on imports from the productive plains that bear pesticide/chemical fertilizer-enhanced yields. Cultural domination from the plains also threatens Uttarakhand's traditional foods as an increasing taste for mill-polished rice is outcompeting mountain crops. Activists in the hills have responded with a Save the Seeds movement and are raising awareness about the need or agricultural biodiversity.

122. Agriculture is also practiced in the river valleys of Uttarakhand a small 10-15 percent of the total land area. Over hundreds of years, many of the slopes have been cut into field terraces, a common characteristic of mountain agriculture throughout the world. The region's farmers have also developed advanced manure, crop rotation, and intercropping systems. Most of the land on hilly slopes is non-irrigated. Three types of agriculture can be found in most river valleys with each particularly suited to the type of land. These are as follows:

- Katil (Forest edge land)
- Hoe cultivation, with a standard rotation of 3 crops in 5 years
- Major crops are Finger millet/Mandua *(Eleusine coracana)*, Barnyard millet/Jhangora *(Echinochloa frumentesia)* and Chaulai/Ram Dana *(Amaranthus polygamous, Amaranthus blitum)*
- Upraon (Hillside land)
- Permanently terraced but unirrigated
- Major crops are Finger millet/Mandua *(Eleusine coracana)*, Barnyard millet/Jhangora *(Echinochloa frumentesia)* and Chaulai (*Amaranthus polygamous*) *etc.*
- Talaon (Valley bottom land)
- Paddy cultivation, low-lying, irrigated, double cropped
- Major crops area Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Sugarcane (*Saccharum officinarum*) *etc*.

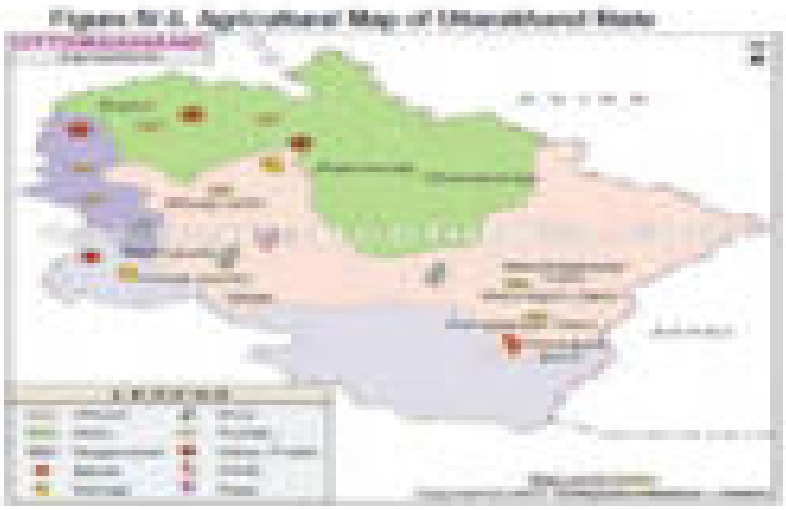


Table IV-16. Area under Principal Crops and Productivity in Uttarakhand

Sl. No.	Items	Year/ Period	Unit	Statistics
Area Under Principal Crops (Provisional)				
1.	Cereals	2011-12	Hectare	896774
	(i) Rice	2011-12	Hectare	280108
	(ii) Wheat (*Triticum aestivum*)	2011-12	Hectare	369209
	(iii) Barley (*Hordeum vulgare*)	2011-12	Hectare	22508
	(iv) Maize (*Zea mays*)	2011-12	Hectare	28038

	(v) Finger millet (*Eleusine coracana*)	2011-12	Hectare	125163
	(vi) Sanwan	2011-12	Hectare	63002
	(vii)Other	2011-12	Hectare	8746
2.	Pulses	2011-12	Hectare	55690
	(i) Urad (*Phaseolus radiatus*)	2011-12	Hectare	12980
	(ii) Lentil (*Lens esculenta*)	2011-12	Hectare	12295
	(iii) Pea (*Pisum sativum*)	2011-12	Hectare	3451
	(iv) Gahat (*Mycrotoma biflorum*)	2011-12	Hectare	12033
	(v) Rajma (*Dolichos lablab*)	2011-12	Hectare	4614
	(vi) Gram			766
	(vii) Bhatt (Black Soyabeen)	2011-12	Hectare	5734
	(viii) Others	2011-12	Hectare	3817
3.	Oil Seeds	2011-12	Hectare	29705
	(i) Mustard (*Brassica compestris*)	2011-12	Hectare	14294
	(ii) Seasmum (*Sesamun indicum*)	2011-12	Hectare	2020
	(iii) Groundnut (*Arechis hypogea*)	2011-12	Hectare	1112
	(iv) Soyabean (*Glycin max*)	2011-12	Hectare	12279
4.	Other Crops	2011-12		
	(i) Sugarcane (*Saccharum officinarum*)	2011-12	Hectare	108255
	(ii) Onion (*Allium cepa*)	2011-12	Hectare	2353
Agriculture Productivity (Provisional)				
1.	Cereals	2011-12	Qtl./Hectare	22.03
	(i) Rice	2011-12	Qtl./Hectare	21.20
	(ii) Wheat (*Triticum aestivum*)	2011-12	Qtl./Hectare	23.80
	(iii) Barley (*Hordeum vulgare*)	2011-12	Qtl./Hectare	12.64
	(iv) Maize (*Zea mays*)	2011-12	Qtl./Hectare	14.66
	(v) Finger millet (*Eleusine coracana*)	2011-12	Qtl./Hectare	13.92
2.	Pulses	2011-12	Qtl./Hectare	8.15
	(i) Urad (*Phaseolus radiatus*)	2011-12	Qtl./Hectare	8.13
	(ii) Lentil (*Lens esculenta*)	2011-12	Qtl./Hectare	8.19
	(iii) Pea (*Pisum sativum*)	2011-12	Qtl./Hectare	9.54
	(iv) Gahat (*Mycrotoma biflorum*)	2011-12	Qtl./Hectare	8.04
	(v) Rajma (*Dolichos lablab*)	2011-12	Qtl./Hectare	10.27
	(vi) Gram		Qtl./Hectare	7.85
	(vii) Bhatt (Black Soyabeen)	2011-12	Qtl./Hectare	9.83
3.	Oil Seeds	2011-12	Qtl./Hectare	8.34
	(i) Mustard (*Brassica compestris*)	2011-12	Qtl./Hectare	8.00
	(ii) Seasmum (*Sesamun indicum*)	2011-12	Qtl./Hectare	2.26
	(iii) Groundnut (*Arechis hypogea*)	2011-12	Qtl./Hectare	12.72
	(iv) Soyabean (*Glycin max*)	2011-12	Qtl./Hectare	14.46
4.	Other Crops	2011-12	Qtl./Hectare	
	(i) Sugarcane (*Saccharum officinarum*)	2011-12	Qtl./Hectare	609.33
	(ii) Onion (*Allium cepa*)	2011-12	Qtl./Hectare	55.69

Table IV-17. Ecological Sub-Regions and Altitude-wise Major Agriculture Crops

Sl. No.	Ecological Sub-Region	Altitudinal Gradient(m)	Major Agriculture Crops
1.	Lower Dun, Terai	300 - 600	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*) and Sugarcane (*Sachharum officinarum*).
2.	UpperDun,Bhabar, lower Shivaliks	600 - 1,200	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Maize (*Zea mays*) Chaulai (*Amaranthus* species) Finger millet/ Mandua (*Eleusine coracana*) and Barnyard millet (*Echinochloa frumentesia*)
3.	Middle Garhwal-Kumaon	1,200 - 1,800	Wheat (*Triticum aestivum*), Paddy (*Oryza sativa*), Cheena (*Panicum miliaceum*), Potato (*Solanum tuberosum*), Barley (*Hordeum vulgare*), Finger millet (*Eleusine coracana*) and Barnyard millet (*Echinochloa frumentesia*),
4.	Upper Garhwal-Kumaon	1,800 - 2,400	Wheat (*Triticum aestivum*) Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Chaulai (*Amaranthus* species), Cheena (*Panicum miliaceum*) and Phaphra (*Fagopyum tataricum*)
5.	Cold Zone	2,400 - 3,600	Summer Crops: Wheat (*Triticum aestivum*), Barley (*Hordeum vulgare*) Potato (*Solanum tuberosum*), Phaphra (*Fagopyum tataricum*) Chaulai (*Amaranthus* species), Kauni (*Setaria etalica*) Ogal (*Fagopyrum esculentum*) and Uva Jau (*Hoycleum himalayanse*)

123. Various pulses (*e.g.*, "Masur" - *Ervum lens*; "Kulat" *Mycrotoma biflorus*) are grown intercropped during the two harvest seasons early winter after the rainy season (millet), and midsummer before the hot dry season (barley-wheat). Dry and wet rice, taro, pumpkins, beans, corn, ginger, chili, cucumbers, leafy vegetables, and tobacco are also grown in the area. Likewise, potatoes have become an important cash crop being grown in areas unsuitable for other plants (Berreman, 1963).

124. The irrigation facility is only available adjoining to rivers in valleys. The irrigation and drainage system in Uttarakhand is described below.

Table IV-18. Mode of Irrigation and Drainage System in Uttarakhand

Sl. No.	Items	Year/ Period	Unit	Statistics
Net and Gross Irrigated Area				
1.	Canals	2011-12	Hectare	83687
2.	Tube Wells	2011-12	Hectare	216100
3.	Other Wells	2011-12	Hectare	11519
4.	Tanks/ Ponds	2011-12	Hectare	83
5.	Other Sources	2011-12	Hectare	24747
6.	Net Irrigated Area (NIA)	2011-12	Hectare	336136
7.	Gross Irrigated Area (GIA)	2011-12	Hectare	561733
Irrigational Infrastructure				
1.	Length of Canals	2011-12	Km.	11588
2.	Length of Lift Canals	2011-12	Km.	242
3.	Tube Wells (State)	2011-12	No.	1110
4.	Pump Sets (Boring/ Free Boaring)	2011-12	No.	54642
5.	*Hauj*	2011-12	No.	32850
6.	*Gool*	2011-12	Km.	26365
7.	Hydrum	2011-12	No.	1547
8.	C.C.A. Under State Canal	2011-12	Lakh Hect.	3.302
9.	Revenue Collection by Irrigation	2011-12	Rs. Lakh	252.27

Fisheries

125. The State has great potential for the development of fisheries. The State abounds in perennial and seasonal water bodies which hold high promise for the growth of fishery. Golden Mahseer (*Tor putitora*), one of the main game and food fish in the central Himalayan region, has decreased significantly. The fish migrate considerable distances upstream in search of suitable spawning grounds. Stocks of the Himalayan mahseer are depleted and it is now considered an endangered species. Catch data from the major rivers are not available while studies are characterized as sporadic and preliminary in nature. According to available statistics, the Himalayan mahseer contributes significantly only in one river comprising 32.8% of the catch from the Nayar River, 9.7% from Song River, and 0.83.1% from other rivers. The important fishes commonly found in the Himalayan river basins are *Catla catla*, *Labeo rohita*, *Labeio calbase*, *Cirrihinus mirigale*, Clarius, batrachus, *Rita rita*, *Heteropneuptus fonilis*, *Notopterus nontopterus*, *N. Chitala*, *Macrobrachum rosenbergii*, *M. malconsoni*, *M. Chapral*, *Channa punetatus*, *C. gaehua*, and *C. striatus*.

K. Energy and Electric Power Potential

126. Uttarakhand has an estimated hydro power potential of approximately 20,200 MW. However, only 1,130 MW has been tapped at present. Meanwhile, 4,170 MW projects are under implementation and 3,800 MW projects are allotted to Central, State and private sectors. Thirty-nine projects with a potential of 6,374 MW have been identified for PFR under PMs Hydro Initiatives.

    Although Uttarakhand is a power surplus State, a lot needs to be done to harness the untapped potential and sale the surplus power to make this a GDP driver sector for the State.

L. Aesthetic and Tourism

127. Tourism is one of the strong pillars of the State economy. The State has high growth potential for tourism, be in nature, wildlife, adventure or pilgrimage tourism. The State received 10.5 million domestic tourists in the year 2000-01, 11.6 million in the year 2001-02, and 12.9 in the year 2002-03, registering an average growth of 10.7 percent. Expenditure on schemes for tourism development and promotion in the State has progressively increased over the years. In the current five year plan, about Rs. 860 million have been spent, which is about 10 times the amount spent during 1980-85. Some of the major destinations with tourism potential include Haridwar (called 'The Gateway of God'), Rishikesh (the birth place of Yoga), Dehradun, Mussoorie, Almora, Kedarnath, Badrinath, Yamunotri, Gangotri, Jim Corbett National Park, Nainital, Ranikhet, and Pithoragarh.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Environmental impacts due to siting

128. Water supply infrastructure was screened using the ADB's rapid environmental assessment (REA) checklist for Water Supply.

i) The individual environmental screening checklist is provided in Appendix 1 of this report.

ii) **No environmental impacts related to siting**. Project area section is not located inside or near a cultural heritage site, protected area, wetland, and mangrove, estuarine, buffer zone of protected area or special area for protecting biodiversity. There are no rare, threatened, and endangered species (flora and fauna) within the subproject corridor of impact.

iii) **Potential significant environmental impacts.**. The potential significant environmental impacts are related to the excavation and disposal of earth during construction and inconvenience to local commuter during laying of pipes on the roads.

129. The beneficial impacts still outweighs the potential environmental impacts. The beneficial impact includes better water quality and reliability of supply

B. Screening of Environmental Impacts

Sl. No.	Environmental Attributes	Pre-Construction Stage	Construction Stage	Operation Stage
1.	**Physical Environment**	No Impact	No Impact	No Impact
	Geography	No Impact	No Impact	No Impact
	Topography, Geology and Soils	No Impact	No Impact	No Impact
2.	**Climate and Meteorology**	No Impact	No Impact	No Impact
3.	**Ambient Air Quality**	No Impact	Reversible and Insignificant during Construction Stage	No Impact
4.	**Ambient Noise Level**	No Impact	Reversible and Insignificant during Construction Stage	No Impact
5.	**Hydrology**	No Impact	No Impact	No Impact
	Water Drainage	No Impact	Reversible and Insignificant during Construction Stage	No Impact
	Water Quality	No Impact	No Impact	No Impact
6.	**Seismology**	No Impact	No Impact	No Impact
7.	**Ecology**	No Impact	No Impact	No Impact
	Forestry	No Impact	No Impact	No Impact
	Biodiversity	No Impact	No Impact	No Impact
	Biosphere Reserves	No Impact	No Impact	No Impact
8.	**Socio-Economic**	No Impact	No Impact	No Impact
	Social and Cultural Development	No Impact	No Impact	No Impact
	Land Use and Land Use Pattern	No Impact	No Impact	No Impact

Sl. No.	Environmental Attributes	Pre-Construction Stage	Construction Stage	Operation Stage
	Health	No Impact	No Impact	No Impact
	Literacy	No Impact	No Impact	No Impact
	Transportation and communication	No Impact	No Impact	No Impact
	Industrial Development	No Impact	No Impact	No Impact
9.	**Cultural and Archaeological Resources**	No Impact	No Impact	No Impact
10.	**Aesthetic and Tourism**	No Impact	No Impact	No Impact

C. Impact and mitigation measure during planning and design phase

130. There are no significant adverse environmental impacts on topography, soil and geographic significance during the planning and design phase based on the environmental screening of the sub-project in Srinagar.

