Initial Environmental Examination

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NEP: Urban Water Supply and Sanitation (Sector) Project
(Chainpur Urban Water Supply and Sanitation Subproject)

Prepared by Ministry of Water Supply, Government of Nepal for the Asian Development Bank.

Initial Environmental Examination

May 2018

NEP: Urban Water Supply and Sanitation Sector Project (UWSSSP)

Chainpur Urban Water Supply and Sanitation Project

Chainpur, Bajhang District

Prepared by the
Ministry of Water Supply (MoWS)
for the
Asian Development Bank (ADB)

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected Person
DI	Ductile Iron
DSMC	Design, Supervision and Management Consultant
DRTAC	Design Review and Technical Audit Consultant
DWSS	Department of Water Supply and Sewerage
EARF	Environmental Assessment and Review Framework
EIA	Environment Impact Assessment
EMP	Environment Management Plan
EMR	Environmental Monitoring Report
EPA	Environment Protection Act
EPR	Environment Protection Rules
EO	Environmental Officer
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GI	Galvanized Iron
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HHs	Households
HDPE	High Density Polyethylene
IBAT	Integrated Biodiversity Assessment Tool
ICG	Implementation Core Group
IEE	Initial Environmental Examination
MoFE	Ministry of Forests and Environment
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard
NPR	Nepalese Rupees
PMO	Project Management Office
RPMO	Regional Project Management Office
ROW	Right of way
REA	Rapid Environmental Assessment
SPS	Safeguard Policy Statement
SDG	Sustainable Development Goal
ToR	Terms of Reference

USD	United States Dollar
UWSSSP	Urban Water Supply & Sanitation Sector Project
VDC	Village Development Committee
WTP	Water Treatment Plant
WHO	World Health Organization
WSSDO	Water Supply and Sanitation Divisional Office
WUSC	Water Users and Sanitation Committee

WEIGHTS AND MEASURES

C	Celsius/centigrade
dBA	decibel audible
Ha	hectare/s
km	kilometer/s
kph	kilometer/s per hour
M	meter/s
m^3	cubic meter/s
amsl	above mean sea level
mg/l	milligram/s per liter
mm	millimeter/s

NOTES

This Initial Environmental Examination (draft) is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff and may be preliminary in nature. The draft IEE and its environmental management plans will be updated during project implementation.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

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1. The Urban Water Supply and Sanitation Sector Project (UWSSSP) will support the Government of Nepal's 15-year Development Plan for Small Towns. The project will improve water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal.

2. The Chainpur Urban Water Supply and Sanitation Project is located in Bajhang district of the Far Western Development Region, Province 7 of Nepal. The location of the project area is 29º33′ North Latitude and 81º12′ East Longitude. It is situated in the basin of the Seti River at the confluence of BauliGaad River. The project town is surrounded by Sunikot and Bhatekhola VDCs to the East, Daulichour in the North, Rithapata VDC in the West and Luyanta & Henmantabada VDCs in the South.

   The service area of the proposed project covers ward numbers 9, 10 & 11 of Jaya Prithvi Municipality. The major settlements/toles of the service area are Chaud, Dewal, Kholabada, Rithapata, Simkhet of Ward 9, Chainpur,Damdur, Badi Wada, Bangala Tole, Bank Tole, Basanta Tole, Bista Tole, Bramada tole, Bypass Road, Campus Road, Chari Dhunga, Chauraha, Surma Devi Marga, KulaliGaun, Shanti Marg of Ward 10 andBhopur, RuinaBagar, Bhopur, Laltin Bazar of Ward 11.

3. The existing water supply scheme covers parts of the municipality core, which supplies water through around 638 house connections. However, coverage is less than 50 % of the total population of the proposed project area. The distribution system is very unsystematic. Distribution pipelines can be seen everywhere up on the street. Leaking water from the pipes is common problem and water is distributed 2 hours a day.

   Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity, coverage is quite insufficient. Regarding the perception of beneficiaries toward water quality, 15.43 percent of the respondents replied the quality of supplied water is unsatisfactory.

   The town has been declared ODF in December 2015. In general the overall sanitation condition of the project area was observed satisfactory. Most of the households in the market area have permanent type of private latrine and few of them have temporary type of private latrine. It was reported that all the colleges/schools, hospital and government offices have toilets. The overall basic sanitation situation of the project area is satisfactory.

   The economy of the area is gradually shifting from rural agricultural economy to business and service based. A high of 33% of the households have business as occupation. Service is another main occupation of 13% households, lead by agriculture (52%). As in the other parts of Nepal remittance has been playing role in local economy of the service area.

4. **Categorization**: Chainpur subproject is classified as Environment Category B as per the SPS-2009 as no significant impacts are envisioned. REA Checklist was filled to assess the impacts. Initial Environmental Examination (IEE) as per EPR-1997 of Schedule-1 has been prepared

and assesses the environmental impacts and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

5. **Subproject Scope:** The subproject is formulated under UWSSSP to improve water supply and sanitation service delivery in ward numbers 9, 10 & 11 of Jaya Prithvi Municipality. Investments under this subproject include intakes, storage tanks, valve chambers, transmission mains with distribution lines, and household connections.

6. **Implementation Arrangements**: The Ministry of Water Supply is the executing agency. The Department of Water Supply and Sewerage (DWSS) is the implementing agency. Implementing activities will be overseen by a separate Project Management Office (PMO) which is established in DWSS head office in Kathmandu and two Regional Project Management Offices (RPMOs) in the eastern and western region. A team of technical, administrative, and financial officials including safeguard specialists will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMO will be staffed by qualified and experienced officers and will be responsible for the day-to-day activities of project implementation in the field, and will be under the direct administrative control of the PMO. Consultant teams are responsible for subproject planning and management and assuring technical quality of design and construction; designing the infrastructure and supervising construction; and safeguards preparation.

7. **Description of the Environment**: The subproject components are located in Jaya Prithvi Municipality. The subproject components will be located in WUSC sites, public road right-of-way (ROW). There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

8. **Environment Management**: An environmental management plan (EMP) is included as part of this IEE, which includes i) mitigation measures for environmental impacts during implementation, ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting, iii) public consultation and information disclosure, and iv) a grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. The EMP will be included in civil work bidding and contract documents.

9. Locations and sitting of the proposed infrastructure were considered to further reduce impacts. The concepts considered in design of subproject are: i) demand for new piped water supply; ii) maximum population coverage mostly in residential areas and areas of high growth rate; iii) avoidance of water-use conflicts, iv) locating pipelines within ROWs to reduce acquisition of land; v) locating pipelines at least 10 meters away from latrines, septic tanks and main drains to avoid contamination; vi) locating sources at least 30 m upstream from sanitation facilities, vii) locating household and public latrines and septic tanks at least 30 meters downstream from the nearest drinking water source; viii) piloting controlled disposal of septage in accordance to WHO standards to reduce the likelihood of uncontrolled disposal as currently practiced; ix) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

10. During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil; and from the disturbance of residents, businesses, and traffic. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. These are common temporary impacts of construction and will be minimized by using best construction methods. Traffic management will be necessary during pipe laying on busy roads.

    During operation, the delivery of unsafe water is a crucial concern that can be mitigated with good operation and maintenance, prompt action on leaks and quality monitoring of supplied water. The operation and maintenance will be carried out timely during this phase.

11. The Mitigation measures have been proposed for adverse environmental impacts. The IEE suggests mitigation of adverse impacts during construction phase and operation phases.

12. **EMP:** To ensure that the recommended mitigation and monitoring actions are duly implemented, monitored, assessed, evaluated and disseminated to the stakeholders for feedback and improvement, the Project's Environmental Management Office will be established and manned by the qualified environmental experts, whose sole responsibility will be to monitor the implementation of the environmental mitigation measures and direct project supervising engineers through project management office for needed action and coordination. Indicatie cost of NRs 5,00,000 has been proposed for environmental enhancement, mitigation works and safeguards.

13. **Consultation, Disclosure, and Grievance Redress Mechanism**: Public consultations were done in the preparation of the project and IEE. On-going consultations will be carried throughout the project implementation period. A grievance redress mechanism is described to ensure any public grievances are addressed quickly.

14. **Monitoring and Reporting**: The PMO, RPMO and DSMC will be responsible for environmental monitoring. The RPMO with support from DSMC will submit monthly monitoring reports to PMO. The PMO will consolidate the monthly reports and will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports in its website.

15. **Conclusions and Recommendations**: Chainpur Urban Water Supply and Sanitation Project will bring a series of benefits to the local people. However, there are some risks in the commencement of the project on time and sustainability of the project which requires to be identified and measures taken to mitigate them. But the analysis shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning, coordination and management. Therefore the proposed subproject is unlikely to cause significant adverse impacts. Based on the findings of IEE, there are no significant adverse impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken.

I Introduction

A. Name and Address of the Individual Institution Preparing the Report

16. Name of the Proposal

The Name of the Proposal is "IEE of Chainpur Town Water Supply and Sanitation Project" in Bajhang district.

17. Name and Address of the Proponent

The Project proponent, Urban Water Supply and Sanitation Sector Project (UWSSSP) of the Government of Nepal (GoN), Department of Water Supply and Sewerage (DWSS), Ministry of Water Supply (MoWS), is responsible for the preparation of the IEE report. The name and address details are as follows;

The Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage
Urban Water Supply and Sanitation Sector Project
Project Management Office
Panipokhari, Kathmandu
Tel: ++977 1 4423848, 977 1 4412348
Fax: ++977 1 4413280
E-mail: info@stwsssp.gov.np
Website: www.sstwssp.gov.np

18. Consultant Preparing the Report

BDA/PEA (JV) has worked on behalf of the proponent for conducting IEE studies and preparing IEE report using all the prevalent guidelines, acts, policies and regulations. The name and address of the consultant is given below;

B. Basis and Extent of IEE Study

The Government of Nepal has prepared a 15 years development plan to implement the water supply and sanitation programs in emerging towns or small towns in order to improve the health and the quality of life of the people living in the project towns by constructing and extending water supply system, drainage and sanitation facilities and providing health and hygiene education programs in the towns. The project follows the community managed demand responsive approach where the community will be involved from the very planning phase to the implementation phase for the operation and maintenance of the subprojects soon after it is completed. The Urban Water Supply and Sanitation (Sector) Project (UWSSSP) will support the government of Nepal (the Government) in providing improved water supply and sanitation services in urban centers (small

towns) in accordance with the updated 15-year Development Plan for Small Towns[1] and the National Urban Development Strategy.It will help the country to meet Sustainable Development Goal (SDG) 6 to ensure availability and sustainable management of water and sanitation for all by 2030.

19. The proposed project will focus on three core areas: (i) improving urban infrastructure in WSS; (ii) improving access to and the level of service for WSS; and (iii) strengthening institutions and building capacity to strengthen the O&M skills of local governments and WUSCs. The proposed project is closely in line with ADB's Water Operational Plan (2011-2020) as well as ADB's Water for All Policy. UWSSSP will be implemented over a five-year period (indicative implementation period is 2018 to 2023).

20. Both the Nepali law and ADB policy require that the environmental implications of individual developments are taken into account in the planning and decision making process and that action is taken to reduce the impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of lending operations and project development and implementation worldwide. Though this IEE report is prepared meeting GoN and ADB requirements, the IEE template of EPA/EPR 1997 of GoN is followed to prepare the document. The IEE Report primarily: (i) provides information on the sub-project and its environmental requirements; (ii) provides the necessary baseline conditions of the physical, ecological, physical cultural and socio-economic environments and/or resources in and surrounding the sub-project's area of influence; (ii) identifies and assesses potential impacts arising from the implementation of the sub-project on its environments and/or resources; (iii) recommends measures to avoid, mitigate, and compensate the adverse impacts; (iv) presents information on stakeholder consultations and participation during subproject preparation (v) recommends a mechanism to address grievances on the environmental performance of the sub-project; and (vi) provides an environmental management plan.

C. Objectives and Scope of the Environmental Study

21. The main objective of the present IEE study for Water Supply and Sanitation purpose is to fulfill the requirements pertaining to Section 3 of EPA 1997 and with respect to Rule 3, Schedule 1 (Annex H) of the Environment Protection Rules, 1997 (including amendments) and to ensure the environmental and social sustainability of the project. It aims to help the decision makers to make informed decision about the project. The specific objectives of the IEE study are as follows:

- To identify, predict and evaluate the potential beneficial and adverse impacts of the project on the physical, biological and socio-economical resources in the project area,
- To suggest enhancement measures to augment the benefits of the project and to propose suitable mitigation measures to avoid, minimize and compensate the adverse impacts of the project
- To prepare appropriate Environmental Management Plan (EMP)
- To inform public about the proposed project and its impact on their livelihood
- To meet the requirements of the EPR, 1997 for environmental safeguards

[1] Government of Nepal. Ministry of Urban Development, 2015. Updated 15-Year Development Plan for Small Towns Water Supply and Sanitation Sector. Kathmandu.

22. Scope of the present IEE study of this water supply and sanitation project focuses on the adverse environmental impacts and its mitigation measures relating to the location, design, construction and operation of all the project activities.

D. Relevancy of the Project

23. The proposed water supply and sanitation project is need to be studied from the environmental point of view as per EPA 1997 and EPR 1997, 2054 BS (and its amendments). The proposed water supply and Sanitation Project is intended to serve drinking water to complete area of ward numbers 9, 10 & 11of Jaya Prithvi Municipality, Bajhangdistrict. The proposed project shall be run from surface water sources to benefit a design population of 17,974(design year 2038).

24. As the proposed project falls within the definitions provided in the EPR 1997(and amendments) Schedule 1 (Annex H) for drinking water projects; an IEE is sufficient as per point 11 of Table I-1 which compares the status of the project point by point against the conditions defined by Environment Protection Rules 1997 (and its amendments) for which a drinking water;

Table I-1: Criteria for Requirement of IEE for Drinking Water Supply Projects as per Schedule 1; Clause H of Environment Protection Rules, 1997 (Amendments1999 & 2007) Compared with Situation of the Project

SN	Condition described in the Act and Regulations	IEE Required as per the Regulation Schedule 1, H	Conditions in this Project
1	Rain Water Collection and Use of Spewing Wetland	Up to 200 hectares	NA
2	Supply of Water in Dry Season from Surface Water Source with a safe yield of	Up to 1 *cusec* and utilizing up to 50 % of the available quantity	NA
3	Ground Water Recharge	Up to 50 % of total aquifer	NA
4	Water Treatment	Up to 25 liter per sec	Within the limit
5	Construction of Tunnel for Channeling Drinking Water	Tunnel construction	Not constructed (NA)
6	Water Resource Development which displaces People Permanent Residents)	25 to 100 people	Not done
7	Settlement of People Upstream of Water Source	Settlement of up to 500 people	Not done
8	Supply of water to a population of	5,000 to 50,000	Within 50,000
9	Connection of New Source to Supply Water to existing water supply system for a population of	10, 000 - 100,000	Population within 100,000
10	Extraction of ground water from sources which are located at point and non-point sources of biological and chemical pollution and/or their influenced areas.	Not done	No non point and point sources of pollution in the

SN	Condition described in the Act and Regulations	IEE Required as per the Regulation Schedule 1, H	Conditions in this Project
			vicinity of the water source
11	Operation of water supply project included in a multipurpose project utilizing a source of 25 liter per sec water. (Construction of Multiple Purpose Reservoir Required)	Not operated	This is not a multipurpose project and is solely for water supply

II Policy, Legal and Administrative Framework

A. Nepal's Environmental Policy Framework

25. Most of the national policies and laws of the Government of Nepal (GoN) are in favor of environmentally sound economic development and growth. Followingsare the summaries of the relevant policies, acts and regulations and guidelines that have been reviewed during the preparation of the IEE report;

The Constitution of Nepal (2072)

The Constitution defines that each person shall have the right to live in a healthy and clean environment (Clause 1 of Article 30). The victim of environmental pollution and degradation shall have the right to be compensated by the pollutant as provided for by law (Clause 2 of Article 30).It prescribes for the State to give priority to the protection of the environment and prevention of its further damage due to physical development activities. Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards.

National Policy on Rural Drinking Water Supply and Sanitation, 2004

The policy provides guidance on water and sanitation service provision in rural areas using community led participatory approaches. While partially relevant to the urban context, particularly around the integration of inputs and local capacity building, it generally fails to address the complex operational challenges to be faced by municipal authorities in implementing and managing urban services.

National Urban Policy (2007) Policy

The policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.

National Urban Water Supply and Sanitation Sector Policy, 2009

The policy is formulated to provide the overall policy support and guidance towards achieving equity in service delivery by ensuring that the financially marginalized households within the system areas are mainstreamed as valid customers of service through design and implementation of financial incentives where so required. It aims to ensure that the roles and responsibilities of central and local government bodies, external development partners, private sector including NGOs and user groups are clearly defined in scheme implementation and regulation and performance management in accordance with national decentralization policy.

B. Nepal's Environmental Legal Framework

26. Environment Protection Act (EPA), 2054 B.S. (1997 A.D), requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA report approved by the concerned sector agency or ministry of environment, respectively, prior to implementation. The EPA: (i) sets out the review and approval process of IEE and EIA reports, that involve informing and consulting stakeholders; (ii) stipulates that no one is to create pollution that would cause

significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards; (iii) specifies for the ministry in charge of environment to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA report; (iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and (v) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environment Protection Rules (EPR), 1997, and its amendments, define the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that require IEE and EIA.

Other environmental acts, rules, plans, policies, guidelines that are relevant to the sub-project are presented in Table II-1:

Table II-1: Other Relevant Environmental Act, Rules, Plan, Policies & Guidelines of Nepal

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
The Constitution of Nepal		The Constitution of Nepal (2072) made the provision to every person has the right to live in a clean environment. It also made provision that the State shall make necessary arrangements to maintain the natural environment. The State shall give priority to special protection of the environment, and rare wildlife, and prevent further damage due to physical development activities, by increasing awareness of the general public about environmental cleanliness. (Articles 16, 30, 35 and 51)	Provision shall be made for the protection of the forest, vegetation and biodiversity, their sustainable use and for equitable distribution of the benefits.
Water Resources Act	1992	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of EIA & preparation of EIA Report before granting license to use water resources for any purpose.	GoN IEE has been approved. Use of water resource has been granted by the District Office.
		Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Sites for main structures have been acquired accordingly. Unidentified sites for office building, guard house, guard house cum building, will be acquired accordingly.
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	EMP prescribes the compliance with NDWQS and its Directives during operation.
Environment Protection Act	1997	It requires a proponent to undertake IEE or environmental impact assessment (EIA) of the proposed project and have the	All development projects are susceptible to environmental

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
		IEE or EIA report approved by the concerned sector agency or the environment, respectively, prior to implementation.	screening, and further assessment as relevant
Environment Protection Rules	1997	Along with its amendments in 1999 and 2007, it defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14.	Schedules 1 and 2 clarify on the thresholds for conducting IEE or EIA
Child Labor Prohibition and Regulation Act	2001	The section 3 of the act prohibits a child from engaging in work, sub clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and sub clause 2 states "Nobody shall engage a child in a risk full occupation or work set forth in the Schedule".	The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means
Labor Act	1992	The Act emphasizes on occupational health and safety of workers and stipulates provision of necessary safety gears and adopting necessary precautionary measures against potentially hazardous machine/equipment in the workplace.	It also stipulates to make arrangements such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers.
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
Drinking Water Rules	1998	The Rules: (i) gives the procedure for the settlement of dispute on use of water sources; (ii) requires water supplier to maintain the quality of water as prescribed in the Water Resources Act; (iii) prohibits water supplier to construct structures and conduct activities that would pollute the water source and cause significant adverse effect on the environment.	Monitoring of the quality of supplied water is prescribed in eth EMP following the NDWQS Directives. GoN has approved the Project's IEE Report.