131. Impacts on Climate. Ambient Air Qaulity, Noise Level, Seismic, Economic, Cultural and Aesthetics are insignificant in the planning and design stage.

Environmental Attributes and Project Activity and its Impacts	Mitigation
Project Establishment and pre construction activity and its social Impacts	Open liaison channels shall be established between the Site owner, operator, the contractors and interested and affected parties such that any queries, complaints or suggestions pertaining to environmental management aspects can be dealt with quickly and by the appropriate person(s).
	A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes on road. In case of road closure together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc
	Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
	Storage facilities, elevated tanks and other temporary structures on site shall be located such that they have as little visual impact on local residents as possible.
	In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes) or privacy concerns for surrounding buildings exist, the site may require screening. This could being the form of shade cloth , temporary walls, or other suitable materials prior to the beginning of construction.

Environmental Attributes and Project Activity and its Impacts	Mitigation
	Special attention shall be given to the screening of highly reflective materials on site.
Lack of sufficient planning to assure long term sustainability of the improvements and ensure protection of the assets created and the architectural/archaeological character of the surroundings	Design will include provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability.
Layout of components and its location to avoid impacts on the aesthetics, sensitive environmental areas / attributes of the site	The project components siting will avoid impacts on the aesthetics of the site, ensure minimal impacts and in compliance with statutory and regulatory requirements. The contractor, FPIU/ IA and DSC will identify any direct or indirect intervention of primary or secondary activity before establishment of any project components on the ground.
Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be according to specification and from approved sources Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used. Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work Where materials are borrowed (mined), proof must be provided of authorization to utilize these materials from the landowner/material rights owner and the Department of Geology and Mining Procurement of all material according to the material specification of the contract document and sourced from licensed and approved sources. A signed document from the supplier of natural materials shall be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation
Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains	There is not such location is anticipated on the project site. In case of chance of finding such location, Consult Archaeological Survey of India (ASI) and/or concerned dept. of Uttarakhand Govt. as applicable to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

Environmental Attributes and Project Activity and its Impacts	Mitigation
Integration of energy efficiency and energy conservation programs in design of sub-project components	The detailed designs for the sub-project components shall ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, rainwater harvesting etc.
Site clearance activities, including delineation of construction areas	Any removal of vegetation or tree felling shall be done after taking statutory permissions if required. All works shall be carried out such that the damage or disruption of flora other than those identified for cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Environmental Expert of DSC All areas used for temporary construction operations will be subject to complete restoration to their former condition with appropriate rehabilitation procedures.as per the rehabilitation plan prepared by the contractor and approved by the EE of DSC.
Blockage of access in residential area, commercial area and sensitive location like school, college, hospitals and court	Contractor will identify such location in the preconstruction stage and prepare plan approved by DSC to minimize inconvenience to the people.
Slop protection near reservoir and intake well	Retaining wall will constructed near reservoir and intake well

D. Impacts and Mitigation Measures during Construction Phase

132. Majority of the impacts will occur during the construction phase. These impacts, to be described in the succeeding sections are classified according to major components of the environment – physical, biological, air, water, and socio-economic. These impacts were mainly drawn from screening of impacts described in the introduction of this Chapter.

Impact on Physical Environment, Geography, Topography, Geology and Soil

133. The constructions of all components of the sub-project are at the existing location and not requiring additional land. So the impact on location related impact is insignificant.

Impact on Climate and Meteorology

134. The project components do not have impact on the climate and meteorology of Srinagar.

Ambient Air Quality

135. The handling of material, excavation of earth for laying pipes, emission of air pollutants from operation construction vehicles causes air pollution. Since the scale of construction activity is not significant, so the impact is also not very significant. Periodic air quality monitoring to ensure emissions comply with standards will be conducted as per the agreed environmental monitoring plan.

Ambient Noise Level

136. The operation of construction vehicles and equipments will generate noise. Since this operation will be located and limited to the construction site. The beatking of carriage way of road also generated noise. This activity will be limited to day time. So, the impact due to noise is insignificant and limited to the construction period only.Monitoring of noise levels in potential problem areas as per the monitoring plan will be carried out.

Drainage

137. The disposal of soil and excavation of road sides may impact the drainage. This impact will be insignificant since the exaction of road sides will be covered in the same day and disposal of excavated earth will be on the low laying area so that impact on drainage is minimum.Monitoring of water quality as per the monitoring plan will be carried out.

138. The mitigation measures of each project components are provided below.

Environmental Attributes and Project Activity and its Impacts	**Mitigation**
Impacts due to operation of construction Camps and its Location, Selection, Design and Layout	Siting of the construction camps, labour camp and stockpiles shall be as per the guidelines of UEPPCB, ULB, village panchayat and any other applicable guideline to the local site. The contractor will assess the impact of the construction camp and should be acceptable to the FPIU/ IA/PMU.. Construction camps shall not be proposed within 500m from the sensitive receptors, nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Construction camps will be located away from settlements and drainage from and through the camps will not endanger any domestic or public water supply. Construction camps including sanitation facilities must be adequately drained. Sewage management though septic tanks and solid waste management though local ULB system or other alternate measures.
Impacts due to poor supply of poor drinking water to the workers involved in construction.	Sufficient supply of potable water to be provided and maintained as per the standards, requirements, test methods and sampling procedure according to IS:10500. If the drinking water is obtained from an intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.

Impacts on waste disposal from the construction site and construction camp.	Pre-identified disposal location (identified by Contractor in compliance to relevant regulation and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Specialist of DSC. Contractor shall ensure that waste shall not be disposed off near the water course or agricultural land, Orchards and Natural Habitats like Grasslands.
Impacts on local environmenment due to loss of natural resource of earth due to poor storage.	Stockpiling of construction materials and excavated earth or silt in case of construction of river bed filtration does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.
Impacts due to construction traffic on access to Site	Contractors shall ensure that all side and mitre drains and scour check valves on access and haul roads are functioning properly and are well maintained. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt. Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas. Cognizance of vehicle weight / dimensions must be taken when using access constructed out of certain materials. e.g. paved surfaces / cobbled
Quarry Operations	Contractor shall finalize the quarry for procurement of construction materials after assessment of the availability of sufficient quantity of materials, quality and other logistic arrangements. The Contractor shall obtain materials from approved quarries only after consent of the Department of Mines and Geology and District Administration. Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material will be covered to prevent spillage.
Impacts on increased load on water supply	The contractor shall use ground/surface water as a

source due to construction work.	source of water for the construction with the written consent from the concerned Department. To avoid disruption/ disturbance to other water users, the Contractor shall extract water from fixed locations and consult DSC & line agencies before finalizing the locations. The Contractor shall provide a list of locations and type of sources from where water for construction shall be extracted. The Contractor shall need to comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to DSC.
Imapcts due to Soil/land Erosion	Slope protection measures will be undertaken as per design to control soil erosion. The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, other open water bodies and drainage lines adjacent to or within the designated area Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in storm water channels, drainage lines or rivers. There shall be a periodic checking of the site's drainage system by DSC, FPIU/IA and PMU to ensure that the water flow is unobstructed.
Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. Contractor shall not wash his vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these shall then be disposed of to a suitable waste site in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date and applicable norms Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Engineer) shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc.

Water Pollution from Fuel and Lubricants	The Contractor shall ensure that all construction vehicle parking locations, fuel/ lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located at least 300 m away from rivers/streams and irrigation canal/ponds if any Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system as per specified standards and UEPPCB and ULB norms if any.
Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground. All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system
Generation of dust	The contractor will take every precaution to reduce the levels of dust at construction site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation
Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. The use of silent/quiet equipment compliant with India ambient noise standards and standards specified for manufacturers shall be encouraged in the sub Project. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.
Noise Pollution	The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF/CPCB noise standards and all Vehicles and equipment used in construction shall be fitted with exhaust silencers.

	At the construction sites noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am. Noise limits for construction equipment used in this project will be in conformity to the BIS/SPCB/CPCB standards Regular monitoring of ambient noise levels to ensure compliance to Uttarakhand Environment Protection & Pollution Control Board standards.
Material Handling at Site	Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles. Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. Workers engaged in stone breaking activities will be provided with protective goggles, masks, and clothing. Stockpiles shall not be situated such that they obstruct natural water pathways. Stockpiles shall not exceed 2m in height unless otherwise permitted by the Engineer. If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. All concrete mixing must take place on a designated, impermeable surface The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions and applicable regulations. The Engineer will be given at least 6 working days notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the contractor.
Damage, and disturbance to other infrastructure in the construction site	Confirm location of infrastructure. Finalize alignment in coordination with agencies like Uttarakhand Power Corporation Limited, Bharat Sanchar Nigam Limited, etc. Ensure prior permission of respective agency Realign pipelines, if required and subsequently revise IEE Provide public information in case of service disruptions

Disposal of Construction Waste / Debris / Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified disposal locations. In no case, any construction waste will be disposed around the project site indiscriminately.
Disruption / cessation of existing water supply systems due to construction activity..	Care be taken during improvement of existing water supply systems, so that disruption in existing water supply would not occur. Tentative schedule of closure should be known to affected people prior to cessation of water supply. In case disruption of water supply exceeds the intimated schedule, arrangement for supply of potable water should be made.
Safety Measures During Construction	Personal Protective Equipment for workers on the project and adequate safety measures for workers during handling of materials at site will be taken up. The contractor has to comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp. The Contractor will conform to all anti-malaria instructions given to him by the Engineer. The Contractor will also ensure that the interests of the community are preferably not disturbed, and if unavoidable then disturbed to the minimum. Provide traffic management personnel, barricade, appropriate signage and safety information in and around the construction site and prevent local people entering into the construction site.
Clearing of Construction of Camps and Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire

	satisfaction of the Engineer and facility owner.
Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request FPIU/DSC or any authorized person with archaeological field training to observe excavation; Stop work immediately to allow further investigation if any finds are suspected; and Inform FPIU/DSC, and take any action they require ensuring its removal or protection in situ.
Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed only in case of unavoidable circumstances.
Replacement of connection pipes for proper piping arrangement from water mains to consumer house up to the AMR meter, Supply and installation of AMR water meter for Domestic & Non-Domestic water connections in Srinagar	Since the additional works for rehabilitation of house connections and supply/installation of AMR water meters in water connections is to be implemented within the existing project for rehabilitation and augmentation of water supply works in Srinagar/Pauri town and no change proposed hence no additional environmental impacts are foreseen. All the environment protection measures , Health and safety measures proposed for this project will also be applicable for this additional work.

E. Impacts during Operation Phase

Impact on Environmental Conditions due to operation of water supply system	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.
Increased Pollution due to the better water supply.	The subproject involves renovation and rehabilitation of existing system, augmentation of water supply is envisaged for 10 years project population and to fulfill the deficit of water supply to user as per 135 lpcd. Subproject does not envisage improvement in distribution system to end users as such very little increase is pollution load is anticipated. Sewage generated will be handled by the prevalent existing sewage management system of the town.
Algal Growth in Reservoir	Proper and regular cleaning of reservoir & provision of bleaching shall be ensured. Water sourced from River Bed Filtration (RBF) will be stored in Reservoir and chlorination will be done in the reservoir. Water sourced from WTP will be chlorinated at the WTP only and then stored in the reservoir.
Risk of contamination in water.	Chlorine should be added in sufficient quantity so that residual chlorine within permissible limit is available in pipeline.
Impacts due to Backwash water & Sludge generation in Water Treatment plan	Backwash water and clarifier sludge will be disposed in line with the guideline issued by UEPPCB.

Management of Chlorine stock	Chlorine stock shall be maintained in cool, dark and locked rooms, near the reservoir/treatment site and be handled with proper care and under safety measure.
Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	Jal Sansthan will carry out maintenance of the existing toilets, and carry out the regular collection and disposal of wastes as per norms. New facilities proposed to be created under UEAP will cater to additional load.
Impact on ground water and well interference	All the 6 tube wells will be constructed as per recommendations of the technical committee of UJS and spacing of the tube wells will also be as per recommendations **(Refer appendix -6)** **If recommendations are followed impact will be insignificant**
Chlorination in water • Chlorination through Chlorine solution • Chlorination through Chlorine Gas	• Chlorination in water will be done as per CPHEEO manual and ensure residual chlorination within permissible limit. • Regular laboratory testing for dosing and residual chlorine • Chlorine tank will be stored on impermeable platform with facility of collection of accidental leakage. • Gas Chlorination – the storage of Chlorine gas in HDPE drums. • Gas Chlorination through chlorine tunnel in covered room and controlled by chlorinator, • Provision of leak detector and alarm in the chlorination room. • Provision of Eye bath and emergency shower facility near the gas chlorination.
Annual Operation and maintenance of AMR water meter	Annual Operation and maintenance cost for AMR water meter for Domestic & Non-Domest water connections in Srinagar is proposed to be recovered from the provision of meter rent in the Tariff schedule of Uttarakhand Jal Sansthan therefore no additional burden for O & M of meters isassessed

F. Economic Development

139. After the disaster, there is significant economic loss mainly due to loss of life and livelihood and tourism activity. This rehabilitation of water supply scheme will bring positive impact interms of health and economic activity. The restoration of water supply will bring the supply level of pre-disaster stage and give support to the local economy.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public participation during the preparation of the IEE

140. The public participation process included identifying interested and affected parties (stakeholders); informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments and concerns) with regard to the proposed development; giving the stakeholders feedback on process findings and recommendations; and ensuring compliance to process requirements with regards to the environmental and related legislation.

141. Stakeholder consultation and participation with various stakeholders is an integral part of the environmental and social impact assessment and also part of regulatory requirement of EIA Notification, 2006 and ADB requirements. The stake holders of the project include project affected communities (directly or indirectly affected) and institutional stake holders such as PCB, local bodies, Water Resource Department, Environmental Department, Mines and Geology Department, Forest Department, etc. Consultations at micro- and macro-level (e.g. District/State level institutional consultations) helped planners to integrate the short term and long terms requirements of the local, regional, state and national goals in to the planning process. The regional, state and national goals are generally set by the legislations and policies by controlling or limiting the activities in order to reduce and nullify the adverse impact generated by infrastructure projects.

142. The following methodologies were adopted for carrying out public consultation

[i] Local communities, Individuals affected, traders and local shopkeepers who are directly affected were given priority while conducting public consultation.

[ii] Walk-through informal group consultations along the proposed subprojects area

[iii] One to one meetings were generally held with a few members of local communities. These consultations sometimes focused on one or more specific issues in a given section (link) of the project corridor. Focus group consultations were conducted with a sample section of the community with a good representation from the affected communities. Such meetings usually provide substantial information about the community concerns.

During consultation the following general opinions/suggestions were noted

Place: Srinagar **District: Pauri** **Date : 18/11/2016** **Participant: Construction Supervisor (PIU-DSC), site supervisor (contractor) and local community**	
1.	**Issues Discussed:** • Impact on the local environment on going water supply scheme and upcoming metering works • People's expectation for employing generation during the proposed work. • Any nuisance or health hazard due to the activity • Any impact on any historical, cultural or religious monument. • Any disturbance to traffic
2	**Stakeholder's Response:** • No impact on Environment, flora and fauna due to installing of water meters. • Local community appreciated the effort to pay the amount of as much as per their use. • Villagers want employment for local people. • This additional proposed metering activity is not causing any health hazard. • Miminum disturbance to traffic as the proposed metering work is for existing household water connections and would be done in/near their houses
3.	**Recommendation and Suggestion** • Local labor should be engaged wherever possible.

B. Future consultation and Disclosure

143. The public consultation and disclosure program will remain a continuous process throughout the subproject implementation and shall include the following

C. Consultation during Detailed Design

144. Focus-group discussions with affected persons and other stakeholders to hear their views and concerns, so that these can be addressed in subproject design wherever necessary. Regular updates on the environmental component of the subproject will be kept available at the PIU/PMU of UEAP.

145. FPIU/PMU will conduct information dissemination sessions at major habitations and solicit the help of the local community leaders/prominent citizens to encourage the participation of the people to discuss various environmental issues.

146. The FPIU/PMU, with assistance of DSC will conduct information dissemination sessions in the subproject area. During EMP implementation FPIU, DSC, and PMU shall organize public meetings and will apprise the communities about the progress on the implementation of EMP in the subproject works

D. Consultation during Construction

147. Public meetings with affected communities (if any) to discuss and plan work programs and allow issues to be raised and addressed once construction has started.

148. Smaller-scale meetings to discuss and plan construction work with local communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation.

E. Project Disclosure

149. A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. In case of road closure together with the proposed detours will be communicated via advertising, announcements, road signage, etc.

150. For the benefit of the community the IEE will be will be disclosed to the affected people and other stakeholders in a form and language(s) understandable to them at an accessible place in a timely manner and made available at: (i) PIU/PMU office; (ii) District Magistrate Office; and, (iii) DSC office. It will be ensured that the hard copies of IEE are kept at such places which are conveniently accessible to citizens as a means to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE will be placed in the official website of the SDMA UEAP and the official website of ADB after approval of the IEE by ADB. The PIU will issue Notification on the locality-wise start date of implementation of the subproject. Copies of the IEE will be kept in the PMU/PIU office and will be distributed to any person willing to consult the IEE.

Public Disclosure

151. The updated IEE report will be disclosed in the English language at PMU, Jal Sansthan division office and will also be available in the website of ADB. The full reports will also be available to interested parties upon request from PMU.

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (EMMP)

152. The Environmental Management and Monitoring Plan (EMMP) designed will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between the Design & Supervision Consultants (DSC) – also an Engineer for the project, Contractors, Field Project Implementation Unit (FPIU), and Project Management Unit (PMU). Uttarakhand Jal Sansthan is implementing agency (IA) and will implement the Project through its field PIU's. The EMMP identifies the three phases of development as: (i) Pre Construction (ii) Construction Phase; and (iii) Post Construction/Operational Phase.

153. The purpose of the EMMP is to ensure that the activities are undertaken in a responsible non-detrimental manner with the objectives of: (i) providing a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with.

154. A copy of the EMMP must be kept on site during the construction period at all times. The EMMP will be made binding on all contractors operating on the site and will be included within the Contractual Clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance. It shall be noted that the Supreme Court of India * mandates those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventive measures to reduce or prevent further pollution and/or environmental damage. (The polluter pays principle).[8]

155. The Contractor is deemed not to have complied with the EMMP if:

i. Within the boundaries of the site, and site extensions, there is evidence of contravention of clauses;
ii. If environmental damage ensues due to negligence;
iii. The contractor fails to comply with corrective or other instructions issued by the Engineer/PMU/FPIU within a specified time; and
iv. The Contractor fails to respond adequately to complaints from the public.

Institutional Arrangements

156. The institutional arrangements specify the arrangements for the implementation of environmental provisions of the proposed subproject. The Executing Agency (EA), State Disaster Management Authority (SDMA) will work closely with the Implementing Agency (IA) Uttarakhand Jal Sansthan for effective implementation of environmental safeguards related requirements of the sub projects. The institutional arrangements and responsibilities are detailed below.

[8] *Writ petition no 657 of 1995. The Supreme Court, in its order dated Feb.4, 2005 that "The Polluter Pays Principle means that absolute liability of harm to the environment extends not only to compensate the victims of pollution, but also to the cost of restoring environmental degradation. Remediation of damaged environment is part of the process of sustainable development."*

157. The subproject will be implemented and monitored by Uttarakhand Jal Sansthan as Implementing agency and implemented through its Field PIU's supported by DSC (also working as Engineer) and overall management support shall be provided by PMU, UEAP.

158. The Safeguard Staff of UEAP SDMA (EA) in PMU & IA will monitor the implementation of environmental covenants with assistance of Engineer (DSC).

159. UEAP SDMA (EA) shall be responsible for ensuring compliance to environmental requirements of the ADB as well as central/state governments and reporting the same to ADB. A relevant portion of EMMP will be a part of contract with the civil works contractors engaged for execution of the works. The primary responsibility of implementation of EMMP is of the IA during pre-construction and operation and maintenance phases; and of the civil works contractor during the construction phase as defined in the EMMP. The responsibility of supervision of EMMP implementation is of the DSC; and it would guide the IA and the civil works contractors in this regard. , DSC with IA and EA, UEAP will act as monitoring agency as delegated in EMMP. All applicable statutory environmental clearances, consents, and/or permits (at national, state and local levels) as required for the implementation of the subproject would be obtained by the IA or by the civil works contractor in line with India's national/state/local laws and regulations, and in accordance with ADB's SPS 2009 requirements . Redressal of grievances shall be the responsibility of UEAP SDMA (EA). Apart from the mechanism for the grievances receiving and redressal at the level of EA, the provision shall be kept in the EMP of the subprojects wherein the contractor will depute one Environmental Safeguard Officer who shall be responsible for implementation of EMP, reporting and grievance redressal on day-to-day basis. The grievances/complaints received at the level of contractor shall be recorded on the Complaints Register and the same shall be forwarded to the DSC (Engineer of the Contract) within 48 hours along with the details of action taken to redress the grievance. The Team Leader of DSC shall immediately try to resolve the issues and forward the details to the FPIU / IA. If the action taken by Contractor and DSC is found to be inadequate, then necessary instructions shall be issued by the FPIU. IA for implementation of rectification measures.

UEAP, SDMA (PMU)

- Complies with all applicable legislation and is conversant with the requirements of the EMMP;
- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP SDMA for the duration of the Contract;
- May, on the recommendation of the EE DSC and/or Safeguards Staff of UEAP SDMA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his subcontractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- Act as overall monitoring agency.
- Addressing complaints and redressal of grievances.

UEAP, IA / FPIU

- Ensures along with Engineer (DSC) that EMMP and all necessary environmental stipulations are included in bidding documents and Contract documents with Contractor.
- Complies with all applicable legislations and is conversant with the requirements of the EMMP;

- Assesses all activities requiring special attention as specified and/or requested by the Engineer (DSC) and/or Safeguards Staff of UEAP PMU as Implementing agency for the duration of the Contract;
- Ensures that the Contractor conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, as advised by the Engineer and/or Safeguards Staff of UEAP PMU & IA.
- May, on the recommendation of the EE DSC and/or Safeguards Staff of UEAPPMU & IA, through the DSC order the Contractor to suspend any or all works on site if the Contractor or his subcontractors/ suppliers fail to comply with the said contractual stipulations with respect to environment and EMMP.
- Act as supervising & monitoring agency as delegated in EMMP.
- Carries out public consultations, addresses complaints and responsible for redressal of grievances.

The Engineer (DSC)

- Guides EA, IA, FPIU and Contractors with respect to environmental regulations and associated requirements, and facilitates ensuring compliance with those;.
- Arranges information meetings for and consults with interested and affected parties about the impending construction activities;
- Maintains a register of complaints and queries by members of the public at the site office. This register is forwarded to the Project Manager of FPIU on weekly basis
- Enforces and monitors compliance the requirements of the EMMP on site;
- Assesses the Contractor's environmental performance in consultation with Environmental Expert
- Documents in conjunction with the Contractor, the state of the site prior to commencing construction activities.
- Documents state of implementation of EMMP and clearly delineate if any item of EMMP is pending partially or fully before issue of completion certificate of the work.

Environmental Expert of Engineer (DSC)

- Briefs the Contractor about the requirements of the Environmental Specification and/ or EMMP, as applicable;
- Facilitates statutory compliance related activities for the IA and Contractors;
- Advises the Engineer about the interpretation, implementation and enforcement of the Environmental Specification and other related environmental matters;
- Monitors and report on the performance of the contractor/project in terms of environmental compliance with the EMMP to the Engineer and UEAP, SDMA-PMU;
- Provides technical advice relating to environmental issues to the Engineer.
- Organise and ensure public consultation and information disclosure are done as per the EMMP and ADB requirements. Monitor complaints and grievances are handled as per the Grievance Redressal Mechanism and report the same as per the environmental reporting.
- Receives complaints/grievances from public, discuss Team Leader (TL) DSC, FPIU & IA and take steps for implementation of remedial measures in consultation with the TL (DSC), and reports to the Engineer (DSC) on the status in its each monthly progress report till satisfactory resolution.

The Contractor

- Appoints one full time suitably qualified and experienced Environmental Safeguard Officer for implementation of EMMP including Environment Health & Safety (EHS) measures, community liaisoning, reporting and grievance redressal on day to day basis.
- Complies with all applicable legislations, is conversant with the requirements of the EMMP, and briefs staff about the requirements of same;
- Ensures any sub-contractors/ suppliers who are utilized within the context of the contract comply with the environmental requirements of the EMMP. The Contractor will be held responsible for non-compliance on their behalf;
- Supplies method statements for all activities requiring special attention as specified and/or requested by the Engineer or Environmental Expert (of Engineer) during the duration of the Contract;
- Provides environmental awareness training to staff;
- Bears the costs of any damages/ compensation resulting from non-adherence to the EMMP or written site instructions;
- Conducts all activities in a manner that minimizes disturbance to directly affected residents and the public in general, and foreseeable impacts on the environment.
- Ensures that the Engineer is timely informed of any foreseeable activities that will require input from the Environmental Expert (of Engineer)
- Receives complaints/grievances from public, discuss with DSC, FPIU & IA and take steps for implementation of remedial measures in consultation with the Engineer (DSC), and reports to the Engineer (DSC) on the status in its each monthly report till satisfactory resolution.

160. The proposed sub-project will be implemented by the IA & FPIU, Uttarakhand Jal Sansthan**.** The FPIU will be responsible for supervision and monitoring of day-to-day implementation of subprojects including EMMP.

161. For monitoring of environmental parameters as outlined in the EMMP, appropriate monitoring agencies would be engaged by the contractor (cost has been included in each contract based on subproject specific monitoring plans) or by the IAs for the monitoring works not included in the civil works contracts (cost included in the budget given in table VIII-2).

Environment Management

162. All works undertaken towards protection of environmental resources as part of the EMMP and as part of good engineering practices while adhering to relevant specifications will be deemed to be incidental to works being carried out and no separate payment will be made unless otherwise specified explicitly. The costs towards environmental management as per EMMP unless otherwise provided as a separate head, will be deemed to be part of the bill of quantities (BOQ) of the project. The scope of works of the contractor towards the implementation of the environmental provisions shall be as follows:

    - Abide by all existing Environmental regulations and requirements of the Government of Uttarakhand and Government of India, local level ULBs and Gram Sabha etc. during implementation

    - Compliance with all mitigation measures and monitoring requirements set out in the EMMP.

    - Submission of a method statement detailing how the subproject EMMP will be

complied with. This shall include methods and schedules of monitoring.

- Monitoring of project environmental performance including performance indicators defined therein, and periodic submission of monitoring reports.
- Compliance with all measures required for construction activities in sensitive areas, in line with the regulatory requirements of these protected areas, and the guidelines set forth in the management plans for these areas.
- Compliance with all regulatory requirements associated with proximity of the sub-project to the International Borders based on assessment of Contractor in consultation with the Engineer DSC.
- Compliance of all safety rules and regulations applicable at work, and provision of adequate health and safety measures such as water, food, sanitation, personal protective equipment, workers insurance, and medical facilities besides all social and community related requirements as stipulated in EMMP.

163. The detailed provisions for specific environmental issues shall be as outlined in the EMMP table on impacts and mitigation measures. Key clauses are outlined in the following sections.

Quarrying

164. The contractor will identify and seek prior approval of the engineer for quarryingoperations. Quarrying will be carried only from locations approved by the Department of Geology & Mining and State Pollution Control Board and no new quarries will be opened for the purposes of the project. Any deviation from the provisions will be immediately notified and approval of the engineer is to be sought.

165. The Contractor shall maintain all stockpiles, and spoil disposal areas so as to assure the stability and safety of the works and that any adjacent feature like houses and community assets especially along hill slopes are not endangered, and to assure free and efficient natural and artificial drainage, and to prevent erosion. Stockpiling of materials (, fill material, gravel, aggregates, and other construction materials) shall not be allowed during rainy season unless covered by a suitable material. Storage on private property will be allowed if written permission is obtained from the owner or authorized lessee.