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Local Government Operation Act	2017	The Local Government Operation Act, 2017 empowers the local authority for the conservation of local natural resources and implementation of environmental conservation activities along with prime responsibility of conducting development projects which includes water supply, sanitation and awareness activities.	Provides basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, most relevant to the Project are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	Project will not impact on physical cultural heritage & biodiversity. EMP provides measures to mitigate impacts.
National Water Supply and Sanitation Policy	1998	The Policy requires the: (i) monitoring of water quality supplied by completed WSS projects; and (ii) evaluation of their benefits in improving health (e.g., reducing water-borne diseases) and in relieving the sufferings of women and other disadvantaged groups in carrying out their responsibilities over water collection and maintenance of sanitation and hygiene.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
National Urban Policy	2007	Policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.	ADB IEE is conducted to ensure environmental conservation and protection.
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE or EIA of proposed WSS projects in accordance with the EPA/EPR to: (i) incorporate consultations with key stakeholders, including end-point users; & (ii) specify measures to mitigate environmental impacts prior to, during construction & operation, as well as corrective measures.	GoN IEE has been approved. This ADB IEE will be submitted to ADB for review and approval.
Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector	2009	The Plan defines the population threshold of “small towns” to be in the range of 5,000 to 40,000. Reference to Schedules 1 and 2 of the EPR, as amended in 2007, places water supply projects in small towns under Schedule 1 or within the threshold of water supply projects requiring only an IEE. The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes environmental effects and performance monitoring.

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysisand monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in eth EMP following the NDWQS Directives.
National Environmental Impact Assessment Guidelines, 1993		In order to integrate the environmental aspects in development projects and programs, the government has developed the National EIA Guidelines (1993). The guidelines provide guidance to project proponent on integrating environmental mitigation measures, particularly on the management of quarries, borrow pits, stockpiling of materials and spoil disposal, operation of the work camps, earthworks and slope stabilization, location of stone crushing plants, etc.	

27. Nepal is party to the following international environmental agreements that have broad relevance to works and environmental assessment of works under the Project: (i) World Heritage Convention, in 2036 B.S. (1978 A.D.); (ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), in (2045 B.S.) 1987 A.D.; (iii) Convention on Biodiversity, in 2050 B.S. (1992 A.D.); (iv) Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London Amendment, in 2052 B.S. (1994 A.D.); and (v) Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, in (2053 B.S.) 1996 A.D. The relevance of the aforementioned environmental agreements to the Subproject are on their emphasis for human activities (such as development projects) to: (i) take on/institute measures to protect the local, as well as global, natural resources and/or environment; (ii) prevent and/or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Sustainable Development Goals, the sixth goal of which is to "ensure access to clean water and sanitation for all" focusing on water governance and promotion of climate change adaptation.

The Chainpur Urban Water Supply and Sanitation Project does not and will not break or go against Nepal's commitment to these international agreements. It supports the country's effort to meet its committed target for SDG 6th.

C. Environmental Assessment Requirements

28. The Project is subject to the environmental safeguard requirements of both the ADB and the Government of Nepal.

Environmental Assessment Requirements of the ADB

29. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. With respect to the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[2]

30. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements as per Table II-2 and the IEE is intended to meet these requirements.

[2] New Version of the "World Bank Group Environmental, Health, and Safety Guidelines", April 30, 2007, Washington, USA. http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuiidelines

Table II-2: SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that the Subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction will be temporary &local. Hence can be mitigated without difficulty. Hence, IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Impacts are discussed in Chapter VI). No transboundary& global impacts, including climate change.
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	Analysis of alternatives is presented in ChapterVII.
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts by means of environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Chapter IX
Carry out meaningful consultation with affected people &facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted. A grievance redress mechanism for the resolution of valid project-related social and environmental issues/concerns is presented in Chapter VIII.

SPS 2009 - Safeguard Requirements	Remarks
Disclose a draft EA (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	The draft IEE will be disclosed on ADB's website prior to Project appraisal. After the GoN has approved the IEE Report, approved IEE will be made available at the offices of the PMO, ICG and WUSC.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting and disclosure of monitoring reports are included in this IEE report.
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	The sub-project does not encroach into areas of critical habitats. Transmission mains are proposed within RoWs and in public land. No trees will need to be cut. Proposed 450 Cum RVT for Chainpur Bazar system, proposed guard house, office building, Sedimentation Unit and Slow Sand Filter at Atakot site are all under public land, and Bhopur site is also public land; and municipality has given consent for the land. Similarly school owned premise in Jalpa site is also agreed to be used by the project (consent letter received), and Golai site where private land is needed, the owners have voluntarily donated land for use for the project. In these site there is no concern of impact on critical habitat or conservation sites
SPS 2009 - Safeguard Requirements 1	**Remarks**
Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	This requirement is only minimally applicable to the sub-project in the aspect of waste generation, e.g., effluent from septic tanks and generated sludge and slurry disposal from water supply and sanitation structures. The sub-project will not involve hazardous materials subject to international bans/phase outs.

SPS 2009 - Safeguard Requirements	Remarks
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	EMP provides measures to mitigate health and safety hazards during construction and operation phases.
Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The project will not affect any physical cultural resource. The EMP recommends the measures to mitigate any such adverse impacts, and also in case of chance find.

D. IEE Approval Process of Nepal

31. The Environment Protection Rules (EPR) defines for the preparation, review, and approval of the IEE report. The process applicable to the sub-project is summarized in Table II-3 below. The key environmental quality standards applied in relevant to this IEE are listed in Table II-4 and their details featured as Annex 2-A.

Table II-3: The GoN IEE Report Preparation, Review, Approval and Implementation Process

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	Sub-project requires an IEE.
If proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	ToR of the sub-project has been submitted.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	Sub-project carried out the IEE and prepared the IEE Report accordingly.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned VDC or Municipality to the CSA.	Sub-project submitted documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	
➢ If review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 21 days from receipt of report.	
➢ If review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	
Proponent implements approved IEE Report and any terms and conditions given with the approval.	Sub-project has not started implementation.

Steps in the Process	Remarks
CSA monitors and evaluates impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	Sub-project has not started implementation.
MoWS conducts environmental audit after two years of project commissioning/operation.	Sub-project has not started implementation.

CSA Concerned Sector Agency
EPR Environment Protection Rules, 2054 (1997), with amendments in 1999 and 2007
MoWS Ministry of Water Supply

32. Relevant Environmental Quality Standards

Table II-4: Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Emission standard for diesel generator discharge to ambient Air	Emission standard for diesel generator	EPR-15, 1997
Noise	National Noise Standard Guidelines, 2012	WHO Guideline Values on Noise Level
Drinking water quality	National Drinking Water Quality Standards, 2006	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011

* For surface and ground water quality monitoring, the National Drinking Water Quality Standard shall be applied since these resources are used for drinking.

III Approach and Methodologies for Conducting IEE

33. In order to meet the objectives of the IEE study a systematic and integrated methodology was followed in accordance with the legal requirements of GoN.

34. The IEE study was conducted as per provisions of the Environment Protection Rules (1997) following the provision of Rules 5, 7, 10 & 11 in compliance with the schedule 1, 3 & 5. The basic methodology as per EPR includes review of literature for preparation of IEE, ToR preparation and approval from the concerned ministry, followed by a 15-days public notification & collection of suggestions from the project stakeholders and collection of information related to physical, biological socio-economic & cultural environment (Rule 5 of EPR) using various applicable survey tools. The principal steps undertaken in the IEE methodology to accomplish the assignment are briefly discussed below:

35. **Literature review**: Available primary and secondary literature in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps etc were collected and reviewed. Feasibility studies of the project conducted at various times were the key documents collected and reviewed to determine the nature and scope of activities of the project that influences the environmental conditions of the proposal area. Similarly published and unpublished reports pertaining to environmental standards, acts, regulations etc were collected and reviewed. Published and unpublished literatures of the project area pertaining to biological, social, chemical, physical, and cultural environments were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

36. **Field Study**: Field studies were conducted in project site areas in an extensive manner by a multidisciplinary team, which comprised of an environmentalist, biologist, socio-economist, and civil engineer. During the visits, baseline information on physical and cultural, chemical, biological, and social conditions of the project direct and indirect impact areas were collected using checklists (Annex 8). The paragraphs below present briefly the various approaches and methodological tools used during the field exploration;

Physical Environment:

37. An extensive Physical Environment survey was carried out by delineating the project impact area to collect the baseline information on physical environment. Topographic and geomorphic features were observed and documented. Physical features such as topography, climate & meterology, air quality, erosion and land stability &land use pattern were observed and recorded. Similarly, data on rainfall and other meteorological conditions were collected. Consultations with the local communities were done at project sites and at user committee's office.

Biological Environment:

38. The vegetation survey was carried out by walkover survey throughout the project direct impact areas. Type of vegetation and forest were identified based on the species composition. Biodiversity values of the indirect impact area were estimated as low, moderate, and high applying standard tools. Ethno-botanical information was obtained. The protected vegetation (rare, endangered, indigenous etc.) of the influence area as per IUCN Red Book, CITES Appendices, and GoN list species were enumerated based on consultation with the local people in the direct impact areas of the project.

39. Wildlife bio-diversity in the indirect impact areas was studied in the field interacting with local people (for habitat continuity) methods to identify linkages between wildlife habitats and

proposal activities. The indicator wildlife and threatened or endangered species (as per IUCN Red Book, CITES Appendices, and GoN list) in the area were discussed with the local communities.

Socio-Economic and Cultural Environment:

40. Household survey with questionnaires was conducted by interviewing to obtain information on socio-economic and cultural environment like demography, ethnicity, education, health, and sanitation, drinking water condition of the project area, irrigation facility, local traditions, religion, land holding pattern, income and expenditure and to acquire their perception towards proposed project, etc. The survey covered 100% of the total HHs whereas only 10% of the total HHs was survived in detail for socio-economic study.

41. Key person interacitons were with local people and stakeholders in order to collect information on migratory pattern of local people, settlements, agriculture, information on project affected families (PAFs, families whose land or property falls under projects area), land transaction and to obtain suggestions and comments from all relevant stakeholders through. Interviews were conducted to assess the current situation of these facilities and the general water/sanitation status of the communities of the project area. Direct observation (walkover survey) was done to collect information on the cultural sites, and public institutions such as temples, cremation grounds, and festival sites, historical and archaeological sites, school, and health post within the direct project affected areas.

Public/Consultation Meetings

42. Semi-formal consultation meetings were held with the local stakeholders. The meetings were focused on sites for the construction of different project components and possible impacts of the project activities on local environment. The role of users' committee to minimize any scuh possible impacts were also discussed.

Response of Consultation Meetings

43. The core topics of the consultation were:

- ✓ About land availability: The User's Group hasreceived consent from Municipality for use of public land. They have also received consent letter from a school, and also received voluntary donation from owners of private land in the name of Chainpur Water Supply and Sanitation Project.
- ✓ About providing specific role for User's Group Members in the field: The user's group had provided specific role for User's Group Members in the project for the better implementation of the project.

Data Processing and Impact Identification, Prediction & Evaluation Methods

44. The environmental impacts, both beneficial and adverse, were elaborately identified, predicted and evaluated to the extent possible, for both construction and operational stages. Each impact identified, predicted and evaluated by using standard methods and techniques on physical, biological, socio-economic and cultural aspects. The impacts were studied in terms of their nature, magnitude, extent and duration. National EIA Guidelines 1993 was used for the reference for the impact identification, prediction and evaluation. Magnitude of the impact were classified into High (H), Medium (M) and Low (L), and extent of the impacts classified in terms of Site Specific (SS),

Local (L), and Regional (R). Similarly, the duration of impactsare classified into Short Term, Medium term and Long term.

Scoring of Impacts

Nature of Impact: D = Direct; IN = Indirect; Magnitude, H = High (60); M = Medium/Moderate (20) ; and L = Low (10), Extent, R = Regional (60), L = Local (20); and S = Site-specific (10), Duration, LT = Long-term (20), MT = Medium-term (10); and ST = Short-term (5) ,The points/scoring are taken from the National EIA Guidelines, 1993. Significance of Impact rated if total score: More than 75: Very Significant, 45-75: Significant, Less than 45: Insignificant.

Team Members for IEE Study

45. The following experts were mobilized to complete the IEE study of Chainpur Urban Water Supply & Sanitation Project (Table III-1).

Table III-1: Study Team for IEE Study of the Project

SN	Name of Expert	Designation	Expertise field
1	Mohan Karkee	Team Leader, Western DSMC Package	Environmental Engineering
2	Yogesh Shakya	Environmental Specialist (IEE Team Leader)	Environment (IEE Focal Person)
3	Deependra Pokharel	Social Safeguards Specialist	Socio-economist
4	Manoj Kumar Sharma	Engineer	Contract Management
5	Sheela Sharma	Associate Environmental Specialist	Environment
6	Elena Pudasainee	Support Staff	

Preparation of IEE report

46. Upon meeting the GoN and ADB requirements for conducting IEE, an IEE report is prepared in a format prescribed in Environment Protection Rules 1997. The format for EPR 1997 is followed but the requirements of ADB are compliedwhile preparing the report in GoN format.

IV Description Of The Project

A. Location and Accessibility of the Project Area

47. Chainpur is situated in Bajhang district of Seti Zone in Province 7. The location of the project area is 29º33´North Latitude and 81º12´East Longitude.It is situated in the basin of the Seti River at the confluence of BauliGaad River. It is the district headquarters of Bajhang district. It is an ancient town and market centre of the district. The town has been declared as a Municipality in May 2014 called Jaya Prithvi Municipality. The project town is surrounded by Sunikot and Bhatekhola VDCs to the East, Daulichour in the North, Rithapata VDC in the West and Luyanta & Henmantabada VDCs in the South.

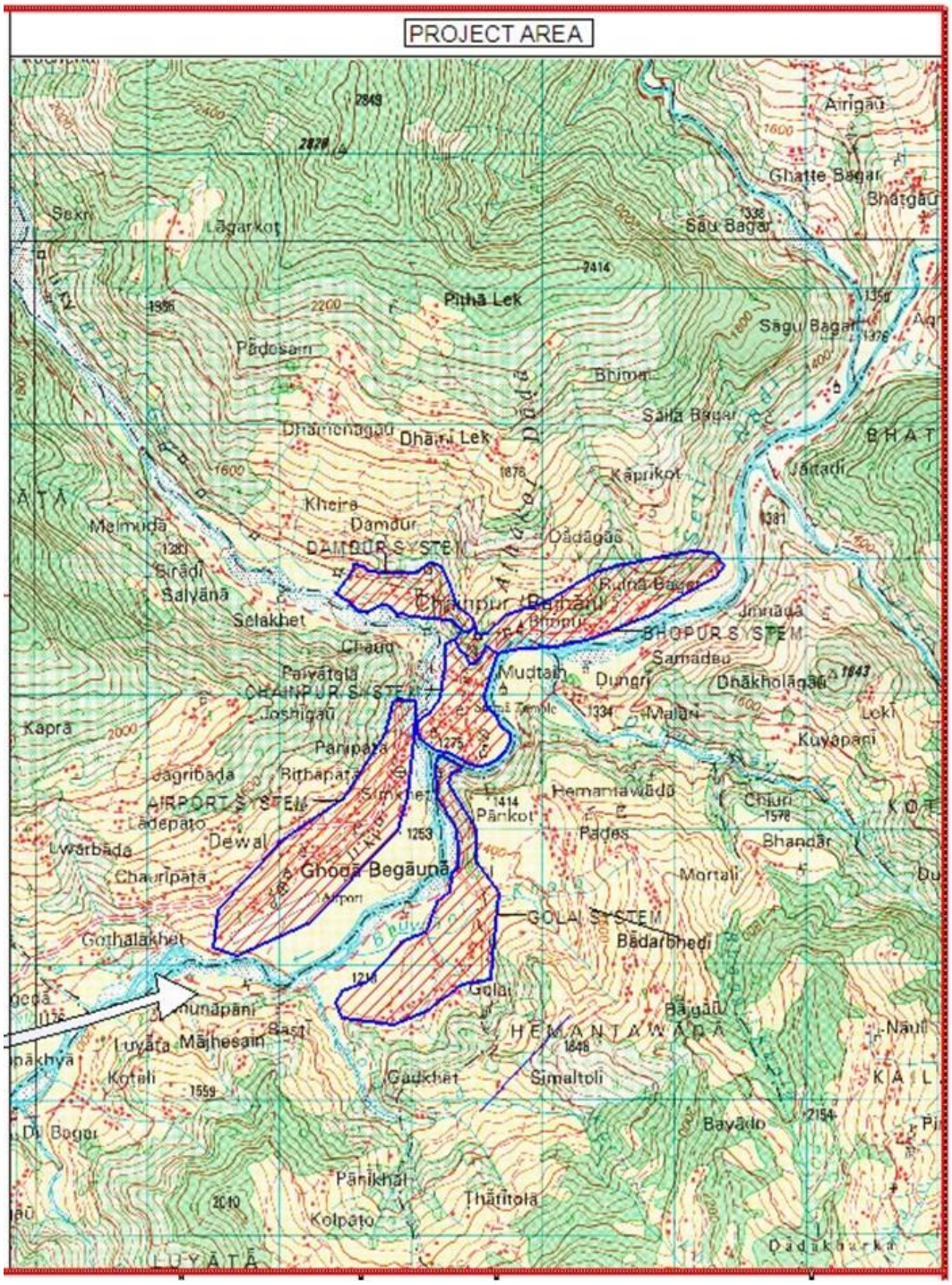


Figure IV-1: Project Area

48. The project area has sub tropical climate. The maximum temperature varies from 25°C to 32°C in summer and 2°C to 12°C in the winter. The average rainfall is 1500 mm. Almost 75% of rainfall occurs during monsoon (June to September).The altitude of the project area (from distribution to intake) is varying from 1300 m to 1700 m above the sea level.

B. Existing Water Supply Situation

49. The existing Chainpur Water Supply System was constructed under WSSDO and handed over to WUSC in B.S 2065. The scheme covers part of the municipality, which supplies water through around 638 house connections. However, coverage is less than 50 % of the total population of the proposed project area. The distribution system is very unsystematic. Distribution pipelines can be seen everywhere up on the street. Leaking water from the pipes is common problem and water is distributed 2 hours a day. Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity and coverage is quite insufficient.

C. Existing Sanitation Situation

50. This town has been declared ODF in December 2015. Most of the households in the market area have permanent type of private latrine and others have temporary type of private latrine. It was reported that all the colleges / schools, hospital and government offices have toilets. Besides this there is one public toilet in Chainpur located at *Khulla Munch*.

51. Lined drain is observed in limited part of the core bazaar area. No water logged area is found as sufficient natural slope exists. The proper management of solid waste by the different agencies has not been developed till now in this town. People were found to manage solid waste in the pits prepared in the backyard of their house.

D. Type, Catergory and Need of the Sub-Project

52. The proposed "Chainpur Urban Water Supply and Sanitation Project" is a surface water based pumping water supply system project covering wards 9, 10 & 11 of Jaya Prithvi Municipality. The project comprises of two major components - water supply and sanitation.

53. The water supply part comprises four new reservoirs have been proposed for storage of water. All the above mentioned sources are surface sources and perennial type.

54. The present water supply and sanitation situation is not satisfactory. Nearly 50% households have tap connections. The distribution system is very unsystematic and water is distributed 2 hours a day. Presently 43 percent of the households are getting water from Public Tap and 7 percent of them are dependent on traditional sources such as spring/river. The existing water consumption scenario indicates that on average only 42 and 39 liter per capita per day of water being consumed in rainy and dry season respectively. Furthermore, more than 96 percent of the beneficiaries feel the quality of supplied water either moderate or unsatisfactory.

55. Chainpur is an emerging town with increasing water demand. The current demand is partially fulfilled by some existing water supply systemswith supply of water for few hours that need to be augmented for better service. Hence to meet the current as well as growing future demand of Chainpurtown, a well-managed water supply system is felt needed. The Chainpur Urban Water Supply and Sanitation Project is a good opportunity for the community to fulfill their water supply and sanitation needs.

Magnitude of Operation of the Project

56. The water supply system has been designed for a base year population of 8,476 for the year 2018. The system has been designed to tap surface water source from an intake and using different water sources for a total design year population of 15,455 in 2038. Four numbers of water storage reservoir tanks has been proposed at different locations considering in mind the elevation difference of the service area. The capacity of 25 cum, 50 cum, 100 cum and 450 cum with total of 625 cum storage capacity reservoirs are designed for the collection and storage of water.