166. Quarries shall be sited, worked, and restored in accordance with the specifications and as per the closure plan (approved by Engineer). Spoils shall be disposed of at approved disposal sites prepared, filled, and restored in accordance with the related specification requirements.

Debris Disposal

167. Dismantling of existing structures: Debris Disposal shall be maximum utilized and disposed as per norms after consultation with DSC/FPIU/PMU Safeguard Specialist. Due care shall be taken that any material falling under hazardous waste category is disposed in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date & applicable norms.

Precautions for protection of Environmental Measures

168. The Contractor shall ensure that construction activities do not result in any contamination of land, air or water by polluting substances or cause noise generated by the activities. For cleaning activities and operation of equipment, the Contractor will utilize such practical methods and devices as are reasonably available to control, prevent and otherwise minimize air/noise pollution.

169. Unless otherwise provided in the specifications, the Contractor shall ensure that no trees or shrubs or other vegetation are felled or harmed except those required to be cleared for execution of the works for which all statutory permissions have been obtained. The Contractor shall protect trees and vegetation from damage to the satisfaction of the Engineer.

Air, Water, Noise Pollution and Soil Contamination

170. All works will be carried out without unreasonable noise and air, water and soil pollution. Subject and without prejudice to any other provision of the Contract and the law of the land and its obligation as applicable, the Contractor will take all precautions outlined in the EMMP to avoid the air, water, soil and noise pollution.

171. The Contractor shall monitor the environmental parameters periodically as specified in the monitoring plan and report to the Engineer.

172. The Contractor shall reduce the dust emission due to construction activities by regular water sprinkling in the affected areas.

173. All the construction equipment and vehicles shall have Pollution under Control (PUC) Certificate to ensure that no air pollution is caused due to operation of their equipment and vehicles.

174. All the construction equipment and vehicles should remain all time in good conditions up to satisfaction of site engineers.

175. The Contractor shall indemnify and keep indemnified the Employer from and against any liability for damages on account of noise or other disturbance created while carrying out the work, and from and against all claims, demands, proceedings, damages, costs, charges, and expenses, whatsoever, in regard or in relation to such liability.

Occupational & Community Health and Safety during Construction

176. The Contractor shall, in accordance with the safety and health provisions specified in the EMMP, provide workers with a safe and healthy working environment, in the work areas, through application of preventive and protective measures consistent with international good practices, as reflected in internationally recognized standards. The contractors, engineer, IAs and the EA will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by-

- Providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances;
- Providing appropriate equipment to minimize risks and requiring and enforcing its use;

- Training workers and other staff; and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment;
- Documenting and reporting occupational accidents, diseases, and incidents;
- Having emergency prevention, preparedness, and response arrangements in place.
- Provide first aid facilities in all the work sites and workers camp and having qualified first aider to give first aid at the time of any accident. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp.
- Contractor should provide safe drinking water, clean eating and resting areas, separate toilets for male and female work force and sufficient amenities at work site and workers camps as per prevalent Labor law and EMMP. Contractor will ensure proper sanitation and would provide soak pits and septic tanks for disposal of waste water and sewage.
- Contractor should have prepared emergency response plan (to be approved by Engineer) with full details and methods of emergency response during any accident and shall have and display the emergency contact numbers at site.
- Contractor should follow all the applicable rules and regulations for workers health and safety.

177. The Contractor will also ensure that the interests of the community are disturbed to the minimum as envisaged in the EMMP. Provide barricade, signage and safety information in and around the construction site and also to prevent local people entering into the construction site.

Post Construction Clearance

178. On completion of work, wherever applicable, the Contractor shall clear away and remove from the sites all constructional plant, surplus materials, rubbish, scaffoldings, and temporary works of every kind and leave the whole of the sites and works in a clean condition as per agreed redevelopment plan to the satisfaction of the Engineer.

179. Construction camp sites and any other sites temporarily occupied during construction shall be cleared as specified in the contract and handed over to the Owner. It will be ensured by the contractor that the site handed over is in line with the conditions of temporary acquisition signed by both parties. Contractor would obtain and furnish (to FPIU) a certificate to this effect from the owner.

180. **Annual Operation and maintenance cost for AMR**

Annual Operation and maintenance cost for AMR water meter for Domestic & Non-Domestic water connections in Srinagar is proposed to be recovered from the provision of meter rent in the Tariff schedule of Uttarakhand Jal Sansthan therefore no additional burden for O & M of meters is assessed

B. Environmental Monitoring Plan

181. To ensure the effective implementation of mitigation measures and Environmental Management Plan during construction and operation phase of the sub-project, it is essential that an effective Environmental Monitoring Plan be followed as given in Table below.

182. Monitoring is an essential component for sustainability of any developmental project. It is an integral part of any environmental assessment process. The monitoring program consists of performance indicators, reporting formats and necessary budgetary provision. The contractors monitoring methods and parameters should be in accordance with the norms prescribed by the Uttarakhand Environment Protection and Pollution Control Board (UEPPCB) & CPCB which ever has stringent standards for air, water, soil and noise. Indicators and Targets for Environmental Performance are provided in the table VIII-4 in Section E of this EMMP. The frequency of sampling and selection of sampling sites are sub-project specific.

183. The monitoring will be carried out by the contractor through approved agency accredited by National Accreditation Board for Testing and Calibration Laboratories and will be supervised by the Environmental Expert of the Design & Supervision Consultant. The monitoring plan is outlined in Table VIII-1 below.

Table VIII - 1 : Environmental Monitoring Plan

Indicators	Parameters to be Monitored	Frequency	Responsibility
Pre- Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Once in Pre-Construction Stage	Contractor, DSC, IA & EA.
Environmental Baseline Data Generation	Ambient Air Quality, Noise level, Water Quality & Soil characteristics as per parameters outlined in EMMP.	Once in Pre-Construction Stage	Contractor
Debris disposal	Safe disposal of construction wastes including bituminous wastes	Random checks	Contractor
Construction Stage			
Legislation, permits and Agreements	Permissions,/ NoCs/Consents other statutory requirement	Continuous	Contractor, DSC, IA & EA.
Dust suppression	No. of tankers for water sprinkling, Timing of sprinkling, Location of sprinkling (log books to be maintained)	Random checks	Contractor
Ambient air quality	PM_{10}, $PM_{2.5}$), SO_2, NO_x, HC	Once in a Quarter where work is in progress and near sensitive receptors; and at the construction camp sites (except monsoon) for the entire construction period	Contractor, to be monitored through approved Monitoring Agency
Ambient noise	Equivalent Day & Night Time Noise Levels	Once in a quarter	Contractor, to

Indicators	Parameters to be Monitored	Frequency	Responsibility
		where work is in progress and near sensitive receptors during construction stage	be monitored through approved Monitoring Agency
Water Quality	TDS, TSS, pH, Hardness, BOD, Faecal Coli form	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Contractor, to be monitored through approved Monitoring Agency
Soil	Available Nitrogen, Phosphorus, Carbon, heavy metals (including Lead) and Pesticides	Once in a quarter where work is in progress and near sensitive receptors during construction stage	Contractor, to be monitored through approved Monitoring Agency
Heritage Protection, if needed	Visual Inspection of works, compliance with ASI regulations and norms	Continuous	DSC/ASI/FPIU
Occupation Health and Safety	Usage of PPE on site, adequacy of equipment. Testing of drinking water for compliance to standards specified in IS:10500.	Continuous and quarterly for drinking water	Contractor
Establishing Medical facilities	Access to health facilities for the construction workers	Continuous	Contractor
Accident record	No. of fatal accidents at work site, No. of injuries, No. of disabilities	Continuous	Contractor
Post construction clearance of site	Physical field verification and Satisfaction certificate from owner: Whether temporary locations for workers camp, site office, batching plant and other construction locations are restored to pre-project conditions as per approved closure plan	Post construction	Contractor
Operation & Maintenance Stage			
Water quality	All parameters as per UEPPCB & CPCB standards	Once in year during operation stage	PMU, SDMA
Disposal of Solid Waste	Proper disposal of Solid Waste (domestic) generated shall be ensured in accordance with the prevalent norms		

Budget covered in subsequent cost Table, however, would be finalized based on subproject specific requirements. Contractor will obtain a copy of approved IEE and keep available at construction site and site office(s) for proper implementation of IEE & EMMP.

C. Environmental Budget

184. As part of good engineering practices in the project, there have been several measures as erosion prevention, rehabilitation of borrow areas, safety, signage, provision of temporary

drains, etc., the costs for which will be included in the design costs (site development cost) of specific subprojects. Therefore, these items of costs have not been included in the IEE budget. Only those items not covered under budgets for construction are included in the IEE budget.

185. The Contractor's cost for site establishment, preliminary, construction, and defect liability activities will be incorporated into the contract agreements, which will be binding on him for implementation and Uttarakhand Jal Sansthan as Implementing Agency and DSC to ensure the compliance. The air, soil, water quality, and noise level monitoring during construction and defect liability phases will be conducted by the contractor for which provision has been kept in Environmental budget of EMMP.

186. These are small construction projects, therefore, it is not expected to cause much significant air, water, soil and noise pollution. The main EMMP cost will arise from monitoring of environmental parameters (air, soil, water and noise).

187. The costs of water sprinkling for dust suppression and providing personal protective equipment to construction workers shall be borne by contractor as part of conditions of contract. In addition the sources of funds for Mitigation measures during construction stage including monitoring during construction stage are also to be borne by the contractor. These are deemed to be included as part of the contract price amount quoted by the contractor for the works. The costs for generation of baseline data and monitoring shall be borne by the contractor. The locations for baseline data generation & monitoring shall be identified during IEE preparation. The baseline data will be generated prior to commencing with civil works. The costs of components for monitoring during operation and maintenance stage and the capacity building costs are to be funded by the PMU. The EMMP cost is given in the Table VIII-2 below.

188. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with this compliance. Only those items not covered under budget for construction are included in the IEE budget. The IEE costs include mitigation, monitoring and capacity building costs. The summary budget for the environmental management costs for the subproject based on construction period stipulated in the bidding document is presented in Table below:

Table VIII - 2 : Environmental Management & Monitoring Costs

Sl. No.	Particulars	Stages	Unit	Total No.	Rate (INR)	Cost (INR) *	Source of fund
A.	Legislation, permits and Agreements	Consent to Establish and Consent to Operate for plants and machinery of the contractor			The cost for clearances, permits and consents required by IA & Contractors shall be borne by them respectively.		
B.	Public consultations and information disclosure	Pre Construction phase Construction phases		Lump sum	5,00,000	5,00,000	
C. Environmental Baseline Data Generation							
1.	Ambient Air Quality monitoring	Pre-Construction	Per Sample	5	15000	75000	

2.	Noise Quality monitoring			5	5,000	25000	Contractors cost
3.	Water Quality monitoring			4	9,200	36800	
4.	Soil			12	8000	96000	
D.	**Environmental Monitoring**						
1	Air quality	Construction	Per sample	(5 No of Location X 3 seasons in year X 1 sample per location)	15,000	337500	
2	Water quality		Per sample	(4 No of Location X 3 seasons in year 1 sample per location)	9200	165600	
3	Noise Levels		Per location	(5 No of Location X 3 seasons in year X 1 sample per location)	5000	180000	
4	Soil			(12 No of Location X 3 seasons in year X 1 sample per location)	8000	432000	
5.	Dust Suppression at subproject sites	construction and defect liability phases	lump sum		lump sum	500000	
6	Ambient Air Quality	Operation/ Defect Liability Period	Per Sample	(5 No of Location X 3 seasons in year X 3 sample per location)	15000	675000	Implementing Agencies cost/ Contractors cost
7	Water quality		Per year	(4 No of Location X 3 seasons in year 1 sample per location)	9200	110400	
8	Ambient Noise Quality		Per Sample	(5 No of Location X 3 seasons in year X 3 sample per location)	5000	225000	
E.	**Capacity Building (Includes cost estimates for entire sub project area not included in the package costs)**						
1	Capacity Building	EMP Training at Site		2	50,000	1,00,000	PMU/ DSC

	expenses 2 sessions	Implementation of EMMP for field PIUs and Engineer					
					Total INR	34,58,300	

D. Environmental Monitoring and Reporting

189. The PMU will monitor and measure the progress of EMMP implementation. Safeguards Staffs of IA /FPIU will undertake site inspections and document review to verify compliance with the EMMP and progress toward the final outcome. Environment and Safety Officer of the Contractor will submit the monitoring of EMMP to the DSC/Engineer on day to day basis. DSC / Engineer will submit monthly EMMP monitoring and implementation reports to FPIU, who will take follow-up actions, if necessary. FPIU/IA will submit quarterly monitoring and implementation reports to PMU. The PMU will submit semi-annual monitoring reports to ADB based on reporting of FPIU/ IA and its safeguards staff assessment of the implementation performance and its verification by the PMU safeguards specialist. PMU will also take corrective actions as required.

190. Monitoring reports will be posted in a location accessible to the public.

191. ADB will review project performance against the EA's commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the Project's risks and impacts. Implementation of social and environmental safeguards related requirements will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued.

Table VIII - 3 : Standardized EMMP to guide the contractor in mitigating environmental impacts

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
1.	**Site Establishment and Preliminary Activities Impacts**				
1.1	Legislation, Permits and Agreements	In all instances, EA, IA contractors and consultants must remain in compliance with relevant environmental legislation of India at the national, state and local levels.	1. Permissions,/ NoCs/Consent requirement– IA/PMU 2. Permissions / NoCs/Consents requirement for equipment/machineries and material sourced from licensed/ approved quarries etc – Contractor	PMU	IA, Contractor
		Proof of compliance to statutory requirements must be forwarded by the facility owner and/or contractor to PMU/FPIU in relation to hot mixing, stone crushers, diesel generators etc	ESO-Contractor, Engineer, & Environmental Expert of DSC (EE)	PMU	
		A copy of the EMP must be kept on site during the construction period	ESO-Contractor, Engineer & EE	FPIU, IA & PMU	
1.2	Education of site staff on general and Environmental Conduct[9]	Ensure that all site personnel have a basic level of environmental awareness training	ESO-Contractor and EE EE to deliver	IA & PMU	Contractor, IA
		Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task	Safety and environment officer of Contractor and EE	FPIU, IA & PMU	

[9] These points need to be made clear to all staff on site before the work commences.