Proposed Schedule for Implementation

57. The exact schedule for implementation of the project will be known after the work has been assigned to the contractor. For the feasibility study, detailed engineering design study and construction, three years period has been assigned. Therefore the base year for the project has been assumed as the year 2018 and considering design period as 20 year the design year has been taken as the year 2038.

58. The main task associated with the project will be as follows:

- Preparation of Detailed Engineering Design
- Preparation of Working Drawings
- Preparation of Quantity and Cost Estimates
- Carrying out of Economic and Financial Analysis and level of Water Tariff
- Preparation of Socio Technical Profile
- Environmental Study of the Sub Project Area
- Preparation of Tender Documents
- Awarding of Contract
- Construction
- Operation and Maintenance

59. The project has been designed with the principle of active community participation from the design stage itself. The implementation strategy of the project is based on the community management approach, which includes encouraging the financial responsibility towards the improved facility. Therefore, user participation at the outset of the planning and design exercise is an essential requirement. The community has to contribute 50% of the total construction cost. Out of which 5% has to be deposited before implementation of the project as upfront cash. Another 35% - 45% to be contributed taking the loan from TDF. The loan should be recovered within the time frame of 15 years with 5 years of grace period, along with the interest of 5% per annum through their affordable water tariffs. Tariff raised by the service has to support towards maintenance of the supply system of the water supply system. DWSS is acting as the initiator/coordinator for the purpose.

Project Requirements

a. Materials required for the project

60. The required materials have been divided into two categories; (1) Local materials and locally manufactured products,and (2) Imported manufacture products. The materials as aggregates, sand, stone, timber, bricks are considered to be local materials and locally manufactured products are considered as GI pipes and fittings, HDPE (PE) Pipes and fittings, cement and reinforcement bars. The materials as DI pipes and fittings, water meters, electrical

equipment including generators, mechanical equipment, and all kinds of valves are considered as imported manufactured products.

Description of the Project and its Components

61. The Chainpur Urban Water Supply and Sanitation Project has been designed as surface water based water supply system that will provide sufficient quantity and good quality of water to the residents of Chainpur town. The water supply component of the project consists of following construction components;

- Intake with collection chambers
- Slow Sand Treatment Unit
- Chlorine Contact Tank
- Ground water Reservoir
- House (Private) Connection
- System Appurtenances
- Chemical Storage and Chemical Dosing unit
- Office Building
- Guard and Operator house
- Water Quality Testing Laboratory
- Boundary Wall

62. The sanitation component of promotion of household level sanitation and environmentally safe toilets. Awareness activities regarding sanitation and hygiene are also included in the sanitation component.

Salient Features of the Project

63. The salient features of the project are given in table below;

Table IV-1: Salient Features of the Project

SN	Items	Description		
1	**Name of the Project**	Urban Water Supply & Sanitation Sector Project,Chainpur Urban Water Supply and Sanitation Project, Chainpur - Bajhang		
2	**Type**	Pumping		
3	**Study Level**	Final Detailed Engineering Design Report		
4	**Location Area**			
	Region	Far Western Development Region		
	Zone/Province	Seti/Province 7		
	District	Bajhang		
	VDC/Municipality	Jaya Prithvi Municipality		
	Wards	Wards 9, 10 & 11		
5	**Available Facilities**			
	Road	Seti Highway *(connected to East-west highway in Attariya through Dhangadhi- Dadeldhura-Bajhang Highway)*		
	Nearest Airport	Chainpur		
	Existing Water Supply System	Partly covered by piped water supply system, springs are used.		
	Electricity, Communication	Available		
	Health Services	Available		
	Banking Facilities	Available		
6	**Source Characteristics**			
	Source Name and Type	Sumps wells 2 Nos. in the bank of Seti river		
	Source Location	Bhopur, Ward No. 10		
	Proposed Tapping yield(lps)	23.41 lps		
7	**Project Components**			
	Storage Reservoirs	**Sub Systems**	**Reservoir sizes (m^3)**	**Remarks**
		Bhopur	50	Proposed Ground based
		Damdur	25	Existing 38 Cum RCC Reservoir will be used
		Chainpur Bazaar	450	Proposed Ground based
		Airport	100	Proposed Ground based
		Total	**625**	
	Valve Chambers (Nos.)	Valve Chamber Type 1 (1500x900x1000) : 19 #		
		Valve Chamber Type 2 (900 x900x1000) : 69 #		
		Air Valve Chamber Type 1 (1500x900x1000) : 4 #		
		Air Valve Chamber Type 2 (900 x900x1000) : 3 #		
		Washout Chamber Type 1 (1500x900x1000) : 10 #		
		Washout Chamber Type 2 (900x900x1000) : 31#		
	Community Stand Posts	Nil		
	Household Connection (Nos.)	2,131 in design year 2038 1, 165 (during construction phase)		
		Transmission		

	Total Length of pipe (m)	**Description**	**Length (m)**
		Pumping Main	1,125
		Gravity Main	3,918
		Sub Total	5,043
		Distributions	
		Subsystems	**Length of Pipes (m)**
		Bhopur	3,909
		Damdur	1,983
		Chainpur Bazaar	7,406
		Airport	5,174
		Sub Total	**18,473**
		Total	**23,516**
	Treatment Unit	Lime dosing unit, Aerator, Pressure filter and Disinfection Unit	
	Fire hydrants	13 numbers	
8	**Social Status**		
	Survey Year Population (2015)	6,454 (permanent) 1,298 (floating) [Total 7,752]	
	Base Year Population (2018)	7,059 (permanent) 1,417 (floating) [Total 8,476]	
	Design Year Population (2038)	12,911 (permanent) 2,544 (floating) [Total 15,455]	
	Household Nos. (2015)	1,065	
	Average Family Size	6.01	
9	**Total Water Demand**		
	Survey year 2015	**906.23 (m3/day) [10.49 lps]**	
	Base Year 2018	**987.80 (m3/day) [11.43 lps]**	
	Design year 2038	**2020.46(m3/day) [23.38 lps]**	
10	**Total Cost of the Project (NRs.)**	**241.0843 million** with 15% contingencies & 13%VAT	
	Water Supply Sector	NRs 233.0849 million	
	Sanitation Sector	NRs 7.9994 million	
11	**Cost Sharing Arrangement for water supply component (NRs)**	**NRs 233.0849 million**	
	1) GoN Grant @ 70%	Rs 163.1594 million	
	2) WUSC Contribution		
	a) upfront cash contribution @ 5%	Rs 11.6542 million	
	b) Loan through TDF @ 25%	Rs 58.2712 million	
12	**Cost Sharing Arrangement for Sanitation Component (NRs)**	**7.9994 million**	
	1) GoN / ADB Grant @ 85%	Rs 6.7995 million	
	2) Local Body (WUSC, VDC & others) 15%	Rs 1.1999 million	
13	**Per capita Investment (for water supply sector including floating population) NRs**	a) Base Year : 27,499.40	
		b) Design Year : 15,081.52	
14	**Monthly Tariff**	**Band**	**NPR per Cum**
		Minimum up to 6 Cum	35.00
		More than 6 cum up to 10 Cum	52.50
		More than 10 Cum up to 20 Cum	78.75
		More than 20 Cum	118.13
15	**Project Status**	Design Phase	
		Revised Detailed Engineering Design	

E. Project Sub-Components

64. Chainpur Urban Water Supply and Sanitation Projectis a piped water supply system using surface water as sources. Service area has elevation difference in order of 210m. Thus considering the topography, landuse, settlement pattern and use of existing facilities; 4 separate distribution schemes are proposed and are briefly described below:

Damdur Sub system

65. This scheme is proposed to serve part of ward 10 *i.e.*north-west portion of the service area. This scheme will mainly serve Damdur settlement located in higher elevation. This bears rural setting. Presently 69 households with 427 populations are residing; and this subsystem is designed to serve 673 populations.

Bhopur Sub system

66. This will serve parts of ward 11. Major settlements *viz*. Bhopur, Lalteen Bazaar, Ruinabagar etc are the main settlements that will be served by this subsystem. Presently 97 households with 677 permanent population and 85 floating population (Total 762 population) are residing; and this subsystem is designed to serve a total of 1,344 populations.

Chainpur Bazaar Subsystem

67. This subsystem is the largest subsystem which serves main bazaar of the service area in ward 10. The present day households are 697; permanent population is surveyed as 4,166. Considerable rental populations (1,192 in numbers) are also accounted. Total population served in survey year is 5,358. BadiTole, Badi Wada, Bagala Tole, Bagar, BaikeTole, Tole, Bista Tole, Bramadatole, etc are the major toles that are covered by this subsystem. This subsystem is designed to serve a total of 10,628 populations.

Airport Subsystem

68. This scheme is proposed to serve part of ward 9 *viz* south-west portion near Airport. Few government offices and Bajhang District Hospital are located in this subsystem. Chaud, Dewal, Kholabada, Simkhet etc are the major settlements served by this subsystem. Presently 202 households with 1184 permanent and 21 rental population are residing; and this scheme is designed to serve 2,810 populations.

Table IV-2: Subsystem-wise Population Projection

Distribution sub system	Survey Year (2015)			Base Year (2018)			Design Year (2038)		
	Population			Population			Population		
	Permanent	Floating	Total	Permanent	Floating	Total	Permanent	Floating	Total
Chainpur Bazaar	4166	1192	5358	4555	1302	5857	8282	2345	10627
Bhopur	677	85	762	729	92	821	1195	150	1345
Damdur	427		427	453		453	673		673
Airport	1,184	21	1205	1,322	23	1345	2,761	49	2810
Total	**6,454**	**1,298**	**7,752**	**7,059**	**1,417**	**8,476**	**12,911**	**2,544**	**15,455**

69. **Water Source:**The existing water sources in the project area are:

The existing water sources in the project area are:

i. Sump well in the bank of Seti River (proposed)
ii. Vankha khola (spring source) dry season discharge 67 lps
iii. Bire khola (spring source) dry season tapping 1.5 lps (presently used)

iv. Balzade khola 0.6 lps (presently sued
v. Khara khola discharge 1.3 lps (presently used)

The sump well in the bank of flood plain of Seti River is expected to yield about 15 lt/ sec. The proposed area is having boulders, sand, gravel which seems good potential aquifers. Other sources are spring sources and perennial type. Discharge of these sources is very small compared to the Seti River and Consultant prefers not to consider taking into the account of climate change.

Two sump wells have been proposed in the bank of the Seti River. The location of the sump well is Bhopur, ward 10. Each sump well is expected to yield minimum of 14.6 lps. As the demand of water is 23.41 lps, the amount of water to be tapped from each sump well is 11.705 lps. The detailed design of the sump well is presented in the Volume II: Design Calculations and Appendix.

Water Quality Assessment/Treatment Facilities:

70. The Nepal Environmental and Scientific Services (NESS) Laboratory was used to conduct chemical, bacteriological and physical tests of the proposed surface water. Samples from Seti River were collected on May 7, 2018 to assess the raw water quality of proposed source. Since there is no existing sump well in the bank of the Seti River, the water sample was collected from the river directly.

Table IV-3: Water Quality Assessment

S.No.	Parameters	Units	Test methods	Observed Values	NDWQS, Nepal
PHYSICAL					
1	Colour	Hazen	2120 B, APHA, 21st Edition	<5.0	5 (15)
2	Turbidity	NTU	2130 B, APHA, 21st Edition	18	5 (10)
3	Conductivity	µS/cm	2510 B, APH, 21st Edition	164	1500
4	pH		4500-H^+ B, APHA, 21st Edition	7.6	6.5 – 8.5
5	Lab temperature	°C	2550 B, APHA, 21st Edition	25.1	-
6	Taste	TFN	2160 B, APHA, 21st Edition	N.O.	Not objectionable
7	Odor	TON	2150 A, APHA, 21st Edition	N.O.	Not objectionable
8	Total Dissolved solid	mg/l	2540 C, APHA, 21st Edition	103	1000
CHEMICAL					
9	Total Hardness	mg/l as CaCO3	2340 C, APHA, 21st Edition	92	500
10	Carbonate Hardness	mg/l	Calculation	68	-
11	Calcium	mg/l	3500- Ca B, APHA, 21st Edition	23.2	200
12	Total Alkalinity	mg/l as CaCO3	2320 B, APHA, 21st Edition	68	-
13	Bicarbonate Alkalinity	mg/l as CaCO3	2320 B, APHA, 21st Edition	68	-
14	Chloride	mg/l	4500-Cl^+ B, APHA, 21st Edition	1.9	250
15	Ammonia	mg/l	4500-NH3 C, APHA, 17th Edition	0.06	1.5
16	Nitrate	mg/l as NO3	4500-NO3 B, APHA, 21st Edition	1,6	50

17	Fluoride	mg/l	4500-F D, APHA, 21st Edition	0.2	0.5-1.5
18	Sulphate	mg/l	4500-SO4 B, APHA, 21st Edition	112	250
19	Iron	mg/l	3111 B, APHA, 21st Edition	2	0.3 (3)
20	Manganese	mg/l	3111 B, APHA, 21st Edition	0.07	0.2
21	Arsenic	mg/l	3114 APHA, 21st Edition	<0.005	0.05
22	Cadmium	mg/l	3111 B, APHA, 21st Edition	<0.003	0.003
23	Mercury	mg/l	3112 B, APHA, 21st Edition	<0.001	0.001
24	Chromium	mg/l	3111 B, APHA, 21st Edition	<0.05	0.05
25	Lead	mg/l	3113 C, APHA, 21st Edition	<0.01	0.01
26	Copper	mg/l	3113 C, APHA, 21st Edition	<0.01	1
27	Aluminium	mg/l	3500-Al B, APHA, 21st Edition	<0.01	0.2
BIOLOGICAL					
28	E. Coli	CFU/100 ml	9222 B, APHA, 21st Edition	300	Nil

Treatment Process:

71. The water treatment process has been selected based on the raw water quality. The raw water quality of the proposed sources is similar in nature of samples tested.Hence, the treatment system consisting Sedimentation Unit, Slow Sand Filter and Disinfection unit is proposed to make the water safe for drinking purpose. The schematic diagram of the proposed treatment plant is shown in figure below;

Sample tests of the sources indicate most of the parameters comply with the NDWQS value. This is to be noted water samples were collected in the month of December, 2015. The turbidity is likely to increase in rainy season and may reach the value of 100. Thus treatment process comprising Sedimentation unit, Roughening filter, Slow Sand filter and Disinfection Units are proposed. The schematic diagram of the proposed treatment plant is as shown in Figure VI- 2.

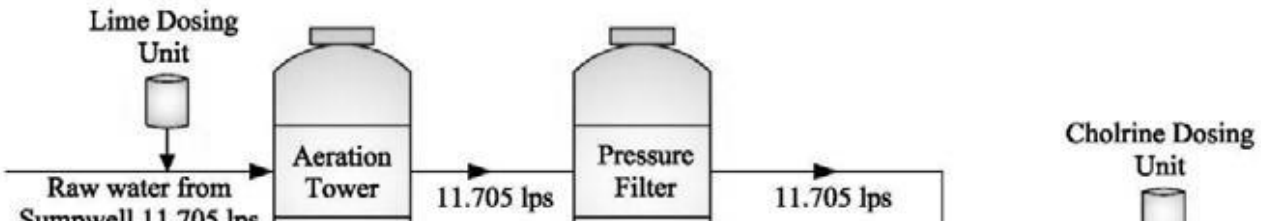


Figure IV-2: Schematic Diagram of Proposed Treatment Process, Chainpur, Bajhang

Sedimentation Unit

72. The proposed sources are spring sources. Although the water quality of these sources is generally good during the dry season with low concentration of the suspended solids, its water quality may worsen during the rainy season with increase in the suspended solids and turbidity. Some of the minerals present in water as shown in Table IV-3 may be in the precipitated form. Sedimentation tank will remove the suspended solids including precipitated minerals. The horizontal flow rectangular sedimentation tank made of R.C.C. with 3 hours detention time is proposed. The proposed sedimentation tank is expected to remove 70% of the suspended solids. 2 units of sedimentation tanks are proposed.

Slow Sand Filter

73. Slow sand filter made of R.C.C. is proposed to remove fine suspended solids thus by reducing the turbidity of water. The slow sand filter is to be packed with sand and gravel as per the design specifications. The under drainage system is installed below the gravel support to collect the filtered water. The filtration rate of 0.20 $m^3/ m^2/ hr$ has been adopted. The slow sand filter is expected to bring down the turbidity of water as per the NDWQS. Large number of coliforms is also expected to be removed in the slow sand filter due to biological action.Four Slow Sand Filter unit are proposed.

Disinfection

74. Although slow sand filter removes coliforms to certain extent, the water might still contain coliforms which might be harmful to human health. These coliforms are killed by disinfection process and make the water safe. The disinfection is proposed by the addition of bleaching powder in the reservoir. Bleaching powder is to be dosed from chlorine dosing tank through a doser. The chlorine dose of 1 mg/l is proposed.

75. **Transmission Mains:** Transmission mains of 5,043 m are estimated to convey water from source to distribution reservoirs of all the five. DI and GI pipes are proposed. For other sizes PE

(HDPE) pipes are proposed. Following table describes the length and sizes of the transmission mains required.

Table IV-4: Transmission main

S.No.	Systems	Length of Pipes (m)
1	Pumping Main	1125
2	Gravity Main	3918
	Total	5043

76. **Storage Reservoirs:** The total storage requirement for the system at the end of design period i.e. 2038 is calculated as 625 m^3. The provision of this quantity has been fulfilled by providing additional ground reservoirs. The reservoirs will be constructed of RCC and is designed as ground based tank as the terrain suggests. The following table summarizes the requirement of reservoir tanks subsystem-wise;

Table IV-5: Requirement of Reservoir

SN	Sub Systems	Reservoir sizes (m^3)	Remarks
1	Bhopur	50	Proposed Ground based
2	Damdur	25	Existing 38 Cum RCC Reservoir will be used
3	Chainpur Bazaar	450	Proposed Ground based
4	Airport	100	Proposed Ground based
TOTAL		**625**	

77. **Distribution Network**

The distribution system comprises of pipe network, which consists of mainly loops and branch in very few places. This network is analyzed using EPANET 2, a design analytical software tool. Distribution pipes are laid both sides of the all metaled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes are predominantly used. Pipe class & size lesser than 6 kgf and 50 mm is not proposed to use. Existing pipes will not be used as these are leaking and found substandard (class of 4 kgf). The total distribution pipe length of the proposed system is about 18,473 km.

TableIV-6: Distribution of Road Networks

SN	Subsystems	Length of Pipes (m)
1	Bhopur	3,909.00
2	Damdur	1,983.00
3	Chainpur Bazaar	7,406.00
4	Airport Subsystem	5,174.00
TOTAL		**18,473**

78. **House Connections:** The system has been designed, predominantly as house to house connections and has been analyzed for a design capacity of providing a total of 2,131 house connections. However, initially during construction phase, only 1,165 house connections are provided to satisfy the need for the base year population.

79. **Appurtenances:** These will primarily comprise of valve chambers or connector boxes to house in flow control valves for controlling flow in the pipeline and to the community taps etc. Altogether 136 valve chambers and 24 pipe type valve boxes are expected in the system. Other appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Some road crossing has been initially provided. This will also facilitate for less road cuttings during the operational phase.

80. **Guard House:** Three guard houses are proposed one located at the northern tip of the project area locating treatment units, and one in the reservoir for Chainpur bazaar sub-system. Refer Drawing Volume for details.

81. **Office Building/Laboratory Room:**One office building consisting manager's room, cash counters, meeting hall, lab room etcis proposed.

82. **O&M Equipments and Tools**

An assessment was done for the needed items. The TSTWSSSP has also some guide lines on it. Besides the following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out;

- Leakage detecting equipment- 1 set
- Submersible sludge pump- 1 no
- Electro-fusion machine for joining the HDPE pipes including portable Generator - 1 set
- Water quality testing laboratory equipment – 1 set
- Other Tools and Plants like: electric pipe cutters, pipe wrenches etc.

83. **Sanitation Improvement**

This component comprises, waste water management, solid waste management, public toilet *etc* and are described below.

Public Toilet

Public toilets are operating in the Bazaar area. Each toilet contains 5 urinals and 2 pans for male users while & 4 female units in separate male and female compartments. Thus public toilet is not included in this project.

Individual Household Toilet Improvement

It was learnt, some of the households have prepared pit latrines with bamboo, shrubs cover. The walls of pit are not found properly protected. Similarly toilet as such was also found made temporarily eg from bamboo, wooden post etc. Thus training programme in association with local bodies will be carried out for the proper construction of local material eg, cement plaster in bamboo woven to make wall, strengthening pit wall by locally available stone , use of RCC rings and cover and its molding methods etc. Accordingly awareness campaign is also carried out regarding public sanitation and health.

Design of low cost latrine for low income household

There are a few types of latrines that may be adopted for low income household and range from borehole latrines to septic tank latrines. The type of latrines the people will construct depends largely on the financial capacity of the consumers. The other factors as culture, tradition of the people, ground condition, climate and availability of space also play a vital role. There are three distinct income groups in the project area. People with higher income tend to build better sanitation

facilities with more contribution, people with medium income like to improve but with little contribution while low income people want to have latrines constructed but do not want to contribute.

Waste Water management
Chainpur does not have a water-borne sewerage system. The current practice of human excreta management and disposal is on-site sanitation consisting of individual household or institutional septic tanks often without a proper effluent disposal system. The septic sludge is often discharged, though illegally, in to surface water-course. The existing practice is unhygienic and unaesthetic for the population.

Solid Waste Management
Chainpur bears a semi urban and rural setting. It was observed that 95 % of the households manage their solid waste by making pit near their houses. This on- site –sanitation practice should be promoted. Thus public awareness campaign and training program shall be conducted regarding the onsite sanitation of solid waste management to concerned municipal officials, users and WUSC members and other members of Tole Lane Organisations. These software programs will help to reduce, reuse and recycle the waste from the households.

F. Community Participation

One of the major financial objectives of the project is to encourage the financial responsibility of the consumer for the improved facilities by requiring co-financing of 30% of the capital cost of water supply, with additional 25% cost recovery of the loan funds for the construction. Up front cash is 5 % of total cost.

There are quite a few clubs and local NGOs in the project area doing social programs. They will be effective for future use especially in awareness generating programs provided they are given training. School children and community social workers will be used in awareness generating programs. Commitment for contribution and participation is found high for the project. All surveyed household samples are willing to contribute for the development of the water supply project. The works of collecting cash is already commenced. During the field visit, contribution aspects were also discussed. It has been said that there would not be any problem for collecting cash from the community.

G. Support Activities

As described earlier, the project is the community based approach and involves communities from the inception to the project implementation. As such there is a need of variety of trainings to water user's committee members. Besides, awareness -generating programs have been identified. The project thus intends to conduct following training and awareness generating programs in the service area.

- Health Awareness Campaign
- School Health Education Program
- Training of Community Motivators
- Training of Community Health Workers
- Training of WUSC Members
- Training of School Teachers
- Solid Waste Management Training
- Animal Waste Management Training

This is a software program in the project, which includes varied training programs. The above program also includes training to WUSC on matters of financial (fixing of water tariff, collection of water revenue, accounting etc.) and purely technical aspects (water quality testing, monitoring, metering, maintenance, estimating cost etc.)

V DESCRIPTION OF THE ENVIRONMENT

A: Physical Environment

84. **Location:** Chainpur is situated in the Bajhang district of the Seti Zone in Far Western Development Region, now Province 7. It is situated in the basin of the Seti River at the confluence of the Seti River and Bauli Gaad River. It has a sub-tropical type of climate. Almost 80% of the rainfall occurs during the monsoon (June to September). The project area lies at 29º 33′ North Latitude and 81º 12′ East Longitude. The altitude of the town is 1,325 m above mean sea level.

Climate, Topography and Geology: Chainpur, Bajhang is situated in the mid-hill region. Geologically it is situated in the Mahabharata range which consists of grey to dark grey phyllite, quartzite and phyllitic schist with thick bedded, fine grained, grey to dark grey shale. The area also consists of grey, greenish-grey, gritty phyllite and phyllitic quartzite, metasandstone and conglomerate beds with white, massive quartzite and basic rocks. It has a sub-tropical type of climate. The maximum temperature varies from 25°C to 32°C in the summer and 2°C to 12°C in the winter. The average rainfall is 1,500 mm. Almost 75% of the rainfall occurs during the monsoon (June to September).The altitude of the project area varies from 1,300 to 1,700 m above mean sea level.

B: Biological Environment

85. **Flora in the Project Areas:**
The dominant forest and fodder species reported in the project area are *Grewia oppositifolia* (Bhimal), *Celtis australis* (Khari), *Sapium insigne* (Khirro), *Bauhinia variegate* (Koiralo), *Sapindus mukorissi*, (Ritha), *Toona ciliate* (Tooni) and in the upper part *Prunus cerasoides* (Paiyu), *Rhododendron arboreum* (Lali Gurans), *Myrica esculenta* (Kaphal), *Alnus nepalensis* (Utis), *Pinus roxburghii* (khote salla), *Quercus semecarpifolia* (Bajh), *Barberis aristata* (Chutro), Ruspberry (Aiselu) etc.

86. **NTFPs in the Project Areas**:
Non-timber forest products (NTFPs) are defined as any kind of product derived from forest species other than timber and fuelwood. The main NTFP species found in the project area are: *Girardiana diversifolia* (Allo), *Rubia manjith* (Majitho), *Gaultheria fragrantissima* (Dhasingare), *Acorus calamus* (bojo) etc.

87. **Fauna of in the Project Areas**:
Panthera pardus (Leopard), *Muntiacus muntjak* (Barking deer), *Hystix indica* (Porcupine), *Canis aureus* (Jackal), *Macaca mulatta* (Monkey), *Felis chaus* (Jungle Cat) are the wild animalsreported in the proposed road area. Similarly birds are *Lophura lencomelana* (kalij pheasant),Lophophorus (Danphe*), Columba livia* (Pigion), etc. The main species of fish found in Seti River (which falls in the watershed of proposed road) is *Schizotharax* sps. (Asla).

To check the sensitivity of ecological concerns, IBAT information has been assessed. Since the project is of small scale and its Indirect Impact Zone (IIZ) is only 200m, only the species listed under 1 km periphery of the core project coordinate have been considered, and the assessment shows that there are very few such species in the proximity DIZ and IIZ (Annex 4).

88. Protected Area.

In the periphery of the subproject area, there is no declared protected area. Buffer zone of Khaptad National Park is more than 5 kms from the project area.

C: Socio economic and Cultural Environment

89. **Demography:** While carrying out the household survey, the local leaders and beneficiary community provided great assistance to identify the exact service area to be considered in the proposed project. During household's survey done by the consultants the households within service area were accounted as 1,065 and population 7,752. The ward numbers and the cluster settlements is presented in table below;

Table V-1: Service Area, HH and population (Survey year 2015)

Ward No.	Major Tole / Settlement	HHs	Population		
			Permanent	Rental	Total
9	Chaud, Dewal, Kholabada, Rithapata, Simkhet	202	1184	21	1205
10	Chainpur,Damdur, Badi Wada, Bangala Tole, Bank Tole, Basanta Tole, Bista Tole, Bramada tole, Bypass Road, Campus Road, Chari Dhunga, Chauraha, Surma Devi Marga, KulaliGaun, Shanti Marg	766	4593	1192	5785
11	Bhopur, RuinaBagar, Bhopur, Laltin Bazar	97	677	85	762
Total		**1,065**	**6,454**	**1,298**	**7,752**

Source: Socio-economic Survey, December 2015

Among the total permanent population (7,752) in the service area, 3,313 are male and 3,141 are female. Male population is slightly higher (51.33 %) than the female population (48.66 %). Ward wise population composition by gender is also illustrated in Figure V-2.

Table V-2:Male/female population and Average HH size (Survey year 2015)

Municipality	Ward No	HHs	Population			Average HH Size
			Male	Female	Total	
Jayaprithvi	9	202	597	587	1184	5.90
	10	766	2393	2200	4593	6.00
	11	97	323	354	677	7.00
Total		**1,065**	**3,313**	**3,141**	**6,454**	**6.10**

Source: Socio-economic Survey, December 2015

90. **Caste / Ethnicity:**The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Brahmin and Chhettri, comprising 76.96 percent of total families, are the most prevailing caste group in the service area. Dalit are the next major group with 17.37 percent, followed by Janajati which constitutes about 4.79 percent (Table V-3);

Table V-3: Caste / Ethnicity

S.N.	Ethnicity	Ward No.			Total	%
		9	10	11		
1	Brahman/Chhetri	175	554	80	809	76.96
2	Janajati	2	41	8	51	4.79
3	Dalit	25	152	8	185	17.37
4	Others		19	1	20	1.88
Total		**202**	**766**	**97**	**1065**	**100.00**

Source: Socio-economic Survey, December 2015

91. **Educational Status:** Chainpur has 16 educational institutions including schools and colleges. Male literacy (79.8) is significantly higher than female literacy (49.5%). The average literacy rate is 64.8% in the municipality *(CBS, 2014)*.

92. **Occupation:** Although, the economy of the area is gradually shifting from rural agricultural economy to business and service based, majority of the households are still dependent on agriculture. As the socio-economic data shows, nearly 52 percent of the households have agriculture as occupation. Business is another main occupation of 33 percent households, followed by service (11%). As in the other parts of Nepal remittance has been playing important role in local economy of the service area, which is the main source of income of more than 1 percent households.The percent of household by occupation is illustrated in Figure V-1.

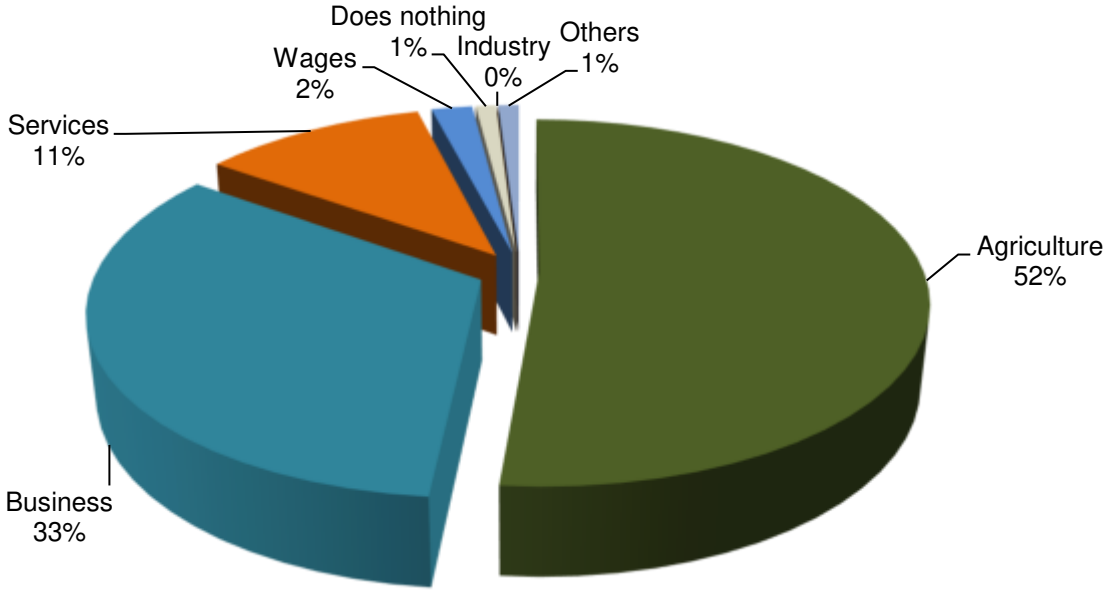


Figure V-1: Household's Main Occupation

Household's Monthly Income Level: Economic condition of the families in service area is satisfactory in terms of their monthly income level. Thedistribution of households by income range is shown in Table-3.5, which indicates that 54.5 percent of themhave income range NRs. 20,001-50,000 per month. Likewise, 32.3 percent of households fall under theincome range NRs. 8,001-20,000 category. As the data shows 9.3 percent of households have highestincome level (more than NRs.50,000/month), whereas 1.50 percent of the households have lowest incomelevel i.e. less than NRs.5,000 per month..The percent of household by occupation is illustrated in Figure 3.

Table V-4: Monthly Average Income Range

S.N.	Income Range (NRs.)	Ward			Total	%
		9	10	11		
1	<5000		15	1	16	1.5
2	5000-8000	2	19	5	26	2.4
3	8001-20000	88	228	28	344	32.3
4	20001-50000	105	424	51	580	54.5
5	>50000	7	80	12	99	9.3
	Total	**202**	**766**	**97**	**1065**	**100**

Source: Socio-economic Survey, December 2015

Finding of socio-economic census survey depicts that the household average monthly income is NRs. 30,816.

Existing Water supply condition: The existing Chainpur Water Supply System was constructed under WSSDO and handed over to WUSC in B.S 2065.The scheme covers part of the Municipality,

which supplies water through around 638 house connections. However, coverage is less than 50 % of the total population of the proposed project area. The distribution system is very unsystematic. Distribution pipelines can be seen everywhere up on the street. Leaking water from the pipes is common problem and water is distributed 2 hours a day.

Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity, coverage is quite insufficient. Regarding the perception of beneficiaries toward water quality 79.5 percent of the respondents feel the quality of supplied water is satisfactory or moderate and only 4.3 percent of them feel good, where as 16.2 percent of the respondents said the water quality is unsatisfactory.

Table V-5: Satisfaction In Terms Of Water Quality

S.N.	Water Quality	Ward Number			Total	Percent
		9	10	11		
1	Good	13	26	7	46	4.3
2	Satisfactory	183	586	78	847	79.5
3	Unsatisfactory	6	154	12	172	16.2
Total		**202**	**766**	**97**	**1,065**	100.00

Source: Socio-economic Survey, December 2015

Existing Sanitation Condition: This town has recently been declared ODF in December 2015. In general the overall sanitation condition of the project area was observed satisfactory. Most of the households in the market area have permanent type of private latrine and others have temporary type of private latrine. It was reported that all the colleges / schools, hospital and government offices have toilets.

Lined drain is observed in limited part of the core bazaar area. No water logged area is found as sufficient natural slope exists. The proper management of solid waste by the different agencies has not been developed till now in this town. People were found to manage solid waste in the pits prepared in the backyard of their house.Regarding the drainage facility, less than 1 percent of the respondents reported that they have access to drainage, whereas nearly 99 percent of them do not have access to it. The sewerage system has not been developed in the service area so far.

93. **Access to Household Latrine:** The access of household to toilet facility is shown in Table V-6, which reveals that 96.71 percent (1030 out of 1065) of the households have household toilet.

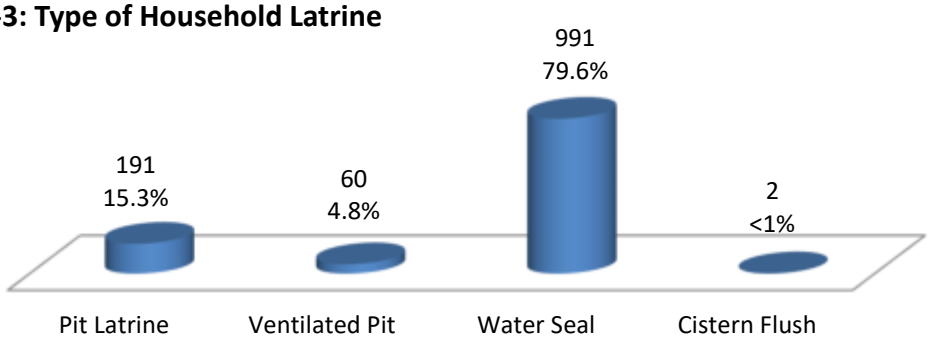
Table V-6: Household Latrine

Toilet	Ward No. / HHs Number			Total	Percent
	9	10	11		
Yes	200	735	95	1030	96.71
No	2	31	2	35	3.29
Total	202	766	97	1065	100

Source: Socio-economic Survey, December 2015

94. Among the households with access to household latrine, 15.3 percent of them have pit latrine, 79.6 percent have water seal type latrine and 4.8 percent have ventilated pit type latrine.

Figure V-3: Type of Household Latrine



Public Toilet: There is one public toilet in Chainpur located at Khulla Munch.

Existing Health Situation: There is one District Hospital and one Health Centre located at Chainpur Bazaar. The district Hospital has 15 beds and providing basic health care facilities. Most of the people visit District Hospital and Chainpur Health Centre for general health treatment. However local people visit Mahendranagar, Nepalgunj or even Kathmandu for treatment of complicated health problems. Additionally total 7 numbers of medical shops are available in this area.

95. Most of people are found aware in health and hygiene. People are aware about hand washing before touching and eating food, and after defecation etc.

Industrial, Commercial and Other demand:
About 20 numbers of cottage industries like bamboo and agro based are functional in the service area. Around 22 numbers of hotels/ lodges are in operation. In coming days, these numbers will be increasing. This shows that non-residential use and demand of water is in increasing trend.

Other Infrastructure:
Electricity, communication, health services and banking facilities are available in the project area. The nearest airport is the Chainpur airport. The project area is connected to East-west highway at Attariya through Dhangadhi-Dadeldhura-Bajhang Highway.

Willingness to pay Monthly Water Tariff
All households were asked how much could they pay as monthly water tariff. Out of the total householdsinterviewed 75.49 percent of households were found eager to pay monthly water tariff range NRs. 101-200, followed by 11.17 percent of household willing to pay up to NRs. 100 monthly as water tariff. Likewise, 10.05 percent of them would like to pay even more than NRs.500 monthly as water tariff.

Table V-7: Willingness to Pay Monthly Tariff

S.N.	Water Tariff	Ward			Total	Percent
		9	10	11		
1	Up to NRs.100	28	80	11	119	11.17
2	NRs. 101-200	172	557	75	804	75.49
3	NRs. 201-500		31	4	35	3.29
4	>NRs. 500	2	98	7	107	10.05
Total		202	766	97	1065	100.00

D. Major Environmental Problems of Project Areas
Some of the major environmental problems prevalent to Chainpurtown are as follows:
96. **Air Quality**: There are no industries in the project area, but there are around 20 cottage industries. These industries are emitting very low amount of air pollutants. Dust from road and vehicular emissions are other sources of air pollution. Other gaseous emissions come from

household cooking and open burning of waste. Emissions from these sources are scattered/spread apart both in terms of locations and timing. From field observation, the ambient air quality of the area is considered to be under normal and acceptable levels.

97. **Acoustic Environment**: The sources of noise in the project area are the construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market places and only in the daytime. At nighttime, noise is generated with the arrivals and departures of buses at the bus park. From field observation, noise level in Chainpur town is within the national and international permissible standards at daytime and nighttime.

98. **Water Quality**: Spring sources and other surface water sources are abundant in the project area. Human activities like washing, waste disposal, sanitary seepages and surface runoff are some of the causes of pollution of water sources. However, the spring sources are relatively cleaner, and water quality analysis shows acceptable limits.

99. **Solid Waste Management**: Chainpur bears a semi urban and rural setting. It was observed that 95% of the households manage their solid waste by making pit near their houses. This on-site sanitation practice should be promoted. Thus public awareness campaign and training program shall be conducted regarding the onsite sanitation of solid waste management to concerned local officials, users/WUSC members and other members of Tole Lane Organisations. These software programs will help to reduce, reuse and recycle the waste from the households.

100. **Sanitation Services**: All the households have their own toilets in or outside the house. In the core, most of the buildings have been constructed with attached water sealed toilet or flush toilet with septic tanks. The newly constructed houses, offices and camps need to be monitored so as to ensure that there is no open defecation. The effort towards the initiation to adopt proper sanitation system can still be found because children at school are being made to practice it, since every school and college has at least one toilet.