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor	Contractor and EE	FPIU, IA & PMU	Contractor, IA
		All employees must undergo safety training and wear the necessary protective clothing /equipment.	Contractor and EE	IA & PMU	
		A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • No alcohol / drugs to be present on site; • Measures for abatement of noise due to construction related activities and conduct of work force. • Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. use of firewood for cooking, the use of surroundings as a toilet facility are forbidden) • Trespassing on private / commercial properties adjoining the site is forbidden	Contractor and EE	IA & PMU	

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		• Other than pre approved security staff, no workers shall be permitted to live on the construction site. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.			
1.3	Social Impacts[10]	Open liaison channels shall be established between the Site owner, operator, the contractors and interested and affected parties such that any queries, complaints or suggestions pertaining to environmental management aspects can be dealt with quickly and by the appropriate person(s).	Environment and Safety officer of Contractor with the Engineer, EE & FPIU	IA & PMU	Contractor
		A communications strategy is of vital importance in terms of accommodating traffic during laying of pipes. The road closure together with the proposed detour needs to be communicated via advertising, pamphlets, radio broadcasts, road signage, etc	Contractor with the Engineer, EE & FPIU	IA & PMU	
		Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Contractor with the Engineer, EE & FPIU	IA & PMU	
		Storage facilities, elevated tanks and other temporary	Engineer and EE	IA & PMU	

[10] It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work.

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		structures on site shall be located such that they have as little visual impact on local residents as possible.			
		In areas where the visual environment is particularly important (e.g. along commercial/ tourism routes) or privacy concerns for surrounding buildings exist, the site may require screening. This could being the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction.	Engineer and EE	IA & PMU	Contractor
		Special attention shall be given to the screening of highly reflective materials on site.	EE	IA & PMU	
1.4	Lack of sufficient planning to assure long term sustainability of the improvements and ensure protection of the assets created and the architectural/archaeological character of the surroundings	Design will include provisions for ensuring effective maintenance and protection of the assets created so as to ensure the long term sustainability.	Contractor, Engineer, EE and FPIU	IA/ PMU	IA
2.	**Design Impacts and Pre-construction Impacts**				
2.1	Layout of components and its location to avoid impacts on the aesthetics, sensitive environmental areas / attributes of the site	The project components siting will avoid impacts on the aesthetics of the site, ensure minimal impacts and in compliance with statutory and regulatory requirements. The contractor, FPIU/ IA and DSC will identify any direct or indirect intervention of primary or secondary activity	Engineer, EE and FPIU	IA & PMU	IA

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		before establishment of any project components on the ground.			
2.2	Selection of materials and construction technologies, if not carefully chosen, will adversely impact the aesthetic appeal of the destinations	Selection of materials will be according to specification and from approved sources Material selection would be done keeping in view that no asbestos (except as allowed), and CFC is used. Contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc), and submit these to the Engineer for approval prior to commencement of any work Where materials are borrowed (mined), proof must be provided of authorization to utilize these materials from the landowner/material rights owner and the Department of Geology and Mining Procurement of all material according to the material specification of the contract document and sourced from licensed and approved sources. A signed document from the supplier of natural materials shall be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant	Engineer, EE and FPIU	IA & PMU	IA

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		legislation			
2.3	Socio cultural resources- Ground disturbance can uncover and damage archaeological and historical remains`	There is not such location is anticipated on the project site. In case of chance of finding such location, Consult Archaeological Survey of India (ASI) and/or concerned dept. of Uttarakhand Govt. as applicable to obtain an expert assessment of the archaeological potential of the site; Consider alternatives if the site is found to be of medium or high risk; Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.	Engineer, EE and FPIU	Contractor, IA & PMU	IA
2.4	Integration of energy efficiency and energy conservation programs in design of sub-project components	The detailed designs for the sub-project components shall ensure that environmental sustainability principles, including energy efficiency, resource recycling, waste minimization, rainwater harvesting etc.	Engineer, EE and FPIU	IA & PMU	IA
2.5	Site clearance activities, including delineation of construction areas	Any removal of vegetation or tree felling shall be done after taking statutory permissions if required. All works shall be carried out such that the damage or disruption of flora other than those identified for	Contractor,	Engineer, EE and FPIU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		cutting is minimum. Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works shall be removed with prior approval from the Environmental Expert of DSC All areas used for temporary construction operations will be subject to complete restoration to their former condition with appropriate rehabilitation procedures.as per the rehabilitation plan prepared by the contractor and approved by the EE of DSC.			
2.6	Blockage of access in residential area, commercial area and sensitive location like school, college, hospitals and court	Contractor will identify such location in the preconstruction stage and prepare plan approved by DSC to minimize inconvenience to the people.	Contractor	Engineer, EE and FPIU	Contractor
2.7	Slop protection near reservoir and intake well	Retaining wall will constructed near reservoir and intake well	Contractor	Engineer, EE and FPIU	The cost and specification is part the bill of quantity of the contract.
3	**Construction Impacts**				
3.1	Construction Camps - Location, Selection, Design and Layout	Siting of the construction camps, labour camp, stockpiles shall be as per the guidelines of UEPPCB, ULB, village panchayat and any other applicable guideline to the local site. The contractor will assess the impact of the	Contractor with the Engineer and EE	FPIU, IA & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		construction camp and should be acceptable to the FPIU/ IA/PMU. below and details of layout to be approved by DSC. Construction camps shall not be proposed within 500m from the sensitive receptors, nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Construction camps will be located away from settlements and drainage from and through the camps will not endanger any domestic or public water supply. Construction camps including sanitation facilities must be adequately drained. Sewage management though septic tanks and solid waste management though local ULB system or other alternate measures.			
3.2	Drinking water availability	Sufficient supply of potable water to be provided and maintained as per the standards, requirements, test methods and sampling procedure according to IS:10500. If the drinking water is obtained from an	Contractor	Engineer and EE	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		intermittent public water supply then storage tanks will be provided. The cleanliness of the storage tanks will be ensured and all measures to be taken to avoid any water contamination.			
3.3	Waste disposal	Pre-identified disposal location (identified by Contractor in compliance to relevant regulation and approved by EE-DSC) shall be part of Comprehensive Waste Disposal Plan Solid Waste Management Plan to be prepared by the Contractor in consultation and with approval of Environmental Specialist of DSC. The Environmental Specialist of DSC shall approve these disposal sites after conducting a joint inspection on the site with the Contractor. Wherever, possible Solid waste management shall be through local ULB system or other alternate measures. Contractor shall ensure that waste shall not be disposed off near the water course or agricultural land, Orchards and Natural Habitats like Grasslands.	Contractor with Engineer	FPIU, IA & PMU	Contractor
3.4	Stockpiling of construction materials	Stockpiling of construction materials and excavated	Contractor with Engineer	FPIU, IA & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		earth or silt in case of construction of river bed filtration does not impact obstruct the drainage and Stockpiles will be covered to protect from dust and erosion.			
3.5	Access to Site	Contractors shall ensure that all side and mitre drains and scour check walls on access and haul roads are functioning properly and are well maintained. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damage as soon as these develop. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have been spilt. Unnecessary compaction of soils by heavy vehicles must be avoided; construction vehicles must be restricted to demarcated access, haulage routes and turning areas. Cognizance of vehicle weight / dimensions must be taken when using access constructed out of certain materials. e.g. paved surfaces / cobbled entranceways.	Contractor with Engineer	FPIU, IA & PMU	Contractor
3.6	Quarry Operations	Contractor shall finalize the quarry for procurement of	Contractor with Engineer	FPIU, IA & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		construction materials after assessment of the availability of sufficient quantity of materials, quality and other logistic arrangements. The Contractor shall obtain materials from approved quarries only after consent of the Department of Mines and Geology and District Administration. Adequate safety precautions will be ensured during transportation of quarry material from quarries to the construction site. Vehicles transporting the material will be covered to prevent spillage.			
3.7	Arrangement for Construction Water	The contractor shall use ground/surface water as a source of water for the construction with the written consent from the concerned Department. To avoid disruption/ disturbance to other water users, the Contractor shall extract water from fixed locations and consult DSC & line agencies before finalizing the locations. The Contractor shall provide a list of locations and type of sources from where water for construction shall be extracted. The Contractor shall need to	Contractor with Engineer	FPIU, IA & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		comply with the requirements of the State Ground Water Department for the extraction and seek their approval for doing so and submit copies of the permission to DSC.			
3.8	Soil/land Erosion	Slope protection measures will be undertaken as per design to control soil erosion. The Contractor shall not in any way modify nor damage the banks or bed of streams, rivers, other open water bodies and drainage lines adjacent to or within the designated area Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. i.e.: these materials must not be placed in storm water channels, drainage lines or rivers. There shall be a periodic checking of the site's drainage system by DSC, FPIU/IA and PMU to ensure that the water flow is unobstructed.	Contractor with Engineer	FPIU, IA & PMU	Contractor
3.9	Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent entering of wastewater into streams, water bodies or the irrigation system during construction. Contractor shall not wash his	Contractor with Engineer	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		vehicles in river/stream water and shall not enter riverbed nearby the water resource area for that purpose. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these shall then be disposed of to a suitable waste site in accordance with Hazardous Wastes (Management, Handling and Transboundary movement) Rules, 2008 and amendments till date and applicable norms Site staff shall not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Engineer) shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc.			
3.10	Water Pollution from Fuel and Lubricants	The Contractor shall ensure that all construction vehicle parking locations, fuel/	Contractor	EE of DSC, Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites shall be located at least 300 m away from rivers/streams and irrigation canal/ponds if any Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuels and lubricants does not contaminate the ground. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be collected and separated through an oil interceptor before discharging it on land or into other treatment system as per specified standards and UEPPCB and ULB norms if any.			
3.11	Soil Pollution due to fuel and lubricants, construction waste	The fuel storage and vehicle cleaning area will be stationed such that spillage of fuels and lubricants does not contaminate the ground. All pollution parameters will be monitored as per monitoring plan. Wastewater from vehicle parking, fuel storage areas, workshops, wash down and refueling areas shall be	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		collected and separated through an oil interceptor before discharging it on land or into other treatment system			
3.12	Generation of dust	The contractor will take every precaution to reduce the levels of dust at construction site. Regular sprinkling of water and Stockpiles of soil will be kept covered in such a manner to minimize dust generation	Contractor	Engineer, FPIU & PMU	Contractor
3.13	Emission from Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery used for construction shall confirm to the relevant Bureau of India Standard (BIS) norms. The discharge standards promulgated under the Environment Protection Act, 1986 shall be strictly adhered to. The use of silent/quiet equipment compliant with India ambient noise standards and standards specified for manufacturers shall be encouraged in the sub Project. The Contractor shall maintain a record of PUC for all vehicles and machinery used during the contract period which shall be produced for verification whenever required.	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
3.14	Noise Pollution	The Contractor shall confirm that all Construction equipment used in construction shall strictly conform to the MoEF/CPCB noise standards and all Vehicles and equipment used in construction shall be fitted with exhaust silencers. At the construction sites noisy construction work such as crushing, operation of DG sets, use of high noise generation equipment shall be stopped during the night time between 10.00 pm to 6.00 am. Noise limits for construction equipment used in this project will be in conformity to the BIS/SPCB/CPCB standards Regular monitoring of ambient noise levels to ensure compliance to UEPPCB standards.	Contractor with Engineer	EE, FPIU & PMU	Contractor
3.15	Material Handling at Site	Workers Employed on mixing cement, lime mortars, concrete etc., will be provided with protective footwear and protective masks and goggles. Workers, who are engaged in welding works, will be provided with welder's protective eye-shields. Workers engaged in stone breaking activities will be provided with protective	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		goggles, masks, and clothing. Stockpiles shall not be situated such that they obstruct natural water pathways. Stockpiles shall not exceed 2 m in height unless otherwise permitted by the Engineer. If stockpiles are exposed to windy conditions or heavy rain, they shall be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. All concrete mixing must take place on a designated, impermeable surface The use of any toxic chemical will be strictly in accordance with the manufacturer's instructions and applicable regulations. The Engineer will be given at least 6 working day's notice of the proposed use of any chemical. A register of all toxic chemicals delivered to the site will be kept and maintained up to date by the contractor.			
3.16	Damage, and disturbance to other infrastructure in the construction site	Confirm location of infrastructure. Finalize alignment in coordination with agencies like Uttarakhand	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		Power Corporation Limited, Bharat Sanchar Nigam Limited, etc. Ensure prior permission of respective agency Realign pipelines, if required and subsequently revise IEE provide public information in case of service disruptions			
3.17	Disposal of Construction Waste / Debris / Cut Material	The Contractor shall confirm that Safe disposal of the construction waste will be ensured in the pre-identified disposal locations. In no case, any construction waste will be disposed around the project site indiscriminately.	Contractor	Engineer, FPIU & PMU	Contractor
3.18	Disruption / cessation of existing water supply systems due to construction activity..	Care be taken during improvement of existing water supply systems, so that disruption in existing water supply would not occur. Tentative schedule of closure should be known to affected people prior to cessation of water supply. In case disruption of water supply exceeds the intimated schedule, arrangement for supply of potable water should be made.	Contractor with Engineer and FPIU	EE, IA and PMU	Contractor
3.19	Safety Measures During Construction	Personal Protective Equipment for workers on the project and adequate safety measures for workers during handling of materials at site will be taken up. The contractor has to comply with	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. The contractor has to comply with all regulations for the safety of workers. Precaution will be taken to prevent danger of the workers from fire, etc. First aid treatment will be made available for all injuries likely to be sustained during the course of work. Contractor shall also organize periodic visits by a qualified registered medical practitioner to the site and workers camp. Contact information of Doctor, availability & location of first aid box shall be displayed in appropriate language both at work site and workers camp. The Contractor will conform to all anti-malaria instructions given to him by the Engineer. The Contractor will also ensure that the interests of the community are preferably not disturbed, and if unavoidable then disturbed to the minimum. Provide traffic management personnel, barricade, appropriate signage and safety information in and around the			

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		construction site and prevent local people entering into the construction site.			
3.20	Clearing of Construction of Camps and Restoration	Contractor to prepare site restoration plans for approval by the Engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the Engineer and facility owner.	Contractor	Engineer, FPIU & PMU	Contractor
3.21	Risk of archaeological chance finds	Strictly follow the protocol for chance finds in any excavation work; Request FPIU/DSC or any authorized person with archaeological field training to observe excavation; Stop work immediately to allow further investigation if any finds are suspected; and Inform FPIU/DSC, and take any action they require ensuring its removal or protection in situ.	Contractor	Engineer, FPIU & PMU	Contractor
3.22	Conflict with locals	Contractor shall ensure that mostly the local labourers are employed and migratory laborer shall be employed	Contractor	Engineer, FPIU & PMU	Contractor