VI ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

101. The potential impacts of the proposed Chainpur Urban Water Supply and Sanitation Project are physical, biological, and socio-cultural in nature. They can occur at various phases of the project such as design, preconstruction, construction and operation and maintenance phases. The magnitude of the impacts can be small, moderate, or high depending upon its severity, and can be temporary or long term, reversible or irreversible, local or wide. The impacts need not necessary be limited to negative ones but can be positive as well. The objective of Environment Management is to attempt to augment positive impacts and to minimize negative impacts by sustainable mitigation measures.

A: Beneficial Impacts and Augmentation Measures

A-1: Construction Phase

i. Employment Generation and Increase in Income

102. Creation of employment opportunity to the local community and neighbourhood communities is one of the major benefits of the project. In contrast to other small town's project sites, there are only 1% households with wage-absed working as main occupation. So wage-based works is expected to attract more of outside workers. However, semi-skilled and skilled works can be taught to local youth and jobless. The amount of money that is earned by the wages will directly enhance various economic activities and enterprise development with multiplier effect in Chainpur. In order to augment the impact, the local people particularly poor; dalits, ethnic minority and women will be given priority for employment and job trainings.

ii. Skill Enhancement

103. Although many people in the project area are found unskilled at present, the construction of the water supply system and the distribution network is likely to enhance their skills in plumbing, fittings and other construction works. Furthermore, the project will also give on-the-job practical trainings to the workers which will enhance their technical skills. The skill and knowledge acquired from the project during construction will enhance employment opportunities of local people who can earn livelihoods from similar projects in the future.

104. Local workers will be given on-the-job training on plumbing bathroom fittings, and other construction activities in order to augment this benefit.

iii. Enterprise Development and Business Promotion

105. The people of project area are actively involvemed in small scale enterprises and business activities. Nearly 52% of the households are involved in agriculture as prime occupation and nearly 28% of the household heads are involved in business activities. During the construction period, different types of commercial activities will come into operation in order to cater the demand and requirement of workers. As money flow begins, they will regularly demand different food items, beverages and other daily needs. To meet these demands, small shops and restaurants around the vicinity of the construction sites are likely to open. Various farm based enterprises including wide range of agricultural and livestock products will also gain momentum as a result of increased demand by labors during the construction period. This will increase local trade and business in the area.

A-2: Operation and Maintenance Phase

i. Improvement in health and saving of time

106. After the water supply and sanitation project is complete, the people living within the project area will benefit from the supply of sufficient quantity and good quality water and improved sanitary conditions. The Nepal Living Standard Survey (2010/11) shows that health expenditures in urban hills is USD 22.2 per capita. The NLSS also indicates that the incidences of water borne diseases are on average 25 percent of all diseases. Based on these findings and using similar assumptions for the project town, the per capita expenditure for treating the diseases in the towns is estimated at US$6.55. It is assumed that the delivery of clean drinking water through the sub-projects will reduce health expenditures by 25%.

107. Women and girl child will be directly benefited as they have to spend less time in fetching water and thus have more time for study, other household and income generating activities. With 41 workings days of time is saved per household per year, the annual economic benefit of a household with assumption that shadow labour price of Rs 315 per day will be Rs 12,618.

Table VI-1: Economic value of times saved from water fetching

Assumptions		Economic Value: Benefit/year (Rs)
Time Savings per Household per year (Working Days)	Shadow price of labor per day (Rs)	
41	315	12,618

Source: Socio-economic Survey, 2015

108. The impact will be augmented through regular maintenance of the water supply and sanitation system by the users group (WUSC).

ii. Development of Market center

109. The population growth rate is at high 3.75% in areas near market and adjacent to the highway. This shows a strong opportunity for growth of local markets in future. The availability of good supply of drinking water will accelerate the rate of development of Chainpur as a leading market centre. In order to promote the development of a market centre, municipality shall ensure planned growth with required infrastructure facilities for healthy and hygienic environment in the market areas and regular operation and maintenance of the water supply and sanitation system will be ensured.

iii. Appreciation of Land Value

110. One of the major benefits of the project is that land price will increase due to the availability of reliable safe drinking water and sanitation system. Chainpur has limited fertile land and has irrigation facilities too. The unavailability of good drinking water could be one of the reasons for some persons to opt for conducting their business in the project area. Upon completion of the present project, migration from nearby hills is expected. In order to promote land development in the area, the local people will be aware that high value lands are acceptable to the banks and microfinance institutions to provide loans for them to start their own economic/social ventures.

iv. Women Empowerment

111. Women will largely benefit from this project, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, time will be saved. As contaminated water can lead to diseases the women of the family also have to spend a good deal of their time to care for the sick family members. With the improvement of water supply, there will be marked reduction in the occurrence of infectious disease in the area. This will provide more time to spend on other economic and social activities leading to empowerment. In order to augment the impact, the water supply system will be regularly maintained so that it operates smoothly and health and awareness programmes will be given to the local people.

v. Quality of Life Values

112. The project is not expected to adversely affect any cultural or recreational resources but will increase the existing quality of life values due to improvement in personal, household and community hygiene practices and health. The project may help to enhance the quality of life of people by many ways, like by providing opportunities for jobs, providing good quality water, improved sanitation etc.

B: Adverse Impacts and Mitigation Measures

B-1: Pre-construction Phase

113. The pre-construction works involves field survey and investigation, development of design & detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary.

114. WUSC already has acquired land required for the construction of structures. As the works involve review of design, estimate, discussions with concerned stakeholders and bidding processes and no construction activities involved; there will be no adverse impacts.

115. The Rapid Environmental Assessment (REA) Checklists for water supply and sanitation were used to identify potential impacts/issues/concerns of the sub project as per preliminary design (Annex 2-A). The REA identified the issues and concerns that should be considered during design, impacts that should be mitigated during construction and impacts that should be mitigated or enhanced during operation. Table VI-2presents the measures taken during project preparation and IEE to mitigate them.

116. Relating to design, the salient concerns would be the inadequate consideration/ incorporation of the REA-identified impacts/issues/concerns that should be considered during design as listed in Table VI-2 and the following:

- Existing users of the groundwater resource in the vicinity or upstream;
- social considerations of nearby population and service providers and their opinions;
- Sustainable source/s for construction aggregate materials.

Table VI-2: REA-identified Impacts/Issues/Concerns and Mitigation Measures Taken during Project Preparation and IEE

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED and IEE to mitigate impacts/issues/concerns
Issues &concerns that should be Considered during design - Unsatisfactory raw water quality	During the detailed engineering design stage, water samples from Vankha source were tested. Tests revealed that surface water source is relatively clean and unpolluted.This information has guided design of water treatment.
- Delivery of unsafe water to the distribution System	Design proposes basic treatment using sedimentation, slowsand filterand disinfection. The horizontal flow rectangular sedimentation tank made of R.C.C. with 3 hours detention time is expected to remove 70% of the suspended solids. Slowsand filter is designed to remove much of the pollutants in the water from source. Disinfection is designed using $Ca(ClO)_2$ and there are provisions for well equipped laboratory of water quality assessment and analysis. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first few years of operation under the Water Safety Plan included in the sub project design& continuing training there-after.
- Inadequate protection of intake structures	The intake of Vankha source has a fully designed spring intake structure. There are no possible of effluent discharge or any damage to the intake due to human activities.
- Health hazards arising from inadequate Design of facilities for receiving, storing and handling of Cl & other chemicals	Separate storing of chlorine is under the design. The management plan includes guidelines for safe chlorine use and trainings required for the same.
Delivery of water to distribution system, Which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed DI, and HDPE pipes.
Contamination of drinking water source and other environmental receptors from household and public toilets	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m down-stream of the drinking water source.
Risk to public and environmental health due to inappropriate siting and design of septage disposal pit.	The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e.g. USEPA standards etc).This includes;(i) locating disposal pits at least 300 m away from the nearest dwelling ,and 30m down-stream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and(iii) site selected for establishment of pits should not be where food crops are grown.

B-2: Construction Phase

a: Physical Environment

i. Erosion and land surface disturbance

117. Excavation and digging of trenches during construction may lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. Haphazard disposal of the excavated earth can disturb the road surface. The activity as such will be a nuisance and discomfort to the road users and inhabitants.
Accordingly water stagnation in the construction area especially during the rainy season may occur.

118. During construction, precautionary measures will be taken, proper backfilling of excavated trenches will be done and the excavated soil will be stacked properly. Construction activities will be, as far as possible, avoided during the rainy season.

ii. Topsoil conservation

119. Formation of topsoil is very long natural process and is the most fertile portion of the soil. Efforts should be made to safe guard the topsoil. The topsoil of about 20cm thick should be placed at a separate place and the remaining excavation should be done. After placing the pipes in trenches and backfilling with other soil and compaction, the topsoil should be replaced to its original position and compacted.

iii. Damage to the Existing Facilities

120. During the construction time, while excavating the earth, existing water supply distribution pipe lines and telecommunication cable may get damaged in few places particularly in the bazaar area in spite of great care. A repair team will be on standby for the repair of water supply pipe line for immediate repairs.

121. To avoid damage to telephone/ telecom line coordination with the telecom office will be set up. Layout drawing should be at the site to avoid possible damage.

iv. Air and Noise pollution

122. The construction activity will comprise of construction of intake, laying of transmission and distribution pipes, construction of storage reservoirs, transport and installation of pumps. Other works do not involve heavy machines except in constructing intake which will produce some extent of disturbance for a certain period of time. There will be some activities such as transportation, loading/unloading of construction materials viz.sand and aggregates, stockpiling of construction waste and construction materials and earthworks. These will cause effect into air quality due to dust generation and vehicular emission as well as noise pollution.

123. Use of power horns and movement of heavy vehicles can cause a serious disturbance to the community, educational institutes, hospitals/health posts and residences etc.Mitigating measures to reduce air and noise pollution are:

- Provide information to the public about the work schedule
- Allow the use of vehicles only complying with NVMES 2069 or vehicles having green stickers meeting Vehicle Emission Standards 2057 during the project construction period
- Limit the speed of vehicles.
- Ban the use of power horns.
- Regular maintenance of equipment and vehicles.
- Prohibit the operation of plants and construction vehicles between 7 PM to 6 AM in residential areas.
- Avoid working at sensitive times (during religious festivals in the area)
- Increase the work force in sensitive areas so as to finish the work quickly

- Impose a ban on burning of solid wastes particularly in workers camp and construction sites
- Ban the use of firewood as fuel in the worker's camp.

vi. Impact on water bodies

124. There will be some impacts on water bodies located within the project area during the construction phase. Possible activities, which may influence the water quality, are listed below.

- Haphazard disposal of solid waste in the vicinity of water bodies
- Sediment and excavated materials may be transported to the water bodies due to rain.
- Leakage and disposal of oil and grease from construction equipment.

125. The excavation work for RVTand other structures will cause turbidity in water up to a certain extent. However the quantity is limited with respect to the discharge of water in Seti River very minimal impact will be there for short period of time.

126. The worker's camp should not be located at the vicinity of water bodies. Waste generated from the workers' camp should be properly disposed off. Organic waste like food waste and others will be properly buried. Inorganic waste will be collected in a bin and properly disposed off. Regular monitoring of the workers camp should be done.

127. Excavated soil will be stacked. Back filling of trenches should be done before the rainy season. A separate area shall be allocated for the stacking and collection of construction wastes.

vii. Waste Management and Disposal

128. Proper waste management and disposal system should be done during the construction period. Temporary sanitary toilets for the workers should be installed before starting the work. Waste like excess grease, lubricants will be collected in plastic containers and will be sold to scrap dealer. Solid waste and other construction waste will be deposited near by the labour camp and will be cleared after the completion of the construction works.

b: Biological Environment

129. Only scattered plants of local species and fruit plants are available within the sub-project sites and thus minor impacts are anticipated only during the construction period. Most of the pipe lines pass along the roadside and only a few numbers of plants and bushes have to be cleared up within the transmission pipe line stretches. The impacts to human settlement including villages, cattle sheds and farmlands will be very low.

130. The potential environmental impacts of the project on local flora and fauna during construction and post construction phases will be low as it involves no tree felling along the distribution line, minimum loss of grazing land, and no loss of agriculture lands. Some of the impacts that may likely to occur are described below:

i. Loss of vegetation cover

131. Bhopur site is most sensitive in terms of vegetation cover. A 60 cum RVT is to be constructed. Though the site is a forest area, the site for construction of the RVT is selected so as to avoid any tree felling. Toleni Community Forest is near the construction site, and although no construction activities take palce in the forest, the workforce may collect wood from there. This will be prohibited.

132. The loss of vegetation cover and species diversity due to earthwork primarily in the direct impact area of the intake site will be minimized as it is located on open grassland. During the construction, there will be loss of only shrubs cover.

133. Some of the topsoil and vegetation may also be lost during pipe laying works. No pipeline passes through the forest area. To protect the topsoil and vegetation, the topsoil should be kept separately and replaced in its original position after laying the pipes.

134. The project components require a very small area of land for implementation and environmental impacts on the vegetation and natural eco-system do not seem to be significant.

ii. Impact on Fauna

135. The project site is within areas with sparse vegetation and tree covere except in some cases. Population dynamics of resident and migratory birds and reptiles at the project site may be affected during the construction period due to various construction activities. But these effects will be of temporary in nature. The condition will be normal after construction is over. The workers may be involved in bird hunting. For example Kalij is found in the project area.However, the workers will not be allowed to hunt birds.

iii. Impact on aquatic life

136. Some of the construction activities and protection works are proposed at the bank of the Seti river. Other small surface water bodies flowing through or nearby the project area are Bhuwani khola, Baljade khola andKhara khola. Construction activities will physically disturb the water quality for a certain period of time and may cause adverse impact on aquatic life. But these effects will be temporary in nature. Fishing in the river will not be allowed. Washing in rivers by workforce will be prohibited.

c: Socio-economic Environment

i. Disturbance to community activities

137. Ruina bagar, Bhopur, Simkhet, Chainpur, Campus road, Bank tole are among the places where settlements and market areas may be disturbed due to project activities. Construction activities, particularly construction works on roads will cause disturbances to the community activities, festivals and social events. The free movement of vehicular traffic and pedestrians will be affected. Noise produced due to the operation of machines may disturb the neighbourhood in construction areas.

138. In order to minimize the disturbance to the community activities, a detailed Traffic Management Plan will be developed by contractor during the early stage of construction phase for areas along the construction works to minimize traffic flow interference from construction activities. Advance local public notifications of construction activities, schedules, routings, and affected areas including road closures will be made. Signage in Nepali and English languages will be erected. The residents will be consulted and informed about the disturbances in advance.

ii. Social Dispute and Dissatisfaction

139. There is a possibility of influx of outside workforce and with them money from the construction work and unwanted communities can cause problems with the local community. The local population may not get employment benefits from the project causing dissatisfaction and conflicts in the area. There is a possibility of social dispute in the community due to irresponsible behaviour of the workers such as gambling and drinking.

140. An employment policy will be prepared so that the local people may not be deprived of employment opportunities. Local people and women above the age of 16 will be given preference for employment. Wages will be settled based on DWEC (District Wage Evaluation Committee) with the list of employees.

iii. Occupational Health and Safety (OHS)

141. The project area consists of inclined areas and sites. Life and health of workers particularly of those involved in concreting, trench cutting, formwork and rebar fixing in the reservoir tank is of prime concern. To mitigate or minimize the hazards adequate safety instructions should be provided to the contractor and monitored by the project.

- Health and hygiene in the camp site (against unsafe working conditions, accidents, transmission of communicable diseases etc.) will be given top priority.
- Regular health checkups, proper sanitation and hygiene, health care will be provided. Awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS will be conducted during focus group discussions.
- Personal protection equipment (PPE) eg. safety helmets, safety belt, boots, gloves will be provided to all construction workers.
- The loss of life or any type of injuries will be compensated and insurance to the workers will be provided. First aid kits, standby vehicle, and fire extinguishers will be provided in camp sites.
- To avoid risks from accidents on site due to the movement of the public and workers, health and safety measures of the contract will also prohibit entry at construction sites to the public and the area will be barricaded and warning signs will be placed.

B-3: Operation & Maintenance Phase

i. Chemical hazard

142. High exposure to Chlorine and Bleaching Powder are toxic and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose, and mouth are of extreme hazard to the workers handling chlorine and bleaching powder.

- The storage procedures, in-plant handling and dosages of chlorine (bleaching powder) will be addressed. Procedures and guidelines will be developed for its handling and first aid measures will be introduced for emergencies. Training on the handling and on dosage of the chemicals will be given to the staff.

ii. Impact on water bodies and aquatic life

143. The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.

144. As the backwash water mainly contains suspended solids a small pond of 20,000 litre capacities will be constructed for decantation and will be drained of to the river/ stream course.

- To avoid the impact to aquatic life, the effluent and sludge should be disposed off only in designated areas and regular monitoring of the river or stream water quality should be done.

- Haphazard disposal of effluents and sludge from the treatment plant will not only be a nuisance to the public but also affect the aquatic life by eventually finding its way to nearby water bodies.

iii. Resettlement, relocation and compensation issue

145. The major structures are to be constructed on public or unused land parcels, or land belonging to WUSC. Similarly, the distribution system network follows within the roads and its RoW. Therefore resettlement or relocation is not required.

VII: Analysis of Alternatives

A. With- and Without-Subproject Alternatives

146. The town is facing increased demand of water supply and if not met, it will be one of the major problems. The overall sanitary condition of the project area is reasonably satisfactory. Doing nothing about these challenges would be allowing the subproject municipality to further develop as "under-serviced", put the health of its residents and the general public at more risks, and worsen its living environment. This would impede: (i) further social and economic development project municipality and (ii) Nepal's delivery of its commitment to SDG 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation.

147. The 'with subproject' alternative will contribute to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector and to the delivery of Nepal's commitment to SDG 6th.

B. With subproject's location alternative:

148. The project area is a major junction and booming market place along the Seti highway, and is also connected to East-west Highway. Thus investment here in long term basic urban facility is very strategic. With the Subproject, 2660 households (1,277 during construction phase and others later) in the municipality will have convenient access to reliable and adequate safe and potable water supply and easy access to sanitation at public place so that it helps to improve health and sanitation. As a result, good hygiene and sanitation practices will be promoted; there will be reduced health and safety risks.

149. In overall, 'with subproject alternative' will bring about enhanced public health and living environment that will contribute to improved quality of life in the municipality. Improved water supply and sanitation will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of the municipality will benefit from; thus, contributing to the overall local economic development of the district.

C. Alternatives Relative to Planning and Design

150. The proposed system is a small scale intervention. The major product components of water supply system as detailed in the feasibility study are: intake improvement and consideration of new intake (spring sources: Vankha, Baljade, Bire and Khara) as sources; treatment facilities with sedimentation unit, slow sand filter and disinfection unit; 4 new reservoirs and use of existing one with total 625 Cum capacity of reservoirs; distribution mains, system appurtenances, guard room, office building, compound fencing etc.

151. Possible alternative sources were assessed. Among the above sources Vankha source is reliable and bears almost 67 lps of water in dry season. Thus Vankha source is adopted in this design.

152. Regarding the feasibility of distribution system, two alternative analyses were analyzed; (a) Option I: distribution from single point (interconnecting reservoirs), and (b) Option II: adopting multiple distribution system. Option II was economical and thus suggested accordingly. During the field level presentation WUSC with community people also recommended for the same.

153. It was assessed that the proposed water supply system with adequate treatment will have very small negative impact on the environment. However, there will be substantial improvement in personal hygiene thereby increasing the quality of life and community health. The WUSC has finalized the required site of land for RVT, treatment plant and other structures. All water supply components will be constructed on the land owned by WUSC. Apart from this, the project will not have any resettlement, relocation or compensation issue. Hence no further alternatives need to be assessed.

VIII INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Information Disclosure, Consolations and Participations

154. Stakeholder consultation and participation was an essential process in project preparation. The process in engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table VIII-1 lists the persons consulted during the IEE Study.

Table VIII-1: Lists of People and Institutions Consulted

SN	Name	Organization/Address	Mlae/Female
1	Mr. Lokendra Bista	President, WUSC Chainpur	M
2	Khadga Subarnakar	Vice President, WUSC Chainpur	M
3	Prem Prakash Chhatyal	Secretary, WUSC Chainpur	M
4	Juna Jagri	Treasurer, WUSC Chainpur	F
5	Kanthe Khadka	Member, WUSC Chainpur	M
6	Dipak Oli	Member, WUSC Chainpur	M
9	Babin Singh	Member, WUSC Chainpur	M
10	Punam Joshi	Member, WUSC Chainpur	F
11	Nirmala Singh	Member, WUSC Chainpur	F
12	Priya Bishta	Beneficiary, JayaPrithvi Municipality	F
13	Pratibha Khatri	Beneficiary, JayaPrithvi Municipality	F
14	Krishna Nepali	Beneficiary, JayaPrithvi Municipality	F
15	Bhagwati Durai	Beneficiary, JayaPrithvi Municipality	F
16	Salikram KC	Beneficiary, JayaPrithvi Municipality	M
17	Narendra Bhandari	Beneficiary, JayaPrithvi Municipality	M
18	Top Bahadur KC	Beneficiary, JayaPrithvi Municipality	M
19	Amar Raj Khatri	Chief Administrative Officer, JayaPrithvi Municipality	M
20	Bishnu Prasad Koirala	Principal, Shree Jalpa Secondary School	M
21	Shyam Bahadur Khati	Beneficiary, Ward 4 - JayaPrithvi Municipality	M
22	Kesh Bahadur Khati	Beneficiary, Ward 4 - JayaPrithvi Municipality	M

155. During the IEE preparation, consultations were undertaken in compliance with GoN's EPR. In order to ensure public involvement, a 15 days public notice was published (18th May 2018, Arthik Abhiyan - a national daily) seeking written opinions from Municipality office, DCC, schools, health posts and related local organizations and concerned people. A copy of the public notice was also affixed in the notice boards of the above mentioned organizations in the project area and a deed of enquiry (muchulka) was collected. A municipal level consultative meeting was held on 17th June 2018 (Annex 5). The IEE team discussed with the local stakeholders on environmental concerns. Following issues were raised and following suggestions were received;

- The Mayor of the municipality suggested on ensuring the adequacy, quality and sustainability of the water supply from the project
- The Chairperson of Ward 10 sussgested for proper/adequate protections to be provided for the project structures to be built on the bank of Seti River
- Beneficiary, Mrs Bina KC suggested on need of proper protection/stabilization works in the site where water reservoir tanks are to be made
- The need of Public Toilet, and its sustainable opration was raised as a concern, IT was discussed that a local club can be mobilized for its sustainable operation.

Provision of water through a public tap-point was also discussed to support the proper operation of the toilet.
- Timely implementation of project so that the environmental impacts do not get more aggravated,
- Minimal loss of vegetation, and suggested for greenery promotion.

156. Stakeholder consultations will continue throughout the implementation of the subprojects and operation. All stakeholders must be invited and encouraged to participate in community consultations. To facilitate the engagement of stakeholders, the PMO and ICGwill maintain good communication and collaboration with WUSC and the Municipality. PMO, ICG, Contractors and/or WUSC will be open to the public to contact on matters concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances. Future stakeholder consultations will be as follows:

- During the construction stage, if there would be a major change in design/alignment/location, the PMO and ICG will hold at least one public consultation meeting early on in the construction period to solicit perceived impacts, issues, concerns and recommendations from affected communities;
- Prior to construction, the PMO and ICG will conduct an intensive information, education and communication (IEC) campaign to ensure sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and ICG, and status of compliance with the Government's environmental safeguard requirements, among others, are attained/provided. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will have been set up at strategic locations within the subprojects' main areas of influence. The grievance redress procedure and details will have been posted at the offices of the ICG, WUSC and Municipality;
- During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;
- During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;
- The public consultations and information disclosure will be continuous throughout the project cycle. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

157. The GoN-approved IEE Report (in English), will be available at the offices of the PMO, ICG and WUSC for the perusal of interested parties. Copies may be made available upon formal request. The IEE and environmental monitoring reports will be disclosed on the ADB's and UWSSSPwebsite.

B. GRIEVANCE REDRESS MECHANISM

B-1: Purpose of the Grievance Redress Mechanism

158. The Project-specific grievance redress mechanism (GRM) is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the subprojects under the UWSSSP. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Subproject are protected; and (ii) their concerns are effectively and timely addressed.

B-2: Proposed Set-Up

159. The MoWS, as the Project executing agency, will establish the GRM and its support system, including setting up the Grievance Redress Committee (GRC) at the subproject level. The GRC will comprise of the: (i) Chief of the WSSDO; (ii) members of the WUSC; (iii) two representatives of affected persons, a male and a female; (iv) a member of IP community, preferably female; (v) a representative of a non-government organization or community-based organization actively involved in IP development/other backward communities in the area, if any; (vi) local government representatives, i.e., Municipality and DDC; (vii) DSMC social safeguard expert; and (viii) DSMC environmental safeguard expert (ESE). The environmental safeguard assistant (ESA) of the ICG will oversee the implementation/observance of the mechanism for environmental complaints at the subproject level. He/she will be technically advised, supported and trained by DRTAC's environmental specialist and the DSMC ESE. PMO's Environmental Officer will oversee the implementation/observance of the GRM in all subprojects. Representatives of affected persons (APs), civil society and eminent citizens will be invited as observers during GRC meetings. Contractors and WUSCs (as Operators) will be required to designate their respective counterpart GRM staff.

160. The GRM will accommodate both informally- and formally-lodged, but Project-related, validgrievances. Informally-lodged grievances are those received by the Contractors during construction or WUSCs during operation. Formally lodged grievances are those received at the ICG office. The ICG, GRC and PMO maintain records of all grievances, informally- and formally-lodged, valid and invalid, and appealed. The ICG will immediately inform the PMO, as necessary, particularly when an appeal is made by an AP in court. PMO will in turn immediately inform the ADB of the same. The observance/implementation of the GRM will be reported by the: (i)ICG/ESAin the subproject's monthly progress reports, semi-annual subproject environmental monitoring report (EMR) during construction and annual subproject EMR during operation; and (ii) PMO EO in the Project's monthly progress report, semi-annual Project EMR during construction and annual Project EMR during operation.

161. Sufficient support system, including well GRM-oriented staff of Contractors and WUSCs, communication/documentation/recording and reporting system, funds, and posters declaring contact details and displayed at strategic locations, among others, will be in place to sustain the effective implementation of the mechanism.

B-3: Access to the Mechanism

162. Any person who has environmental concerns/issues pertaining to the subprojects during detailed design, construction and operation phases will have access to the mechanism free of charge. The PMO EO and ICG ESA will ensure that:

- The public, especially the residents and regular passers-by, in the main areas of influence of the subprojects, are aware of their rights to access, and will have access to the GRM free of administrative and legal charges; and

- The GRM is fully disclosed prior to Notice to Proceed for construction is given: (a) in public consultations and social/community preparations, (b) through posters displayed in the offices of the ICG, VDCs, DDC and at strategic places within the main areas of influence of subprojects (posters to include names and contact details of the EO of the PMO and ESA of the ICG).

B-4: GRM Steps and Timeframe

163. Informal Approach: Informally, APs can lodge complaints directly to the Contractor during construction or Operator (WUSC) during operation. Contractor/Operator will document and screen the complaint immediately. If screening reveals the complaint as Project-related and valid, the Contractor/Operator will act on the complaint within three days from receipt of complaint. Otherwise, the Contractor/Operator will direct the AP with non-Project-related and/or invalid complaint to the ICG. The Contractor/Operator will secure a confirmation of completion of action from the AP. For at least a week after confirmation of completion, the ICG will monitor the effectiveness of the action/resolution taken. After which, ICG will secure a written confirmation of satisfaction from the AP. The Contractor/Operator shall report to the ICG all complaints received, eligible or ineligible, actions agreed on and taken and confirmation of completed action.

164. Formal Approach:If a complaint is eligible but is not acted on within three days from the receipt of the complaint, or if AP is not satisfied with the resolution undertaken by the Contractor/Operator, he/she can access the formal mechanism, as follows: (Figure VIII-1)

165. First Level: The access point will be the ICG. The steps are detailed below.(Figure VIII-2)

Step 1 Lodging a Complaint (Day 1)

AP lodges complaint with the ICG, verbally or in writing.ICGdocuments/registers lodged complaint, makes sure these are duly referenced and provides AP with a copy of the referenced complaint.

Step 2 Screening of Complaint (Day1)

ESA screens the complaint if it is Project-related and valid and informs the AP immediately of the screening results.An AP with complaint screened as non-Project-related and/or invalid will be advised that he/she may raise complaint to the secondlevel of the GRM, and ICG will forward the complaint to the GRC.

Step 3 Investigations, Discussion and Agreement (Day 1)

ICG, together with the Contractor/Operator and AP, will investigate and discuss the complaint at the site. Agreement on actions and measures and time involved will be made with the AP. Agreement will be properly documented and filed; ICG, AP, Contractor/Operator will have copies.

Step 4 Implementing the Agreed Action

If the required action is minor, i.e. not requiring further investigation and would be quick and easy to implement, the Contractor/Operator will immediately implement the agreed action.

- If required action is major, i.e., requiring further investigation and/or procurement of supplies/parts,the Contractor/Operator will: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact (Day 2/Day 3); and (ii) start work on the major action within 5 days from discussion (or not later than Day 8 since receipt of complaint).

AP will be advised by the ICG that his/her complaintmay beraised to the second level of the GRM, if he/she so preferswhen: (i) minor action isnot implemented within 2 days from discussion; (ii)

interim measure prior tomajor action is not implemented within 2 days from discussion; or (iii) major action is not started within 5 days from discussion.

Step 5 Confirmation of Completed Action

Contractor/Operator will secure a written confirmation of completed action from the AP and furnish the ICG a copy.

Step 6 Confirmation of Satisfaction (1 week after confirmation of completed action)

The ICG will monitor the effectiveness of the resolution for at least a week after receipt of confirmation of completed action from the Contractor/Operator. After which, ICG will secure a written confirmation of satisfaction from the AP.

166. Second Level: TheAPwillbenotifiedby theICGwhen complaint isforwardedto theGRC. The GRC will call for a hearing, if necessary, where AP can present his or her concerns or issues. TheGRCwillsuggestcorrectiveaction/measureatthe field level and assign clear responsibilities for implementing its decision within 7 days of receipt of complaint by GRC. If GRC decision is not acceptable to the AP, if the suggested corrective action/measure is not started within 7 days, the matter/AP will be referred to the third level.

167. Third Level: The ICG will refer AP and its unresolved complaint or major issues to the PMO EO, who will act within 15 days.

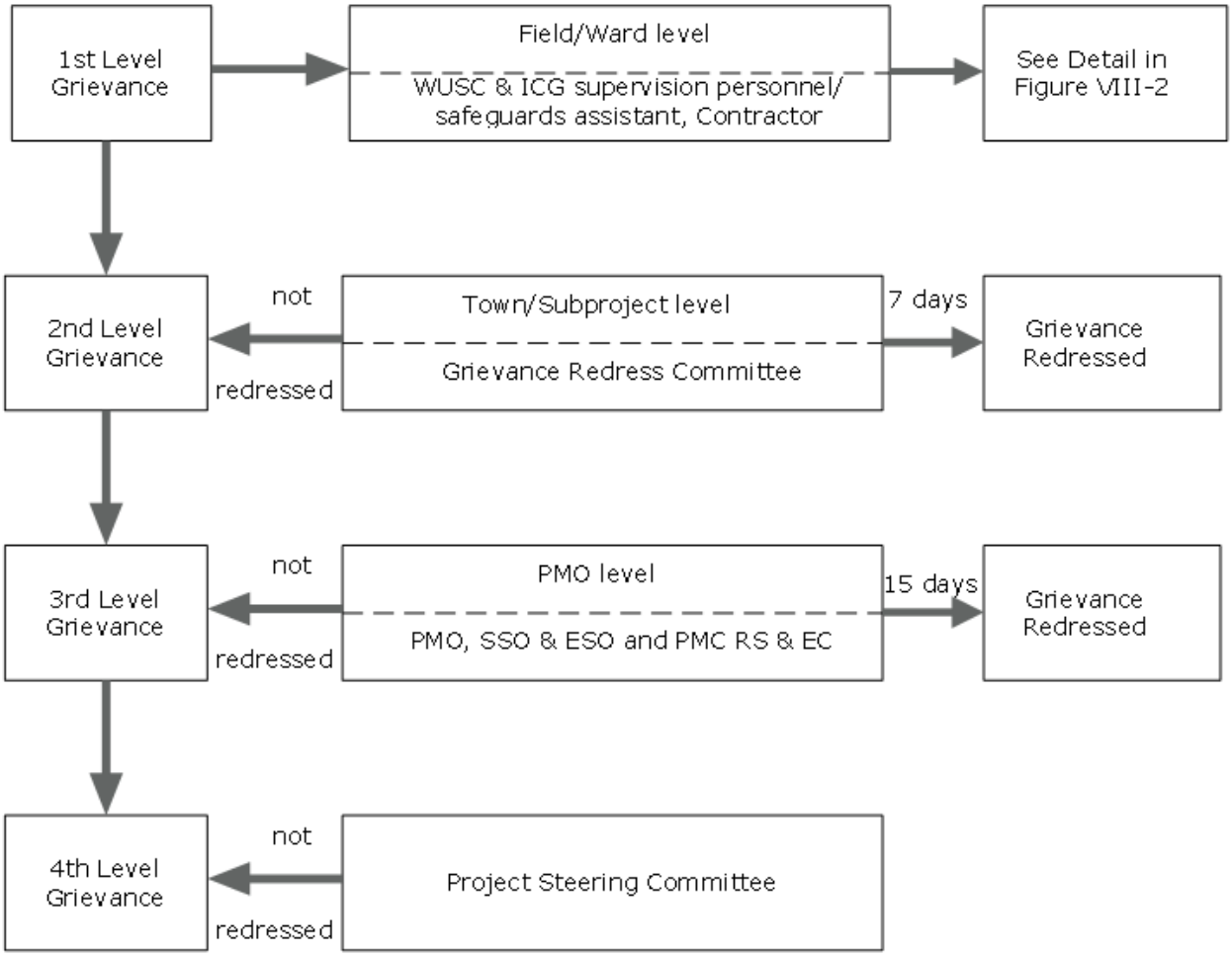
168. Fourth Level: For extremely major issues that will go beyond the third level, these will be referred to the Project Steering Committee (PSC), to be resolved within 30 days. Environmental complaints (other than those that will involve the legal system) are expected to be mainly resolved at the second level, and to a lesser extent at the third level.

169. Despite the GRM, an AP will have access to the country's legal system at any stage. Accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in the country's language. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the GRM.

170. Record keeping and disclosures: The PMO, GRC, ICGwill keep records of all lodged and documented/referenced complaints, actions/resolutions taken, AP's written confirmations of completed action and satisfaction, complaints raised to higher levels and lessons learned. The number of grievances recorded and resolved and the outcomes will be displayed at the offices of WSSDO, ICG, Town LGU, PMO and WUSC and reported in the monthly progress reports, semi-annual EMR during construction and annual EMR during operation, submitted to ADB.

171. Periodic review and documentation of lessons learned: The PMO EO will do periodic review of the effectiveness of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address complaints.

Figure VIII-1: Grievance Redress Mechanism (Formal Approach)



ES- Environmental Specialist

ESO- Environmental Safeguards Officer

ICG- Implementation Core Group

PMC- Project Management Consultant

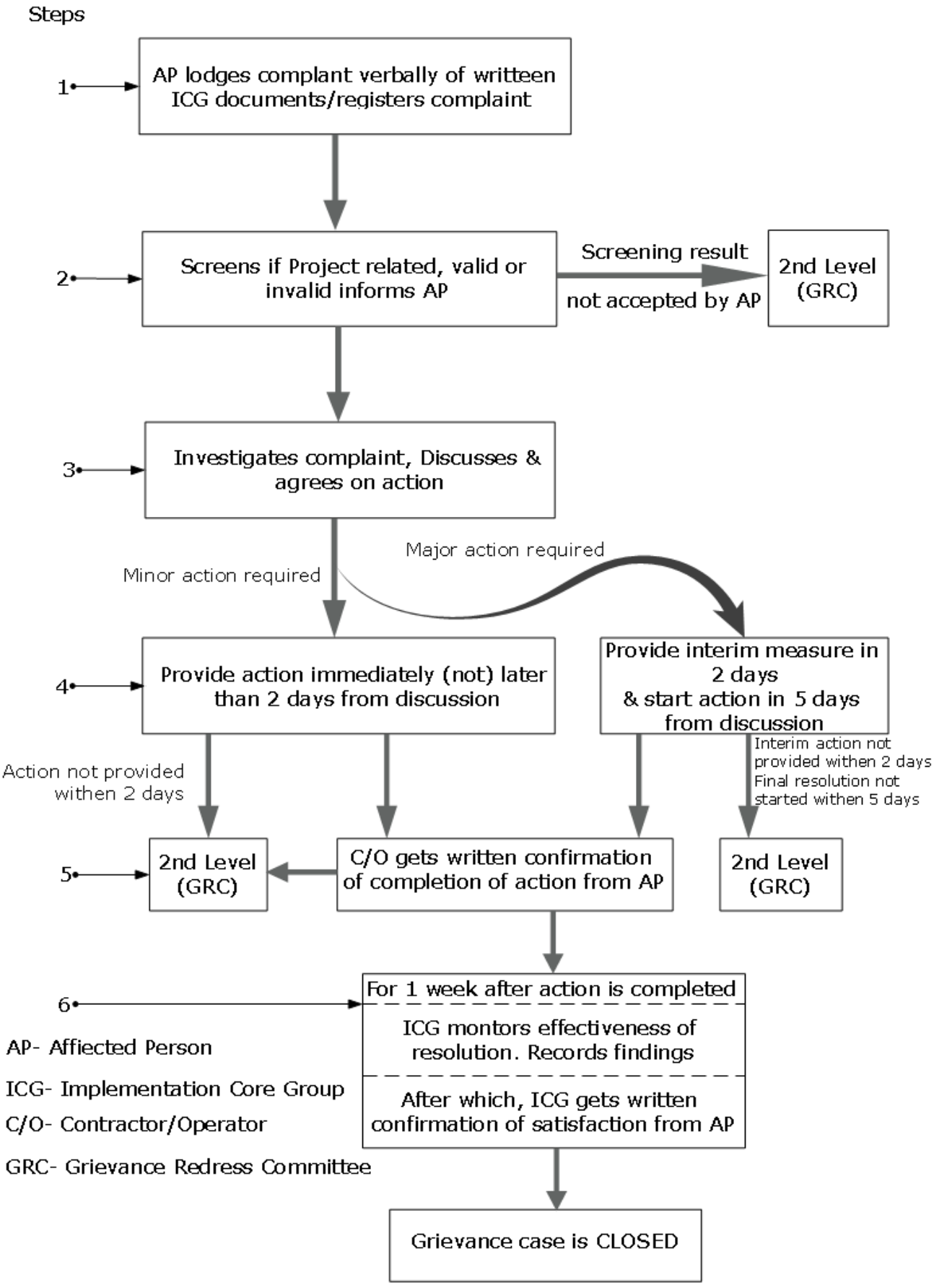
PMO- Project Management Office

RS- Resettelment Specialist

SSO- Social Safeguard Officer

WUSC- Water Users and Sanitation Committee

Figure VIII-2: GRM First Level



IX ENVIRONMENTAL MANAGEMENT PLAN

172. The purpose of the Environmental Management Plan (EMP) as per Table IX-1: is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

173. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

A. Institutional Arrangement

174. Executing and implementing agencies: The Ministry of Water Supply (MoWS) will be the executing agency with responsibility of subproject execution agency with responsibility of subproject execution delegated to the Department of Water Supply and Sewerage (DWSS). The Water Supply and Sanitation Division/Sub-division Office (WSSDOs) are the subproject implementing agencies. Water User's and Sanitation Committees of participating towns are the implementing agencies.