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		only in case of unavoidable circumstances.			
3.23	Environment Safeguard Officer	Contractor shall appoint one full-time suitably qualified and experienced Environment and Safety Officer who shall be responsible for assisting contractor in implementation of EMP, community liaisoning, consultations with interested/affected parties, reporting and grievance redressal on day-to-day basis. This environment and safety officer will be at site till all works related to the project including demobilization are completed.	Contractor	Engineer, FPIU & PMU	Contractor
4	**Operation and Maintenance impacts**				
4.1	Environmental Conditions	The periodic monitoring of the ambient air quality, noise level, water (both ground, surface water) quality and soil, in the subproject area as suggested in pollution monitoring plan through an approved monitoring agency.	Pollution Monitoring Agency appointed by IA	SDMA, PMU	Uttarakhand Jal Sansthan
4.2	Increased Pollution due to the better water supply.	The subproject involves renovation and rehabilitation of existing system, augmentation of water supply is envisaged for 10 years project population and to fulfill the deficit of water supply to user as per 135 lpcd. Subproject does not envisage improvement in distribution system to end users as such	IA, EA and Jal Sansthan	SDMA PMU & GoUK	Uttarakhand Jal Sansthan

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		very little increase is pollution load is anticipated. Sewage generated will be handled by the prevalent existing sewage management system of the town.			
4.3	Algal Growth in Reservoir	Proper and regular cleaning of reservoir & provision of bleaching shall be ensured. Water sourced from River Bed Filtration (RBF) will be stored in Reservoir and chlorination will be done in the reservoir. Water sourced from WTP will be chlorinated at the WTP only and then stored in the reservoir.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	Uttarakhand Jal Sansthan
4.4	Water Quality	Chlorine should be added in sufficient quantity so that residual chlorine within permissible limit is available in pipeline.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	Uttarakhand Jal Sansthan
4.5	Backwash water & Sludge collection	The guidelines to be followed for Consent to Operate of WTPs from UEPPCB (if required) as per Water (Prevention and Control of Pollution) Act 1974. Backwash water and clarifier sludge will be disposed in line with the guideline issued by UEPPCB.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	Uttarakhand Jal Sansthan
4.6	Disposal of Sludge form WTPs		Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	Uttarakhand Jal Sansthan
4.7	Management of Chlorine stock	Chlorine stock shall be maintained in cool, dark and locked rooms, near the reservoir/treatment site and be handled with proper care and under safety measure.	Uttarakhand Jal Sansthan / IA	SDMA PMU & GoUK	Uttarakhand Jal Sansthan

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
4.8	Unhygienic condition due to poor maintenance of sanitation facilities and irregular solid waste collection	Jal Sansthan will carry out maintenance of the existing toilets, and carry out the regular collection and disposal of wastes as per norms. New facilities proposed to be created under UEAP will cater to additional load.	IA, Jal Sansthan.	IA/ Jal Sansthan, GoUK.	Uttarakhand Jal Sansthan
4.9	Chlorination in water • Chlorination through Chlorine solution • Chlorination through Chlorine Gas	• Chlorination in water will be done as per CPHEEO manual and ensure residual chlorination within permissible limit. • Regular laboratory testing for dosing and residual chlorine • Chlorine tank will be stored on impermeable platform with facility of collection of accidental leakage. • Gas Chlorination – the storage of Chlorine gas in HDPE drums. • Gas Chlorination through chlorine tunnel in covered room and controlled by chlorinator, • Provision of leak detector and alarm in the chlorination room. • Provision of Eye bath and emergency shower facility near the gas chlorination.	IA	PMU	Uttarakhand Jal Sansthan
	Annual Operation and maintenance of AMR	Annual Operation and maintenance cost for AMR	IA, Jal Sansthan.	Jal Sansthan, GoUK	Uttarakhand Jal Sansthan

Sl. No.	Activity	Management/ Mitigation	Implementation Responsibility	Supervision Responsibility	Source of Fund
		water meter for Domestic & Non-Domestic water connections in Srinagar is proposed to be recovered from the provision of meter rent in the Tariff schedule of Uttarakhand Jal Sansthan therefore no additional burden for O & M of meters is assessed			

EE= Environmental Expert of Engineer (DSC), DSC= Design & Supervision Consultants, IA= Implementing Agency, EA= Executing Agency, FPIU= Field Project Implementation Unit.

E. Performance Indicator

192. The performance indicators of implementation of environmental management and monitoring plan have been provided in below table.

Table 0-1: Performance Indicators of EMMP

Sl. No.	Performance Indicators	Target	Achievement in Semi-annually and annually
1.	Budget	Environmental Budget (EMMP Budget)	Expenditure till date
	Performance Indicators of Monitoring Plan		
2.	Ambient Air Quality	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
3.	Noise Level	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
4.	Water Quality	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
5.	Soil	Total Number of samples as per Environmental Monitoring Plan	Total Number of samples collected
6.	Safety of Workers	List of PPE as per the number labours	List of PPEs actually provided in the project
7.	Permissions,/ NoCs/Consents requirement	Target timeline to obtain the permit/NoC/ consents and its validity	List of Permission and NoCs / consents obtained till date and status of its validity.
8.	Public Consultation	Total Number of planned Public Consultation with timeline and coverage of people.	Number of public consultation conducted till date and actual coverage of the people.
9.	Grievance redressal	Total number of complaints received, its timeline to response and resolution	Actual number of complaints resolved in percentage, response time.
10.	Issues raised in public consultation	Target to attend the issues raised in the Public Consultation	Status of compliance to the issues of Public consultation
11.	Information disclosure	List of information and locations where information to be disclosed	Actual locations where information has been disclosed.
12.	Education of site staff on Environmental training	Total Number of staffs to be trained	No of staff actually
13.	Capacity Building	Total number of sessions to be covered Total Number of contractors, PIUs and DSCs to be covered	Number of Sessions completed and Number of contractors, PIUs and DSCs.
14.	Implementation of EMP mitigation Measures	All items of Environmental Management Plan with timeline and its respective regulatory standards like for Amebient air Qaulity – NAAQS, 2009	Implementation status of EMP items till date

Sl. No.	Performance Indicators	Target	Achievement in Semi-annually and annually
		standards, Drinking water – IS:10500 etc, Residual Chlorine – UEPPCB standards and CPHEEO manual for handling.	
15.	Reporting	List and number of Report to be submitted	List and number of reports submitted

VIII. GRIEVANCE REDRESS MECHANISM

193. The EA will establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the Projects environmental performance. The project-specific grievance redress mechanism (GRM) is not intended to bypass the governments own redress process; rather it is intended to address affected people's concerns and complaints promptly, making it readily accessible to all segments of the affected people and is scaled to the risks and impacts of the Project.

194. The PMU and PIUs will make the public aware of the GRM through public awareness campaigns. Grievances can be filed in writing using the Complaint Register and Complaint Forms (Appendix 5) or by phone with any member of the PMU or PIU. The contact phone number of the PIUs and the PMU will serve as a hotline for complaints and will be publicized through the media and placed on notice boards outside their offices and at construction sites. The safeguard documents made available to the public in an accessible version will include information on the GRM and will be widely disseminated throughout the corridor by the safeguards officers in the PMU and PIUs with support from the NGO engaged to implement the Community Awareness Program.

195. The PIUs will convene Grievance Redress Committees (GRC) within one week of the voiced grievance at the project level consisting of members of local government, NGOs, project staff, and representatives of the affected people. Decisions on the grievance are to be made within 15 days of committee forming. If the grievance cannot be solved, the PMU is notified to further advice on the situation with higher government and legal bodies.

196. The GRC will ensure rights of vulnerable and poor are included. The grievance mechanism will be scaled to the risks and adverse impacts of the Project. It will address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. The mechanism developed will be in a manner that it shall not impede access to the existing judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

197. The PIU officers will be responsible for processing and placing all papers before the GRC, maintaining database of complaints, recording decisions, issuing minutes of the meetings and monitoring to see that formal orders are issued and the decisions carried out. All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the PMU.

198. The safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second and third tiers), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as Name, ID with unique serial number, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e., open, closed, pending).

IX. CONCLUSION AND RECOMMENDATION

199. The initial environmental examination describes the environmental impact of all components of subproject of Srinagar. This includes rahbilitaion of Water Treatment Plan, Pumping and pumping station, River Bed Filtration, Reservoires and laying of pipes, Replacement of connection pipes for proper piping arrangement from water mains to consumer household upto the AMR meter and installation of AMR meter for proper consumer connections including remote reading of volumetric water consumptions.

200. The locations of all project componets are within the Srinagar Town and on the bank of Alaknanda River. There is no ecologically sensitive area having intervention with the porect components neither directly nor indirectly. No felling of trees envishaged in the project and not having any intervention of cultural or archaeological site.

201. The construction activity will have impact on ambient air and noise environmental due operation of construction vehicles, equipments, excavation and disposal of earth. The laying of pipes in the residential area may cause inconvenience to the local people due obstruction on road and interrupted supply of water. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. The implementation of mitigation measures are suggested in the environmental management and monitoring plan

202. The proposed subproject has been categorized as Category 'B' as per ADB SPS 2009 based on environmental screening and assessment of likely impacts of rehabilitation of water supply system of Srinagar. The initial environmental examination (IEE) ascertains that it is unlikely to cause any significant environmental impacts. Few impacts were identified attributable to the proposed sub-project, all of which are localized and temporary in nature and easy to mitigate.

203. The initial environmental examination ascertains that the subject is unlikely to cause anysignificant environmental impacts. No additional studies or need of undertaking detailed EIA is envisaged at this stage. The Executing Agency shall ensure that EMP and EMoP is included in Bill of Quantity (BOQ) and forms part of bid document and civil works contract. The same shall be revised if necessary during project implementation or if there is any change in the project design and with approval of ADB.

204. To satisfy the GoI guidelines, the statutory clearances are mandatory requirements under projects based on the scope of work and nature of environmental impacts but in this case the consent to operate (CTO) does not require due the proposed minor repairing works to be done at existing water treatment plant (WTP) at Srinagar sub-project. This matter was discussed in State Level High Power Committee (HPC) and UEPPCB meeting and resolved.

205. Since the additional works for rehabilitation of house connections and supply/installation of rehabilitation and augmentation of water supply works in Srinagar/Pauri town and no change proposed hence no additional environmental impacts are foreseen. All the environment protection measures , Health and safety measures proposed for this project will also be applicable for this additional work. Annual Operation and maintenance cost for AMR water meter for Domestic & Non-Domestic water connections in Srinagar is proposed to be recovered from the provision of meter rent in the Tariff schedule of Uttarakhand Jal Sansthan therefore no additional burden for O & M of meters is assessed

.

ANNEXURE I

Brief Description of proposed works

Rehabiltation of House connections and water metering

The proposed works for rehabilitation of water supply projects are under implementation. After the implementation of scheme under UEAP the service level shall improve to 135 lpcd level however it has been observed that present water connection are un-metered therefore it is difficult to assess th consumption and recovery of water charges further more in some areas the house connections are passing through drainage or sub lanes and are damaged therefore, supplying contaminated water.
Hence it is essential to lay branch line and meter all the water connections to ensure supply ofpotable water. In this regard it is worthwhile to note the Current Scenario of Water Connections.

- Buried Corroded old pipes crossing drains.
- Leakage and contaminated drinking water.
- Leakages reduce the pressure in line and consumer dissatisfaction.
- Difficult to check connection points.
- Longer time to repair connections.
- Consumer dissatisfaction for non volumetric water billing.
- No Map of connections from water mains.
- Leakages affect whole distribution system.
- More cost of water production**.**

To improve the above system it is proposed for *"Replacement of connection pipes for proper piping*
arrangement from water mains to consumer household upto the AMR meter and installation of AMR
meter for proper consumer connections including remote reading of volumetric water consumptions"
The scope of works include the replacement of house connection pipes and supply and installation of
AMR water meter on existing house connections along with operation and maintenance for 7 years..
General arrangement shall be as under.

- AMR meters shall be installed during the contract period of one year for existing connections & as per demand for new connections during the contract period of one year.
- For period beyond the contract period, meter installation and related cost to such new connection will be borne by the consumers as per policy of Uttarakhand Jal Sansthan (UJS) and according to their tariff.
- Meter security and water security to such new connection will be borne by the consumers as per policy of Uttarakhand Jal Sansthan (UJS) and according to their tariff.
- Under UEAP, ADB shall provide the assistance for Procurement/ supply and installation of AMR meters along with the related cost of connections, up to 1 year (within the contract period) however shall not provide funds for O&M period & beyond, it is to be borne by UJS similar to the policy applied in other projects of UJS.
- Meter rent and volumetric water consumption charges will be recovered from the consumer by the UJS as per UJS tariff. Operation and maintenance cost for metering

shall be recovered through the meter rent received through water charges as per policy.

- Proper IEC will be done by UJS to solicit the acceptance of the public so that this new system becomes sustainable

The scope of works include the replacement of house connection pipes and supply and installation of AMR water meter on existing house connections along with operation and maintenance for 7 years

Water Connection

Current Scenario (House connections)

S. No.	Parameters	Present water connection	Status of metering	Probable connections after 1 year
1	Domestic 15mm	5455	Un-metered	5997
2	Non Domestic 15mm	204	Un-metered	224
	20mm	1	Un-metered	2
	25mm	3	Un-metered	4
	32mm	3	Un-metered	4
	40mm	0	Un-metered	1
	50mm	3	Un-metered	4
	65mm	1	Un-metered	2
	80mm	2	Un-metered	3
	100mm	1	Un-metered	1
	125mm	1	Un-metered	1
	150mm	2	Un-metered	2
	Total	**221**		**248**
	G. Total	**5676**		**6245**
	TTSP/PTSP	30	Un-metered	36

Need of the project

After detailed assessment it concludes that the present water connections are unmetered, which are proposed to be metered with AMR meters.

- Automatic Meter Reading, or AMR is the technology of automatically collecting consumption, diagnostic, and status data from a water meter and transferring that data to a central database for billing, troubleshooting, and analyzing.
- With the Use of AMR –Human error avoided while taking the reading and need to visit the meter avoided.

Primary reasons for implementing AMR system under UEAP are

- To charge the consumers based on the consumption.
- Under UEAP, water production capacity enhanced based on Demand
- Large Qty. consumers to pay rational charges based on consumption
- To reduce Amount for poorer sections.
- Reduced Meter reading cost.
- Improved Leak Detection.
- Reduce wastage of water.

Sub Project Rational

From the above assessment, it is clear that additional investment is needed for improvement. Large quantity consumers to pay rational charges based on consumption.

Government Action

Government of India has applied an emergency assistance from both ADB and the World Bank; loans from both the funding agencies have already got approved. Loan from ADB has got approved towards the cost of Uttarakhand Emergency Assistance Project (UEAP). Government of Uttarakhand is now focused on implementing metering.