175. The key responsibilities of the executing and implementing agencies are as follows:

176. Prior to construction:

- The MoWS will deputize a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- The MoWS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS will be responsible for reviewing and approval of the IEE Report.
- The DWSS will review the IEE Report prepared by the Design, Supervision and Management ConsultantTeam's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MoWS.
- The DWSS will prepare the ToRs for the Environmental Safeguard Specialist that will engage to support the PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the subprojects.

177. **During construction and operation:**

B. Safeguard Implementation Arrangement

178. Project Management Office (PMO): The safeguard officers (environmental safeguard officer and social safeguard officer) of the PMO will receive support from safeguards experts (environmental and social) of the DRTAC as specified below:

(i) Confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and government rules;
(ii) Confirm whether EMPs are included in bidding documents and civil works contracts;
(iii) Provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by regional project management offices (Eastern RPMO and Western RPMO) and contractors;
(iv) Establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
(v) Facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
(vi) Supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
(vii) Review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommended necessary corrective actions to be taken as necessary;
(viii) Consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
(ix) Ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public; and
(x) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

179. **Regional Project Management Offices (Eastern and Western RPMOs):** The regional DWSS engineers and social development officers of the RPMOs will receive support from; (i) the PMO safeguards officers (environmental and social); and (ii) the safeguards specialists (environmental and social), the social mobilizers and environmental management plan (EMP) monitors of the design, supervision and management consultant (DSMC) teams as specified below:

(i) Prepare new IEEs/EMPs in accordance with the EARF and government rules;
(ii) Include EMPs in bidding documents and civil works contracts;
(iii) Comply with all government rules and regulations;
(iv) Take necessary action for obtaining rights of way;

(v) Oversee implementation of EMPs including environmental monitoring by contractors;
(vi) Take corrective actions when necessary to ensure no environmental impacts;
(vii) Submit monthly environmental monitoring reports to PMO, and;
(viii) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

180. Civil Works Contracts and Contractors: EMPs are to be included in bidding and contract documents and verified by the PMO and RPMOSs. The contractor will be required to designate an environment supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The government will ensure that bidding and contract documents include specific provision requiring contractors to comply with all; (i) applicable labor laws and core labor standards on (a) prohibition of child labor as define in national legislation for construction and maintenance activities, (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project site.

181. Capacity Building: TheDRTAC safeguards experts (environmental and social) will be responsible for training the; (i) PMO's safeguards officers (environmental and social); (ii) RPMOs' engineers and social development officers. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

(i) Sensitization;
(ii) Introduction to environment and environmental consideration in water supply and wastewater projects;
(iii) Review of IEEs and integration into the project detailed design;
(iv) Improved coordination within nodal departments; and
(v) Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

182. Water Users and Sanitation Committees (WUSCs): WUSCs are the eventual operators of the completed subprojects. The key tasks and responsibilities of the WUSCs are, but not limited to:

183. Prior to construction

- Facilitate public consultation and participation, information dissemination and social preparation.
- Provide available data to the DSMC-ESS during the conduct of the IEE
- Assist in securing the tree-cutting permit and/or registration of water source.
- Participate in the capacity development program.

184. During construction

- Assist in the observance of the grievance redress mechanism.

- Actively participate in the monitoring of Contractor's compliance with the IEE and its EMP and the conditions set out with Government's approval of the IEE Reports.
- Facilitate public consultations, as necessary.

185. During operation

- Implement the EMP and the Water Safety Plan.
- If applicable, actively work with the engaged licensed and accredited laboratory in water quality monitoring.
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism.

186. **Licensed and accredited laboratory:** It is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring in the first few years of operation and to train the WUSC on the same. The laboratory will ensure that while carrying out the water quality monitoring as prescribed in the National Drinking Water Quality Standard and its Directives, 'hands-on' training is provided to the WUSC.

Environmental Management Plan (EMP)

Table IX-1: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Prior to Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NoCs, etc can result to design revisions and /or stoppage of works	- Obtain all of the necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. - Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. - Include in detailed design drawings and documents all conditions and provisions if necessary	PMO, RPMOS,& DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract
Existing utilities	Disruption of services	- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction activities - Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. - Require contractors to prepare spoils management plan (see Annex 2-D for outline).	DSMC, RPMOS	List of affected utilities and operators; Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (see Annex 2-D for outline).	During detailed design phase Review of spoils management plan: Twice (once after first draft and once before final approval)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Drinking water supply	Extraction of unsatisfactory raw water quality Delivery of unsafe water to the distribution system Inadequate protection of DTW Health Hazards arising from inadequate design of facilities for receiving, storing and handling of CI & other chemicals	- During the detailed engineering design stage, water samples from surface water were tested. Tests revealed iron content and coliforms as beyond standards limits. This information has guided design of water treatment. However verification on the yield through borehole tests need to be carried out and confirmed before award of contract. - Design proposes basic treatment using lime dosing, pressure filter and disinfection using Ca (CIO)2 and provisions for lab unit and kits. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first two years of operation under the Water Safety Plan included in the subproject design & continuing training thereafter. - DTW has adequate land for perimeter fencing to keep animals away from grazing nearby. Appropriate casing of intakes including the installation of screens. DTW to be located at least30m upstream from sanitation facilities. Where this cannot be maintained; (i) septic tanks will need to be sealed (water tight) and emptied as per the design requirements; (ii) Intake structure to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once every quarter). - Design has included a "housed" dosing unit with appropriate ventilation, bonding and training for staff in handling as per material, safety data sheets (MSDS).	PMO, RPMOS & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract
Sanitation (Toilets and septage disposal)	Contamination of drinking water source and other environmental receptors from household and community toilets	- The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source.	PMO, RPMOS, & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Risk to public and environmental health due to inappropriate sitting and design of septage disposal pit	- The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e,g US EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30 m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown. - The sanitation condition will be maintained to deter flies, mosquitos, and other vectors for breeding, free from odor and aesthetically pleasing. - A proper septage management shall be developed and followed.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations prior to award of construction contracts	DSMC, RPMOS	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	- Mechanism of safe disposal such as - Construction waste will be developed in the project site before the actual commencement of work - Prohibition of unwanted littering and discharge of waste. - Proper management of solid waste will be done using pits for waste disposal	Contractor	Contractor records. visual inspection	Visual inspection by RPMOS & DSMC-ESS on monthly basis
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage	- Prepare list of approved quarry sites and sources of materials	DSMC, RPMOS	List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for	During detailed design phase, as necessary with discussion with detailed design engineers and PIUs suitability of sources and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	patterns, ponding and water logging, and water pollution			verification of quarry sites	permit for additional quarry sites if necessary.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	- Project manager and contractors should undergo EMP implementation including spoils management for construction works; standard operating procedures (SOP) for construction works as it is a method of identifying a work process and breaking it into the specific step by step procedure needed to successfully execute the process right from the beginning and result to greater quality via conforming to proven steps therefore, the written SOP provide instruction for less experience workers and benefits to the contractor is it serves as a benchmark for all workers on how a work process is to be completed ; health & safety (H&S), core labor Act (1992), applicable environmental laws, etc.	PMO, RPMOs and DSMC. Contractor's Environmental Supervisor	Record of completion (safeguards Compliance Orientation) Contractor records for EMP implementation at worksites	During detailed design phase prior to mobilization of workers to site
2. During Construction Activities					
A. Physical Characteristics					
Topography landforms, geology and soils and/or river morphology and hydrology	Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on river). Areas near or around Seti River, Bhuwani khola and other few streams may be susceptible to these impacts	- Contractor's is required to first utilize readily available sources with environmental clearance and license to and that still have a high ratio of extraction capacity over loss of natural state. - Borrow areas and quarries (if these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor. - Coordinate with MoPE, DDC, and local authorities regarding restrictions in quarrying from rivers. As much as possible, alternative source should be identified.	Contractor	Records of sources of materials	Monthly by RPMOS
Erosion Hazards	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the construction of project structures and for	- Soil erosion will be minimized by taking precautionary measures such as; excavated soil will be reused and proper backfilling of the trenches will be done and the excavated soil will be placed properly against erosion. Temporary diversions and	Contractor	Potential area of soil erosion ; transmission mains and distribution pipelines core area	Visual inspection by RPMOS and DSMC-ESS during construction phase on weekly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	installation of transmission mains and distribution pipes.	sign boards for pedestrians will be provided. Bhopur site, construction site of Chainpur sub-system need special attention with respect to erosion during construction period			Frequency and sampling sites to be finalized during detailed construction phase
Water quality	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution pipes. Bhuwani khola, Baljade khola and Khara khola are susceptible to such pollution	- Prepare and implement a *Spoils Management Plan*. - Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with district development committee on designated disposal areas. - All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. - Location for stock yards for construction materials shall be identified at least 300m away from water courses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies - Take all precautions to minimize the wastage of water in the construction activities - Take all precautions to prevent entering of waste water into streams, watercourses, or irrigation system. Install temporary silt traps or sediment basins along the drainage leading to the water bodies. - Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. - While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. - Monitor water quality according to the environmental management plan.	Contractor	Areas for stockpiles storage of fuels and lubricants and waste materials; Number of silt traps installed along trenches leading to water bodies; No visible degradation to nearby drainage, water bodies due to construction activities	Visual inspection by RPMOS and DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subprojects components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon, monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. Ruina bagar, Bhopur, Simkhet, Chainpur, Campus road, Bank tole are the places sensitive in terms of this impact	- Water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - If re-surfacing of distributed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces - Hoarding active work sites in populated areas - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2' free board - Limit speed of construction vehicles in access roads and worksites to maximum of 30kph. - Use of vehicles complying with NVMES, 2069 enforcement and green sticker standards and prohibition of open burning of solid waste within the project area - Ensure use of equipment complying with applicable emission standards to control anthropogenic air pollution - Arrangements to control dust through provision of DSMC screens, water sprinklers etc.	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; Certification that vehicles are compliant with air quality standards.	Visual inspection by RPMOS & DSMC-ESS on monthly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components
Acoustic environment	Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and people. Ruina bagar, Bhopur, Simkhet, Chainpur, Campus road, Bank tole are the places sensitive in terms of this impact However, the proposed subproject will follow	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. - Plan activities in consultation with local administration (Chief district office), local police/traffic office so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating equipment. - Minimize drop heights when loading and unloading coarse aggregates. - Spread out schedule of materials, spoil & waste transport - Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise-producing equipment and sound barriers; Equivalent day and night time noise levels	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	existing ROW alignment and impact is short-term, site specific and within a relatively small area.	- Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufactures' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators (if required) - Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10m or more from the vehicle/s. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. - Identify any building at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.			
Water Pollution due to leakage of fuel & lubricants	Leakage of fuel & lubricants from construction equipments & vehicles & paints spillage could pose a threat to river & ground water quality in & around the project area.	- Strict instructions will be given to the workers not to spill the chemicals and petrolems products used during the construction into surface land and nearby streams. This procedure shall be in-cluded in the terms of contract between the proponent and the contractor	Contactor	Stockpiles storage of fuels and lubricants and vehicles parking area Nearby drainage, water bodies due to construction activities	Visual inspection by RPMOS and DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subprojects components
B. Biological Characteristics					
Impacts on Biodiversity	The proposed project will have less or no impacts on biodiversity. The project components require a very small area of land for implementation; environmental impacts on the vegetation & natural eco-system don't seem to be significant.	- Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling, and Illegal harvesting of nearby community forest resources as fuel for cooking by workers will result in unnecessary loss of vegetation beyond Subproject footprints. - The proposed water supply project won't require to construct any project structures within the area of Community Forests area and also there is no tree felling will be required to construct project structures.	Contractor	PIU and PMO to report in writing the number of trees cut and planted if tree-cutting will be required (to be determined during detailed design stage) Number of complaints from sensitive receptors on disturbance of	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	However, some of the topsoil & vegetation will be lost during construction of RVTs and during pipe laying works.	- During construction disturbances will occur. Some of the mitigation measures include: (i) installing clear signage and markers to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) re-vegetating disturbed slopes and grounds, as applicable; and providing alternative fuel to workers for cooking. Hunting and poaching by workers will be strictly prohibited.		vegetation, poaching fishing, etc.	
Impacts on Fauna	No major impacts on animals area expected	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the area - Horn prohibited sign will be placed in nearby wildlife inhabited areas	Contractor	Vehicles running nearby wildlife inhibited area will be monitored; Number of complaints from sensitive receptors on disturbance of poaching fishing, etc.	Visual inspection by RPMOS & DSMC-ESS on monthly basis
C. Socioeconomic Characteristics					
Impact to Local Residents	The construction related activities that generate dust, noise and impede access will disturb the local residents. Ruina bagar, Bhopur, Simkhet, Chainpur, Campus road, Bank tole are the places sensitive in terms of this impact	- To minimize the disturbances, construction work will be conducted as quickly as possible. - The local residents will be consulted and informed about the disturbances in advance. - Temporary diversions and signboards will be provided for the pedestrians.	Construction contractor	Time schedule of construction work; Information related to construction activity to local residents Number of temporary diversions sign, signboards etc.	Visual inspection by RPMOS & DSMC-ESS on weekly basis
Problem from Outside Work Force	Haphazard disposal of solid waste and improper sanitary conditions generated by the construction workers may cause pollution of surrounding environment and affect the health of local people .Similarly, social problems will arise due to irresponsible behavior of the work force such as gambling, alcoholism and disrespect to local people and their culture.	- A mechanism for the safe disposal of waste will be developed in the project site and a labor camp will be constructed before the actual commencement of work and unwanted littering and discharge of waste will be prohibited. - The contractor should give proper instructions to the workers for them to act responsibly and prohibit activities such as alcohol uptake and gambling at work sites. - Local people should be given more chance to work during construction phase (More than 60%) - (whenever available) in the project which helps to minimize the chances of cultural	Construction contractor	Disposal sites of the waste will be assessed in the project site; Number of local people versus outside workers in the project area will be regularly monitored	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		discrepancy and conflict due to increased labor from outside.			
Occupation Health & Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and are prone to accidents	- A site health and safety plan will be prepared encouraging use of safety measures such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Provide safe drinking water for labours - Workers working at a certain height above the ground especially during the construction will be provided with safety gears. - Personal Protective Equipment (PPEs) will be provided as required. First aid box will be kept at a proper and easily accessible place. - Child labour will be totally prohibited from all the constructional activities. - Awareness on use of PPEs will be conducted at all work-fronts	Construction contractor	Site-Specific H&S plan Equipped first-aid stations Medical insurance coverage for workers Number of accidents Records of supply of uncontaminated water Condition of eating areas of workers Record of H&S orientation trainings Availability of personal protective equipment at construction site % of moving equipment outfitted with audible back-up alarms Signage for storage and disposal areas Condition of sanitation facilities for workers	Visual inspection by RPMOS (monthly) and DSMC-ESS on weekly basis. Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components
Community Health & Safety Hazards	Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; Communicable and transmittable diseases may potentially be brought into the community by construction workers. Ruina bagar, Bhopur, Simkhet, Chainpur, Campus road, Bank tole are the places sensitive in terms of this impact	- Contractor's will maintain adequate space and adequate lighting, temporary fence, reflectorized barriers and signage at camp sites; - Construct gender friendly toilet for labours - Contractor's preparedness in emergency response; - GRM will be formed & implementation of the GRM will be made mandatory	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (see Annex 2-D for sample); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at project location Agreement between landowner and contractors in case of using private land as	Visual inspection by RPMOS & DSMC-ESS on weekly basis Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				work camps storage areas etc.	
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil works, the invasive nature of excavation and the subproject sites being in built-up areas of town where there are a variety of human activities, will result impact to the sensitive receptors such as residents, businesses, and the communities. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc.) located alongside the roads. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Obtain details from nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; - Integrate construction the various infrastructure subprojects to be conducted in town (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. - Consult with local community/district development committee/local administration to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. - Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. - Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. - If construction work is expected to disrupt users of community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre work conditions.	Construction contractor	Utilities Contingency Plan Number of complaints from sensitive receptors	Visual inspection by RPMOS & DSMC-ESS on monthly basis
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment onsite can cause traffic problems. However, the proposed subproject will follow	- Ensure appropriate transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. - Maintain safe passage for vehicles and pedestrians throughout the construction period.	Construction Contractor	Traffic route during construction works including number of permanent signs, barricades and flagmen on worksite;	Visual inspection by RPMOS & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	existing ROW alignment. The impacts are negative but short-term, site specific within a relatively small area and reversible by mitigation measures.	- Schedule truck deliveries of construction materials during periods of low traffic volume. - Erect and maintain barricades including signs, markings, flags and flagmen informing, diversions and alternative routes when required. - Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concern/complaints. - Provide walkways and metal sheets where required to maintain access across for people and vehicles. - Increase workforce in front of critical areas such as institution, place of worship, business establishment, hospitals, and schools. - Consult business and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. - Any damage to properties and utilities will be restored to pre-work conditions.		Number of complaints from sensitive receptors; Number of signage placed at project location. Number of walkways, signage, and metal sheets placed at project location	
Impact on private Land & Loss of standing crops	The project won't acquire any private land & property during construction phase of the project so there is no issues for loss of standing crops. However, disposal of spoil and laying of pipelines may cause temporary damage to the crops	- Efforts will be made to avoid any loss of crops - (If unavoidable) The loss of crops will be assessed timely, and compensation will be provided as per market values (However, negotiation will be under the right of the Users' Committee)	WUSC	Record of loss, and grievance from the affected person	Monthly, and special attention during corpping season
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	There are no scheduled or unscheduled archaeological, paleontological, or architectural sites of	- Stop work immediately to allow further investigation if any finds are suspected.	Contractor	Records of chance finds	Visual inspection by RPMOS and DSMC-ESS on Monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	heritage significance listed by local and/ or national authority and/or UNESCO within the project sites				
E. Others					
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	- Appointment of environment supervisor to ensure EMP implementation - Timely submission of monitoring reports including pictures.	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by RPMOS to PMO PMO to submit semi-annual monitoring report to ADB
Post Construction Activities	Damage due to debris, spoils, excess construction materials, camp-leftovers	- Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and - All excavated roads shall be reinstated to original condition. - All disrupted utilities should be restored - All affected structures rehabilitated /compensated - The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. - All hardened surfaces within the construction camp area shall be ripped, all imported materials removed reinstraining to orginal conditionThe contractor must arrange the cancellation of all temporary services. - Request PMO/PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	Contractor	RPMOS/PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and (iv) worksite clean-up is satisfactory.	Prior to turn-over of completed works to WUSC
Environmental legislation compliance	Lack of awareness amongst project managers and WUSC in operating systems as per required legislation and IEE requirements	- Capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and ensuring compliance with NDWQS, applicable conditions in IEE approvals and license for use of water resource.	PMO, RPMOs, DSMC and WUSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	After commissioning of systems and semi annually
Drinking water supply system	Delivery of unsafe Water	- The operations and maintenance plan and training for staff will cover; (i) competent/cautions handling and storage of calcium Hypochlorite and qualified persons to implement/oversee disinfection	PMO, RPMOs, DSMC and WUSC	Water Quality reports WTP records in the log book	During O&M of the system Quarterly monitoring

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		and treatment; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-complaint EMP and a water safety plan; and (v) monitor water quality.			
	Excessive algal growth in reservoirs.	- The water tanks are designed to be closed. In addition; (i) maintenance of chlorine residual in the system at all times including the cleaning of reservoirs as per the O&M schedule.	WUSC	Water quality results	During O&M of the system. Daily maintenance of chlorine residual, cleaning.
Mishandling of chlorine	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion and DTW of a small quantity of bleach generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting.	- All disinfection chemicals require proper storage and handling practices: ii) providing safe storage for chemicals; iii) ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation iv)Ensure use of PPE while using chemicals; v) Use of chlorine guideline as per WHO (Annex 6)	WUSC	Water quality test	
Sanitation facilities (toilets and septage disposal site)	Contamination to land or water ways due to overflow of septic tanks and/or uncontrolled dumping of septage	- The subproject incorporates controlled disposal of septage. This is to reduce the likelihood of uncontrolled septage disposal to land and local water ways (nallas) which is currently practiced. Further septic tanks will be designed to ensure maximum retention is achieved and will be emptied at the required frequency (min every 3 years). Households will be educated on the above to further reduce the likelihood of septic tank overflows and uncontrolled dumping of septage.	WUSC, DSMC, RPMOs and PMO for education campaign	Sanitary inspection reports. Water quality reports from nearby surface water bodies	During O&M of the system.