Operation & Maintenance of meters

- Necessary after sales Support-Defect repairs
- Stock of spare parts.
- Support for replacement of parts
- Test Bench Facility for repairs.
- Impart Training in repairs etc to UJS staff.
- Stand Guarantee against manufacturing defects for 7 years.
- Meter reading, generate billing and distribution to consumers.
- Fixing of water meters in new connections during the O&M phase.

Scope of work

Fixing arrangement for AMR meters

- Supply of 15mm to 150mm size water meters with inbuilt wireless AMR facility based on R/F technology.
- Supply of strainer, stop cock, nuts, nipples and ferrule etc. complete.
- Supply of 15 to 150 mm GI medium pipes per connection in a length of 12m.
- Supply of following GI medium pipes

    - 20mm – 1000m
    - 25mm – 1000m
    - 32mm – 1100m
    - 40mm – 2210m
    - 50mm – 2365m

- Laying of pipeline, installation of water meters completes at a safe place inside the premises of the owner.
- Road cutting and reinstatement.
- Operation and maintenance for 7 year after completion of the works.

Conclusion

With the above presentation, the detailed project report for "Rehabilitation of water meters in water supply scheme Srinagar" amounting Rs. 934.62 Lacs is being submitted for technical, administrative and financial approval & allotment of funds under Uttarakhand Emergency Assistance Project – UEAP (ADB Assisted).

Proper Water connection arrangement

APPENDIX – I

Environmental Categorization

A. Instructions:

(i) The project team completes and submits the form to the Environment and Safeguards Division (RSES) for endorsement by RSES Director, and for approval the Chief Compliance Officer (CCO).

(ii) The classification of a project is a continuing process. If there is change in the project components or/and site that may result in category change, the Sector Division submits a new form and requests for requests for re-categorization, and endorsement by RSES Detector and by the CCO. The old form is attached for reference.

(iii) In addition, the project team may propose in the comments section that the project is highly complex and sensitive (HCS), for approval by the CCO. HCS projects are a subset of category a projects that ADB deems to be highly risky or contentious or involve serious and multidimensional and generally interrelated potential social and /or environmental impacts.

B. Project Data

Country/Project No./Project Title : Loan No. 3055 - IND
Uttarakhand Emergency Assistance Project (UEAP)

Project Name: Rehabilitation and Augmentation of Water Supply Scheme in Srinagar & Pauri Towns

Department/Division: Uttarakhand Jal Sansthan (UJS)

Processing Stage : Sub-project Appraisal Report (SAR)

Modality :
[ ] Project Loan [ ] Program Loan [ ] Financial Intermediary
[ ] General Corporate Finance
[ ] Sector Loan [ ] MFF [√] Emergency Assistance
[ ] Grant [ ] Other Financing Modalities

C. Environment Category

[ ] New [ ] Re-categorisation - Previous Category [√]

[ ] Category A [√] Category B [ ] Category C [ ] Category F1

D. Basis for Categorization/ Re- Categorization (pls. Attach documents):

[√] REA Checklist as **APPENDIX – I.**
[ ] Project and/ or Site Description
[ ] Other

E. Comments

Project Team Comments	ESMC Comments
In PIU (UWS Sector under UEAP), 9 sub-projects are already under execution and this is an additional work for Srinagar. The proposed work is for replacement of pipes for proper piping arrangement upto AMR meter and installation of AMR meter for proper consumer connection including remote reading of volumetric water consumption in Srinagar town.	The Project category as per ADB's Safeguards Policy (SPS) 2009 is "B", so IEE is required.

A. Recommended for Approval

Proposed by: UEAP- PIU (UWS)	Reviewed by:
Sign. of Deputy Program Manager (PIU-UWS)	Sign. of Environmental Safeguard Specialist, (PMU-UEAP)
Date :	Date : 21st November, 2016

Endorsed by: Program Manager,(PIU-UWS)

Rapid Environmental Assessment (REA) Checklist
(Checklist 2D General of EARF)

Instructions:

i. The Project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director. RSES and for approval by the Chief Compliance Officer.
ii. This checklist focuses on environmental issue and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; (d) gender checklists/
iii. Answer the question assuming the "without mitigation" case. The purpose is to identify impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title	India/ Uttarakhand Emergency Assistance Project
Sector/Division	Water Supply – Srinagar (District –Pauri)

Screening Question	Yes	No	Remarks
A. Project Siting Is the project area…			
Densely populated?	☐	☒	The population of Srinagar is 33047 (census, 2011).
Heavy with development activities?	☐	☒	
Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	☐	☒	No Cultural Heritage or notified archaeological site within 10 km from the sub-project site.
• Protected Area	☐	☒	Project does not fall within any protected area
• Wetland	☐	☒	
• Mangrove	☐	☒	
• Esturine	☐	☒	
• Buffer zone of protected area	☐	☒	The proposed project does not fall within the buffer zones of wildlife sanctuary or national park or biodiversity reserves.
• Special area for protecting biodiversity	☐	☒	
• Bay	☐	☒	
Potential Environmental Impacts Will the Project cause…			
Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?	☐	☒	There is no upstream human intervention to the water.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	☒	No historical / cultural monuments/ areas available.
Hazard of land subsidence caused by excessive ground water pumping?	☐	☒	No ground water abstraction is proposed.
Social conflicts arising from displacement of communities?	☐	☒	Land Acquisition is not involved
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	☐	☒	No conflict of abstraction of water from the stream.

Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	☐	☒	Water will be supplied as per the drinking water standards
Delivery of unsafe water to distribution system?	☐	☒	Water will be supplied as per the drinking water standards
Inadequate protection of intake works or wells, leading to pollution of water supply?	☐	☒	
Over pumping of ground water, leading to salinization and ground subsidence?	☐	☒	No abstraction of ground water
Excessive algal growth in storage reservoir?	☐	☒	No such situation is anticipated as regular monitoring and maintenance will be done.
Increase in production of sewage beyond capabilities of community facilities?	☐	☒	
Inadequate disposal of sludge from water treatment plants?	☐	☒	
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisance and protect facilities?	☐	☒	
Impairments associate with transmission lines and access roads?	☐	☒	
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	☐	☒	No such situation is anticipated.
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	☐	☒	No such situation is anticipated.
Dislocation or involuntary resettlement of people?	☐	☒	No resettlement is required.
Social conflicts if workers from other regions or countries are hired?	☐	☒	No such situation is anticipated.
Noise and dust from construction activities?	☐	☒	No such situation is anticipated.
Continuing soil erosion/silt runoff from construction operations?	☐	☒	No such situation is anticipated.
Increased road traffic due to interference of construction activities?	☐	☒	No such situation is anticipated.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulation in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	☐	☒	No such situation is anticipated.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	☐	☒	No such situation is anticipated.
Accidental leakage of chlorine gas?	☐	☒	No such situation is anticipated.
Excessive abstraction of water affecting downstream water users?	☐	☒	No immediate downstream competing user of water.
Competing uses of water?	☐	☒	No immediate downstream competing user of water.
Increased sewage flow due to increased water supply?	☐	☒	No such situation is anticipated.
Increased volume of sullage (wastewater from cooking and washing) and sludge from waste water treatment plant	☐	☒	No such situation is anticipated.

Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	☐	☒	No such situation is anticipated.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	☐	☒	No such situation is anticipated.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	☐	☒	No such situation is anticipated.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	**Yes**	**No**	**Remarks**
Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see ***APPENDIX - II***)?	√		The project area falls in the seismic zone V as per Indian Seismic Zone map as per IS: 1893 (Part – 1) 2002.
Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns disrupt reliability of water supply; sea level rise creates salinity intrusion into proposed water supply source)?	√		Will be assessed and suitable mitigation measures will be proposed.
Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g.,high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		√	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement etc.
Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?		√	No such possibility of vulnerability increase of the surrounding area.

B. The Assessment checklist on the Categorization and Planning Requirement for this sub-project?

☐ **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required.

☒**Category B**. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and in most cases mitigation measures can be designed more readily than for category A projects. **An initial environmental examination is required.**

☐ **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impact. No environmental assessment is required although environmental implications need to be reviewed.

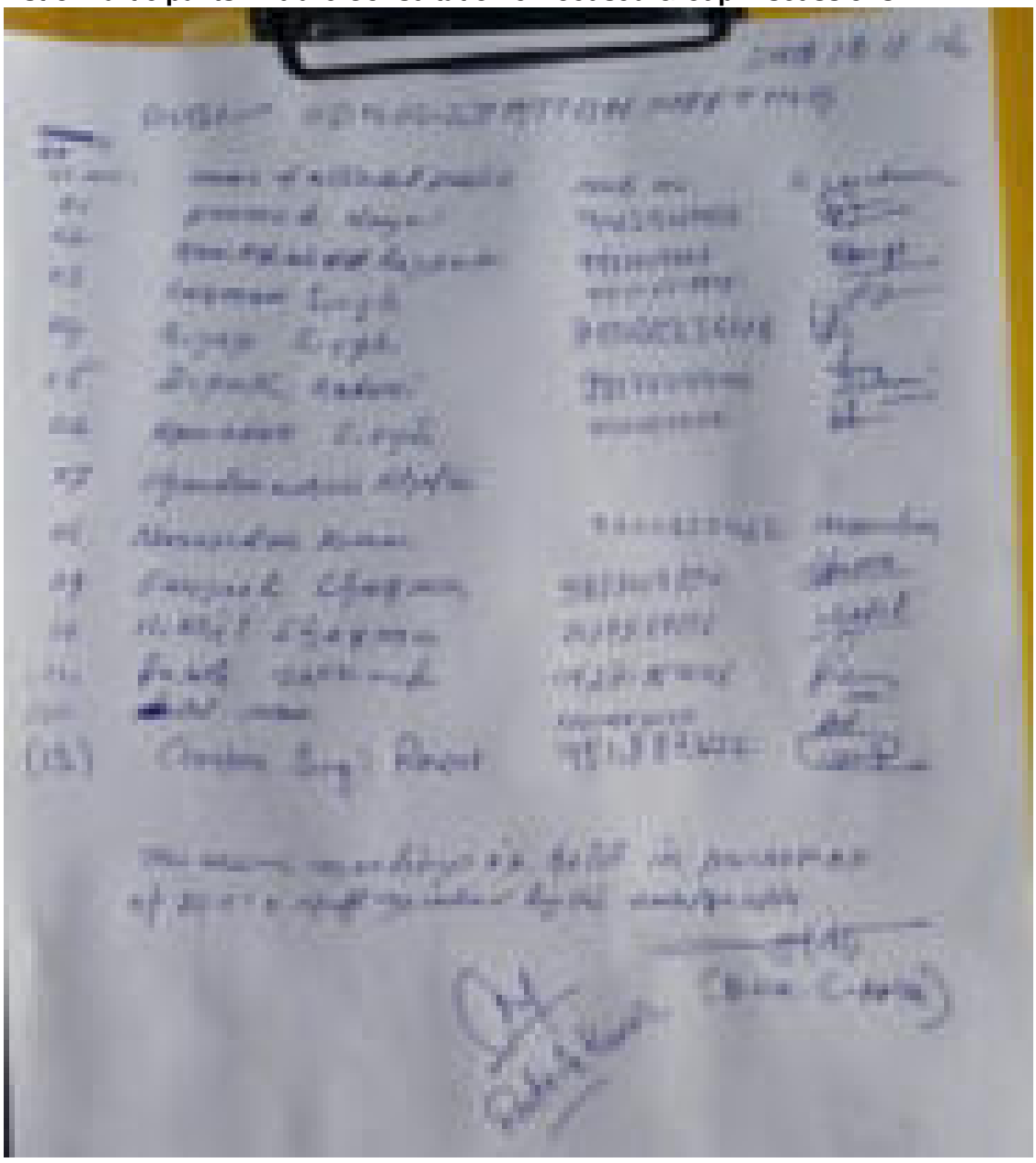
☐ **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a FI.

Appendix – II

Public Consultation

Name of the Sub-Project	**:** Uttarakhand Emergency Assistance Project: Water Supply Sector
Number of Participants	**:** 13+2
Name of the Block	**:** Srinagar
Name of the District	**:** Pauri
Distance from District Head Quarter	**:** 24 Km

List of Participants - Public Consultation & Focused Group Discussions



Appendix III

Public Consultation Photographs

Appendix – IV

Project Photographs of Srinagar Water Supply Scheme

1000KL Water Tank

Scada Room

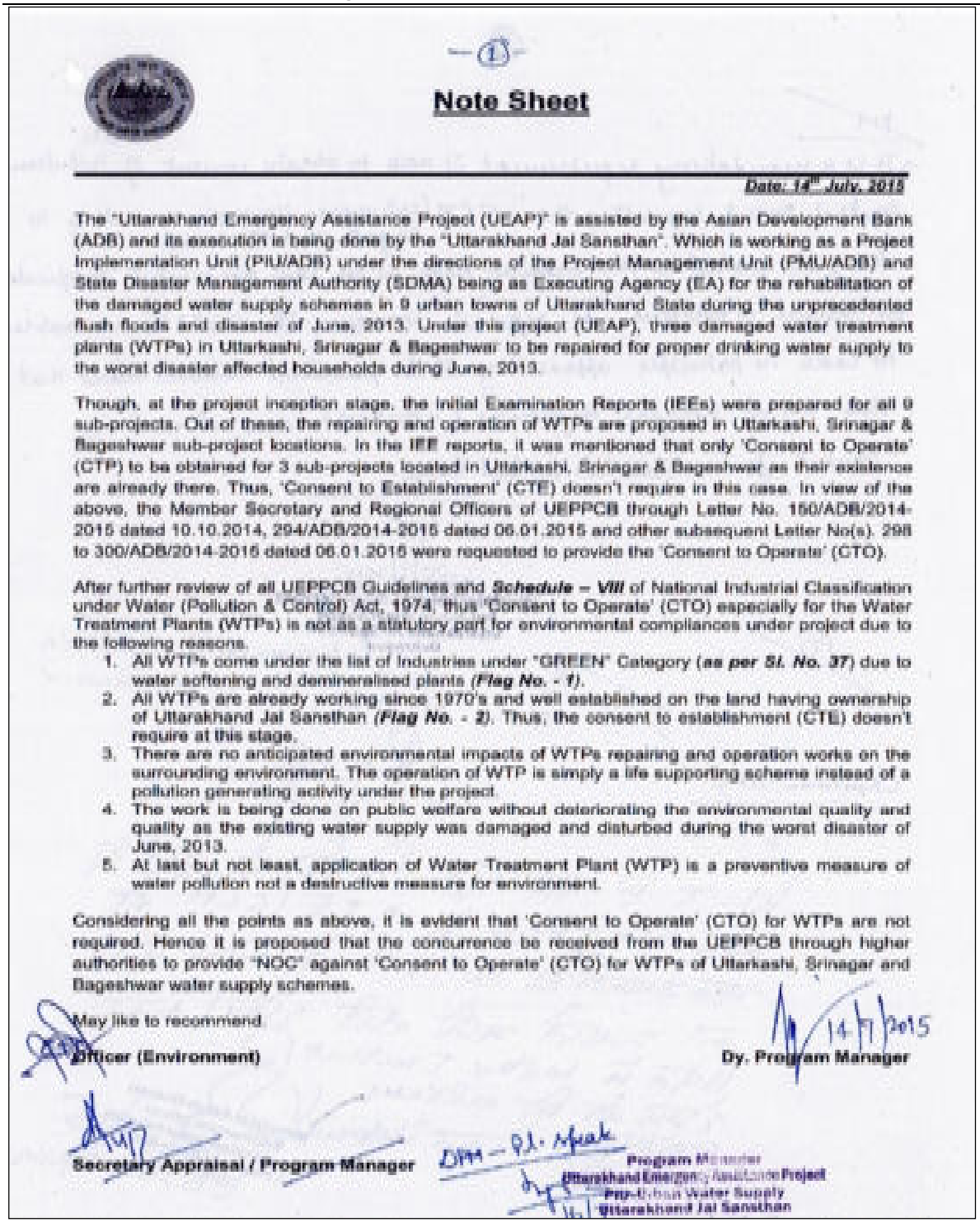
500KL Sump

Office Building

200 KL Water Tank

Pump House

NOC' for Existing Water Treatment Plant (WTP) from UEPPCB



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Note Sheet

Date: 14th July, 2015

The "Uttarakhand Emergency Assistance Project (UEAP)" is assisted by the Asian Development Bank (ADB) and its execution is being done by the "Uttarakhand Jal Sansthan". Which is working as a Project Implementation Unit (PIU/ADB) under the directions of the Project Management Unit (PMU/ADB) and State Disaster Management Authority (SDMA) being as Executing Agency (EA) for the rehabilitation of the damaged water supply schemes in 9 urban towns of Uttarakhand State during the unprecedented flash floods and disaster of June, 2013. Under this project (UEAP), three damaged water treatment plants (WTPs) in Uttarkashi, Srinagar & Bageshwar to be repaired for proper drinking water supply to the worst disaster affected households during June, 2013.

Though, at the project inception stage, the initial Examination Reports (IEEs) were prepared for all 9 sub-projects. Out of these, the repairing and operation of WTPs are proposed in Uttarkashi, Srinagar & Bageshwar sub-project locations. In the IEE reports, it was mentioned that only 'Consent to Operate' (CTP) to be obtained for 3 sub-projects located in Uttarkashi, Srinagar & Bageshwar as their existence are already there. Thus, 'Consent to Establishment' (CTE) doesn't require in this case. In view of the above, the Member Secretary and Regional Officers of UEPPCB through Letter No. 150/ADB/2014-2015 dated 10.10.2014, 294/ADB/2014-2015 dated 06.01.2015 and other subsequent Letter No(s). 298 to 300/ADB/2014-2015 dated 06.01.2015 were requested to provide the 'Consent to Operate' (CTO).

After further review of all UEPPCB Guidelines and ***Schedule – VIII*** of National Industrial Classification under Water (Pollution & Control) Act, 1974, thus 'Consent to Operate' (CTO) especially for the Water Treatment Plants (WTPs) is not as a statutory part for environmental compliances under project due to the following reasons.

1. All WTPs come under the list of Industries under "GREEN" Category (***as per Sl. No. 37***) due to water softening and demineralised plants (***Flag No. - 1***).
2. All WTPs are already working since 1970's and well established on the land having ownership of Uttarakhand Jal Sansthan (***Flag No. - 2***). Thus, the consent to establishment (CTE) doesn't require at this stage.
3. There are no anticipated environmental impacts of WTPs repairing and operation works on the surrounding environment. The operation of WTP is simply a life supporting scheme instead of a pollution generating activity under the project.
4. The work is being done on public welfare without deteriorating the environmental quality and quality as the existing water supply was damaged and disturbed during the worst disaster of June, 2013.
5. At last but not least, application of Water Treatment Plant (WTP) is a preventive measure of water pollution not a destructive measure for environment.

Considering all the points as above, it is evident that 'Consent to Operate' (CTO) for WTPs are not required. Hence it is proposed that the concurrence be received from the UEPPCB through higher authorities to provide "NOC" against 'Consent to Operate' (CTO) for WTPs of Uttarkashi, Srinagar and Bageshwar water supply schemes.

May like to recommend.

14/7/2015

Officer (Environment) **Dy. Program Manager**

Secretary Appraisal / Program Manager

Program Manager
Uttarakhand Emergency Assistance Project
Pey-Jal Water Supply
Uttarakhand Jal Sansthan

— ② —

PM

→ It is a mandatory requirement of MDB to obtain consent of State Pollution Control Board regarding the WTPs (Srinagar, Bageshwar & Uttarkashi). However according to the facts quoted in the previous page, as per law no 'consent to operate' or 'consent to establish' is required. However, it would be advisable to take in principle approval of State pollution Control Board that this WTP at Srinagar, Bageshwar & Uttarkashi does not need any consent from Pollution Control Board.

[signature]
30/7/2015

Program Manager
Uttarakhand Emergency Assistance Project
PIU-Urban Water Supply
Uttarakhand Jal Sansthan
Dehradun

PO

For presentation of UEPPCB to comment as per discussed in HPC.

[signature]
31/7

Chairman HPC

[signature] [stamp]

W.T.P. का [illegible] के [illegible] UEPPCB से CTE/CCA की [illegible] W.T.P. के [illegible] [illegible] [illegible] Water Treatment [illegible] [illegible] [illegible]

[signature]
(Dr. [illegible] Singh Oberoi)
Environmental Officer
Uttarakhand Environment Protection & Pollution Control Board
Dehradun

→ P.D. UEAP

-(8)-

Matter was taken up in M/C held on 28/7/17. The representation of UEPPCB has given his no objection on M/C page 7.

→ PM (P&WD) UWS

28/7

कार्यालय अधिशासी अभियन्ता अनुरक्षण खण्ड उत्तराखण्ड जल संस्थान पौड़ी।
[illegible]
E-mail: [illegible]
Ph No: [illegible]
Fax No: [illegible]

पत्रांक 159 / अ.ली.जी / 2015–16 दिनांक 25 अप्रैल, 2016

//प्रमाण पत्र//

प्रमाणित किया जाता है कि Uttarakhand Emergency Assistance Project(UEAP) के अन्तर्गत प्रस्तावित श्रीनगर–पौड़ी नगरीय पेयजल योजना में प्रस्तावित जल शोध केन्द्र उत्तराखण्ड जल संस्थान के परिसर में स्थित है एवं इस परिसर में उत्तराखण्ड जल संस्थान का स्वामित्व है।

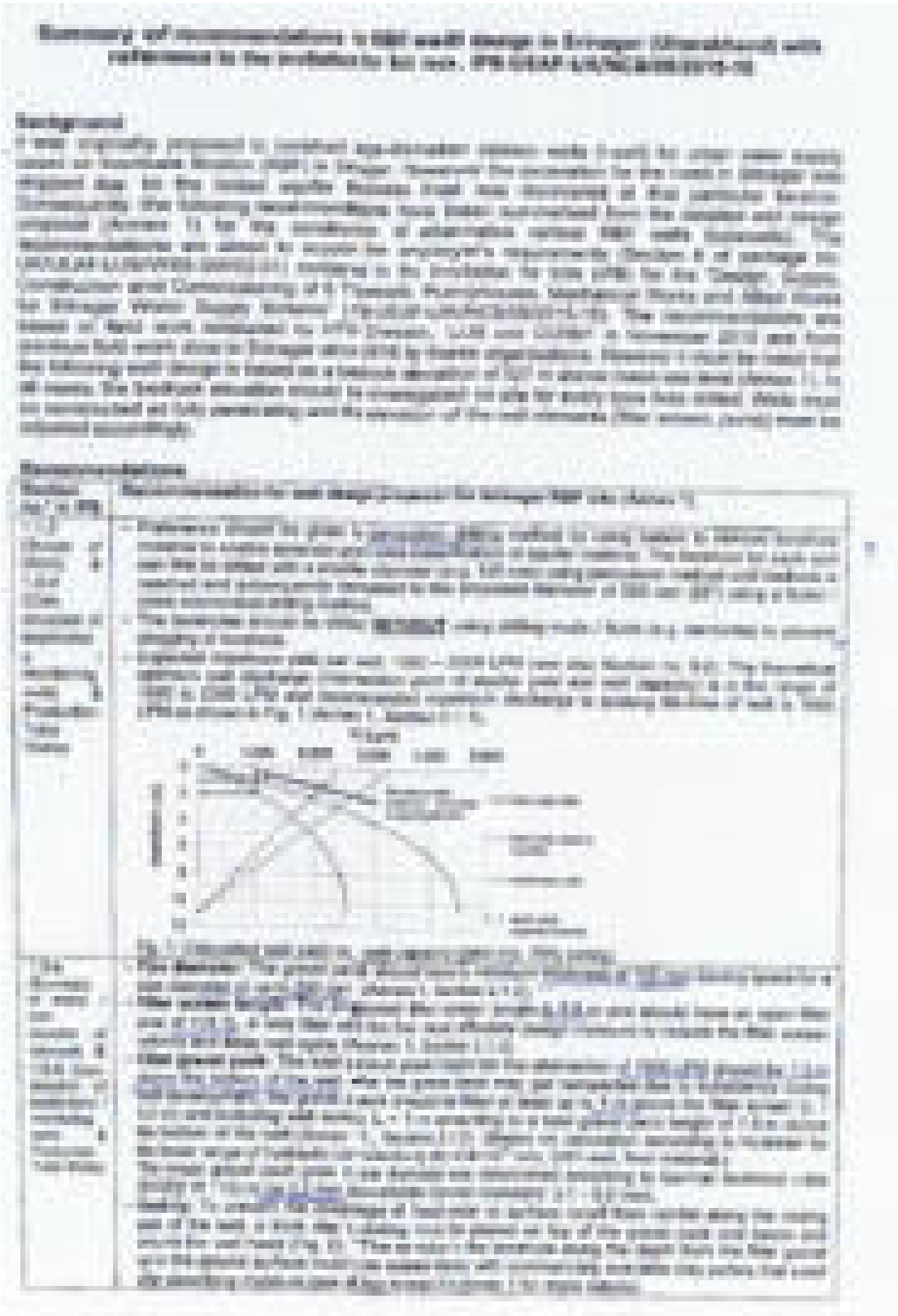
[illegible]
अधिशासी अभियन्ता
[illegible]
पौड़ी (गढ़वाल)

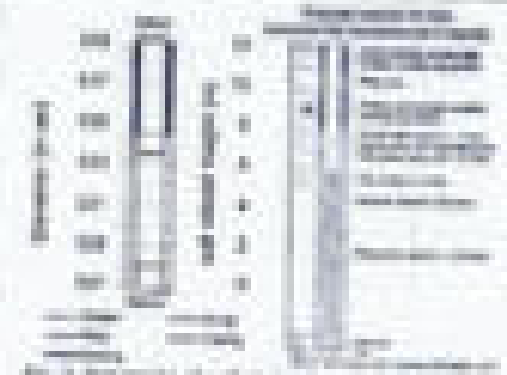
पृष्ठांकन एवं दिनांक उक्त–

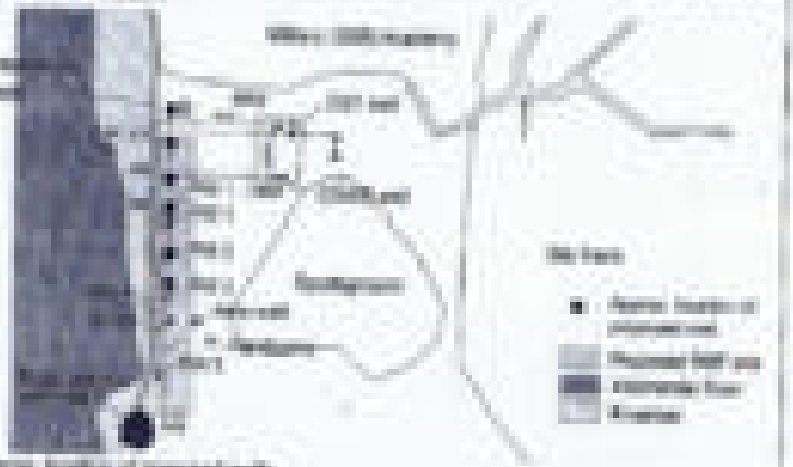
प्रतिलिपि– 1. महाप्रबन्धक (गढ़वाल परिक्षेत्र) उत्तराखण्ड जल संस्थान पौड़ी को सादर सूचनार्थ प्रेषित।

2. अधीक्षण अभियन्ता(पौड़ी वृत्त) उत्तराखण्ड जल संस्थान पौड़ी को सादर सूचनार्थ प्रेषित।

अधिशासी अभियन्ता,
[illegible]
पौड़ी (गढ़वाल)







Appendix – VII

परियोजना प्रबन्धन ईकाई
उत्तराखण्ड डिजास्टर रिकवरी प्रोजेक्ट एवं
उत्तराखण्ड इमरजेन्सी असिस्टेंस प्रोजेक्ट
सिडकुल बिल्डिंग 29 आई.आई.ई. (आई.टी. पार्क) सहस्त्रधारा रोड
देहरादून–248001 उत्तराखण्ड

आपदा राहत एवं पुनर्वास के अन्तर्गत आवास, सड़क, पुल दुर्गम क्षेत्रों के लिये हैलीपैड, चिन्हित क्षतिग्रस्त सरकारी भवनों, पर्यटन विभाग की परिसम्पत्तियों, बहुउद्देशीय भवनों एवं एफ.आर.पी. हट्स बनाये जा रहे है। उपरोक्त से संबंधित किसी भी समस्या के निवारण के लिये परियोजना प्रबन्धन ईकाई एवं जनपद स्तर पर समस्या निवारण प्रकोष्ठ गठित किये गये है, जिनके संपर्क सूत्र निम्नवत है–
इन संपर्क सूत्रों पर कार्यालय दिवसों एवं कार्यालय समयावधि में संपर्क किया जा सकता है।

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