C. Environmental Monitoring Program

187. Environmental monitoring will be done during construction at three levels:

(i) Monitoring development of project performance indicators by the PMO-ESS;

(ii) Monitoring implementation of mitigation measures by the Contractor; and

(iii) Overall regulatory monitoring of environmental issues by the PMO.

188. In addition to regular monitoring onsite (at town level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table IX-2 presents the indicative environmental monitoring plan for the subproject which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

Table IX-2: EnvironmentalPollution Parameter Monitoring Program

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
1.	Air quality	• Prior to construction to establish baseline • Construction phase	PM10 SO2 NOx	• Work site locations • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• 24-hour monitoring once in a season (except monsoons) for the construction period	• National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	• Prior to construction to establish baseline • Construction phase	Equivalent day and night time noise levels	• PTWs location • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• Once in a season (except monsoons) for the construction period	• National Noise Standard Guidelines, 2012	Contractor
3.	Water quality	• Prior to construction to establish baseline • Construction phase	TDS, TSS, pH, hardness, BOD, fecal coliform, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons, mineral oils, phenols, cyanide, temperature	• Adjacent to construction sites (to be identified by the (DRTAC or DSMC))	• Twice a year (pre-monsoon and post-monsoon) for the entire period of construction	• National Drinking Water Quality Standards, 2005	Contractor

D. Institutional Capacity Development Program

189. Considering the limited capability of the Project's key players in environmental management, technical assistance from environmental specialists and capacity development during loan implementation will be needed. Capacity development will consist of hands-on training in implementing the responsibilities in EMP (as well as in EARF) implementation, complemented with a short-term series of lectures/seminars on relevant topics.

190. WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSS has five regional laboratories; however some are not functioning fully due to lack of human resources. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with WUSC actively participating to develop its capacity. Water quality monitoring should be carried out in such a way that WUSC will be "learning by doing". After the engagement period, there should be continuing periodic training of new persons to ensure that the capacity of WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engaged for both the monitoring requirements and to train WUSC. A Water Safety Plan is included in subproject design and will oblige the operator to carry out water quality monitoring accordingly.

191. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work site. The proposed training project along with the frequency of sessions is presented in Table IX-3. The Environmental Safeguard specialist & EMP Field Monitloring Staffs are responsible for organizaing different training program for Environmental Management.

Table IX-3: Training Program for Environmental Management

Items	**Pre-construction/prior to construction**	**Construction**	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and GON and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GON	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Nepal Environmental Laws and Regulations	• Roles and responsibilities of officials/contractors/consultants towards protection of the environment • Environmental issues during construction	Experiences on EMP implementation – issues and challenges

Items	Pre-construction/prior to construction	Construction	
	Module 2: Environmental Assessment Process • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	• Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, ICGs, and (provide if DRTAC orDSMC)
Participants	Executing and implementing agencies, PMO, and PMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

E. Staffing Requirement and Budget

192. Costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;

(ii) Application for environmental clearances; and

(iii) Implementation of EMP, environmental monitoring program and long-term surveys.

193. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMO-ESS assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO-ESS.The cost of mitigation measures and surveys during construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.The indicative costs of EMP implementation are shown in Tables IX-4 and IX-5 (by source of funds).

Table IX-4: Indicative Cost of EMP Implementation

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
A	**Mitigation Measures**						
	Greenary management/ Promotion	Construction phase				200,000.00	Civil works contract
	Compensation costs	Construction phase				250,000.00	Civil works contract
B	**Monitoring Measures**						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	5	30000.00	150,000.00	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location			50,000.00	Civil works contract
3.	Water Quality Test	Pre-construction - Construction	Per Location	12	5000.00	60,000.00	Civil works contract
C	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, GoN environmental laws and regulations, and environmental assessment process; (ii) induction course for contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts during the course of implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the (provide if DRTAC or DSMC) environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to start of Phase 2 and upon completion of the project	lump sum	1 8	Module 1 – 300000.00 Module 2 – 80000.00 Module 3 – 200000.00	300,000.00 800,000.00 200,000.00	Covered under DRTAC or DSMC contract

	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
D	**Administrative Costs**						
	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum				Contractor's Cost
		Environmental assessment and clearances as per EPA 1997 and EPR, IEE presentation	Lump sum	1	500,000	500,000	DSMC Contract
E	**Other Costs**						
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign	As per requirement	Lump sum		190,000	Covered under DSMC contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, and reporting/ information dissemination)		Lump sum		200,000	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract. contractor's DLP
F	**Expert Monitoring Costs**						
	Environmental Specialist			1 MM	100,000	100,000	
	Sociologist			1 MM	75,000	75,000	
	Support staff			2 MM	25,000	50,000	
	Cost of monitoring by MoWS/DWSS					200,000	
	Transportation and logistics					75,000	
TOTAL						**3,500,000.00**	

Implementation Schedule

194. Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table IX-5 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.Similarly, IX-6 proposed topics for capacity building / training.

Table IX-5: Environmental Management Implementation Schedule

Activity			Indicative Time Frame
SUBPROJECT IMPLEMENTATION			
	Detailed Design & Bidding Documents		Q2 Y0
	Procurement		Q3 Y0
	Construction		Q4 Y0 – Q4 Y2
	Contractor Operating Period		Q3 Y2 – Q4 Y3
	Handover to WUSC for Operation		Q3 Y3 – Q1 Y4
	Defects Liability Period		Q3 Y2 – Q4 Y4
ENVIRONMENTAL MANAGEMENT			
	Overall		
	1.	Design Review and Technical Audit Consultant (DRTAC)-Engagement of Environmental Specialist	Starting Q4 Y0 (5 yrs of intermittent inputs)
	2.	PMO's submission of Environmental Monitoring Report	
		- Monthly EMR for subproject's Monthly Progress Report	- 8th day after effective month
		- Semi-Annual EMR during construction for submission to ADB	- 8th day after effective 6-mo. Period
		- Annual EMR for submission to ADB	- 8th day after effective year
	Prior to Construction Mobilization		
	1.	Finalization of EMP, (if applicable) revision of IEE	Q2 Y0
	2.	ADB review & approval of revised IEE & EMP.	Q 2 Y0
	3.	Obtaining Government's approval of IEE Report	Q2 Y0 – Q3 Y0
	4.	Community preparation (including disclosure of Final IEE & its EMP)	Q4 Y0
	5.	Establishment of baseline data (as set out in the EMP)	Q4 Y0 (shall have been done prior to award of contract)
	6.	Preparation of C-EMP by selected Contractor, review of C-EMP	Q4 Y0, before Notice to Proceed is
		against SPS-compliant EMP.	Given
	Construction Period		
		Mobilization to Demobilization	
	1.	Implementation of mitigation measures and conduct of environmental effects monitoring following the C-EMP.	Q4 Y0 – Q4 Y2
	2.	Submission of Environmental Monitoring Report (EMR)	Q4 Y0 – Q4 Y2
		- Monthly, by Contractor	5th day of the month following the effective month
		- Quarterly, by Contractor or by Licensed Laboratory	3rd day of the month following the effective quarter
	Operation Period (could start even before DLP is over)		
	1.	Implementation of mitigation measures & monitoring activities as specified in the EMP	Starting anytime between Q3 Y3 &Q1 Y4
	2.	Submission of EMR	anytime between Q3 Y3 & Q1 Y4
		- Monthly, by Operator	5thday of the month following the effective month
		- Quarterly, by Operator or (if applicable) by Licensed Laboratory	3rd day of the month following the effective quarter

Table IX-6: Proposed Topics for Capacity Building/Training

Topic	Target Participants	Timing
1. By Environmental Specialists		
1.1 Legal Framework	DWSS, PMO,	Early stage
▪ Relevant national laws, regulations & standards on EA& management	WSSDO, ICG,	of Output 2
▪ ADB SPS 2009	RMSO, WUSC (15-18)	
▪ EA& review procedure under the Project		
1.2 Environmental Assessment		
▪ Rapid environmental assessment		
▪ Initial environmental examination		
1.3 Some Aspects of EA Process & Environmental Management		
▪ Meaningful consultation & info disclosure		
▪ Grievance redress mechanism		
▪ Environmentally responsible procurement		
▪ Occupational & community health and safety		
1.4 EMP Implementation, part 1	DWSS, PMO,	Early stage
▪ Institution arrangements & responsibilities	WSSDO, ICG,	of Output 2
▪ Environmental quality monitoring	RMSO, WUSC,	
▪ Emergency response	(15-18)	
1.5 EMP Implementation, part 2		
▪ Performance monitoring & indicators		
▪ Environmental monitoring report		
2. By External Experts		
2.1 Other relevant topics, such as:	MOWS, DWSS,	During
A Good engineering and construction practices as mitigation measures	PMO, ICG,	Project's
B Climate change adaptation (applicable to eligible activities/works under the Project)	WSSDO, RMSO, DSMC(30)	CapacityDevt. Program
B.1 Climate change impacts on infrastructure		
B.2 Climate-proofing of infrastructure		
C Strategic environmental assessment of WSS sector policy, development plans and programs		
D Other relevant topics that may be suggested by MOWS, DWSS, PMO, ICG& WSSDO		

X MONITORING AND REPORTING

195. RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the projects. In addition to recording information on the work and deviation of work components from the original scope PMO, ICGs will undertake site inspections and document review to verify compliance with EMP and progress toward the final outcome.

196. RPMO will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Annex 2-F. Subproject budgets will reflect the costs of monitoring and reporting requirements. For the projects likely to have significant adverse environmental impacts during operation phase, reporting will be continued at bio-annual & annual basis. Monitoring reports will be posted in a location accessible to the public.

197. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO-ESS will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO-ESO, with support from the PMO-ESS

198. ADB will review project performance against the MoWS'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. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) Conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) Conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) Review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) Work with EAs to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

XI CONCLUSION

199. Chainpur Small Town Water Supply and Sanitation Project is highly beneficial from technical study view point as well as social, economic and financial considerations. The project fulfills the majorobjectives of the TSTWSSSP, which are to:

a. Extend water supply and sanitation coverage in project area with the intention of improvingcommunity health and hence economic condition
b. Establish and develop the institutional capacity of community, WUSC in particular in theplanning, implementation and O & M of the facilities.
c. Encourage financial participation by requiring community contribution 30% including minimum of 5 % upfront cash of the Capital Cost in addition to 25% cost recovery of theloan funds through the repayment of the loan through water tariffs.

200. It is recommended that the project be implemented and construction carried out as per schedule.The following actions however need to be executed before going up to actual construction.

a. As the proposed water supply system is on community based approach, the present WUSC needs to be strengthened in terms of community mobilization lead persons in individual wards and communities.

b. The proposed water treatment process is based on the water quality of the Seti River water. The water quality of the proposed sump well may be different. It is recommended to analyze the water quality of the proposed sump well once it is constructed and modify the treatment process accordingly. The design of the water treatment plant should be considered as provisional.

c. Chainpur is a growing town. As such there should be a proper land use plan and integrated action plan in the project area for the effective usage of the water supply system.

XII LITERATURE REVIEWED

ADB, 2003. Environmental Assessment Guidelines.

Constitution of Nepal (2015). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

Environment Protection Act, (1997). Ministry of Science, Technology and Environment Kathmandu

Environment Protection Rules, (1997), Ministry of Science, Technology and Environment, Kathmandu

Environment Statistics of Nepal, CBS, 2011

Environmental Impact Assessment Guidelines, (1993). National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal

Final Feasibility Study of Chainpur Water Supply and Sanitation Project, 2015

Detailed Engineering Design Report of Chainpur Water Supply Sub Project, 2016

Labor Act (1991), Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

Local Self-Governance Act, (1999). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

Ministry of Population and Environment, 1999. Environment Protection Act, 1997 and Environment Protection Rules, 1999. (Amendment, 1999). Ministry of Law, Justice and Parliament Affairs, Nepal

Municipality profile and baseline information of JayaPrithvi Municipality, and National Population and Housing 2011, CBS, 2012

National Transport Policy, (2001). Ministry of Physical Infrastructure and Transport, Government of Nepal, Nepal

National Urban Policy (2007). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

Shrestha K 1998. Dictionary of Nepalese Plant names. Mandala Book Point, Kathmandu, Nepal.

Solid Waste Management Act (2011). Ministry of Science and Technology and Environment, Kathmandu

The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector,2009

Uprety, B.K (2003). Safeguard the Resources Environmental Impact Assessment Process and Practice, Kathmandu

Water Resource Act (1992). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

ANNEXES

ANNEX 1: REA Checklist

ANNEX 1:

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR CHAINPUR PROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST

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 issues 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; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	NEP: Urban Water Supply and Sanitation Sector Project
Subproject:	Chainpur Town Water Supply and Sanitation Project

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the project area**			
Densely populated?	√		It is densely populated in the market areas where the population density is as high as 207/ha, and the density is low in other places (around 25/ha)
Heavy with development activities?		√	There are no large scale interventions, however regular local level development works are ongoing
Adjacent to or within any environmentally sensitive areas?			
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	No nearby sources of pollution are present. However, erosion could be a concern if intake works not well carried out. But design has addressed this concern.

Screening Questions	Yes	No	Remarks
impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	No such loss is anticipated
hazard of land subsidence caused by excessive ground water pumping?		√	NA
social conflicts arising from displacement of communities ?		√	No Displacement
conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	The source is already registered in the name of WUSC.
unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Basic water treatment is proposed. WSP is also planned. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
delivery of unsafe water to distribution system?	√		Design proposes monitoring kits, a lab room. WSP has been planned. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives.
inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design proposes housing for intake, as well as perimeter fencing of the entire land area of the intake & associated facilities.
over pumping of ground water, leading to salinization and ground subsidence?		√	NA
excessive algal growth in storage reservoir?		√	EMP provides mitigation measures.
increase in production of sewage beyond capabilities of community facilities?		√	Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
inadequate disposal of sludge from water treatment plants?		√	Minimal sludge expected. EMP provides mitigation measures.
inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
Impairments associated with transmission lines and access roads?	√		Transmission main pipe lines of 5.043 Km and distribution pipe network of 18.473 km length are proposed within existing public road RoWs/unused government and public land.
health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		$Ca(ClO)_2$, commonly used in basic water treatment, will be used. EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.
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?		√	Chlorine Use Guidelines will be prepared, taught and implied
dislocation or involuntary resettlement of people?		√	No any such case

Screening Questions	Yes	No	Remarks
disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	No such disparities or challenges are there
noise and dust from construction activities?	√		Site specific and short term impacts of noise and dust are foreseen. EMP provides mitigation measures.
increased road traffic due to interference of construction activities?	√		Traffic Management Plan will be prepared, shared and implemented
continuing soil erosion/silt runoff from construction operations?	√		Low scale impacts of the nature are foreseen in construction sites.
delivery of unsafe water due to poor O&M treatment processes (especially MOWS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS. WSP is proposed
delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		√	
accidental leakage of chlorine gas?		√	
excessive abstraction of water affecting downstream water users?		√	Safe yield of Vanka source is 26.8 lps while the dry season discharge is 67 lps Two proposed sump well is expected to yield 14.6 lps.
competing uses of water?		√	
increased sewage flow due to increased water supply	√		Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		There is no wastewater collection & treatment system. EMP provides mitigation measures.
large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	√		The impacts will be of small scale and temporary in nature
social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
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?	√		EMP provides mitigation measures.
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?	√		EMP provides mitigation measures.

Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

Screening Questions		Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides	0	Investments in the sample sub project will not likely be affected by climate change and extreme weather events due to the siting of project. For example all pipes will be constructed below ground no investments will be sited in flood plains etc.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g. sea-level, peak river flow, reliable water level, peak wind speed etc.)	0	Not likely.
Materials and maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro metrological parameters) affect the selection of project inputs over the life of project outputs (i.e. construction materials)	0	
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?	0	Climate conditions will unlikely affect water quantity and quality of water supply system. The water supply schemes will be designed to meet the current and future demand. Further water supply system will be operated and maintained efficiently to reduce system losses. Water safety plans will be implemented to ensure water supplied is safe and potable at all times.

Options for answers and corresponding scores are given below.

Response	**Score**
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned as medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low Other comments: None

ANNEX 2: ENVIRONMENTAL STANDARDS, SAMPLE FORMS, FORMATS AND REPORTING TEMPLATE

ANNEX 2-A:
RELEVANT ENVIRONMENTAL QUALITY STANDARDS

Ambient Air Quality Standards

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard ($\mu g/m^3$) *	WHO Air Quality Guidelines ($\mu g/m^3$) **	
			Global Update 2005	Second Edition ^ 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM_{10}	Annual	-	20	-
	24-hour	120	50	-
$PM_{2.5}$	1-year	-	10	-
	24-hour	-	25	-
SO_2	Annual	50	-	
	24-hour	70	20	-
	10-minute	-	500	-
NO_2	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

^ Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.

Parameter that either has no national standard value for 24-hour observation or with WHO guideline value for 24-hour observation as more stringent than that specified in the national standards.

Noise Level Standards

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L_{Aeq} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	
Diesel generator	90		-	

* Guidelines for Community Noise, WHO, 1999.

Source: Environmental, Health and Safety General Guidelines, 2007.
International Finance Corporation, World Bank Group.

National Drinking Water Quality Standards, 2006

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-water Quality, 4th Edition, 2011*
	Parameter	Unit	Max. Concentration Limits	
Physical	Turbidity	NTU	5 (10) **	-
	pH		6.5 - 8.5	none
	Color	TCU	5 (15)	none
	Taste & Odor		Would not be objectionable	-
	TDS	mg/l	1000	-
	Electrical Conductivity	µc/cm	1500	-
	Iron	mg/l	0.3 (3)	-
	Manganese	mg/l	0.2	-
	Arsenic	mg/l	0.05	0.01
	Cadmium	mg/l	0.003	0.003
	Chromium	mg/l	0.05	0.05
	Cyanide	mg/l	0.07	none
	Fluoride	mg/l	0.5 - 1.5 ^	1.5
	Lead	mg/l	0.01	0.01
	Ammonia	mg/l	1.5	none established
Chemical	Chloride	mg/l	250	none established
	Sulphate	mg/l	250	none
	Nitrate	mg/l	50	50
	Copper	mg/l	1	2
	Total Hardness	mg/l	500	-
	Calcium	mg/l	200	-
	Zinc	mg/l	3	none established
	Mercury	mg/l	0.001	0.006
	Aluminum	mg/l	0.2	none established
	Residual Chlorine	mg/l	0.1 - 0.2	5 ^^
Micro Germs	E-coli	MPN/100ml	0	must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml	0 in 95% of samples taken	

* Health-based guideline values

** Figures in parenthesis are upper range of the standards recommended.

^ These standards indicate the maximum and minimum limits.

^^ From WHO (2003) Chlorine in Drinking-water, which states that this value is conservative.

Parameter with WHO guideline value as more stringent than natilonal standard value.

National Drinking Water Quality Standards was obtained from the Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

ANNEX 2-B:
SAMPLE GRIEVANCE REDRESS FORM
(To be available in Nepalese and English)

The _____ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enables us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information remain confidential, please inform us by writing/typing* (CONFIDENTIAL)* above your name. Thank you.

Date		Place of registration		
Contact Information/personal details				
Name	Gender	*Male *Female	Age	
Home Address				
Place				
Phone No.				
E-mail				
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below: If includes as attachment/note/letter, please tick here:				
How do you want us to reach you for feedback or update on your comment/grievance?				

FOR OFFICIAL USE ONLY

Registered by: (Names of official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/positions of official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

ANNEX 2-C:
SAMPLE TRAFFIC MANAGEMENT PLAN

SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties
- Avoid hazards in addressing issues that may delay the project.

B. Operating Policies for TMP

The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

- Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- Train all persons that select, place, and maintain temporary traffic control devices.
- Keep the public well informed.
- Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

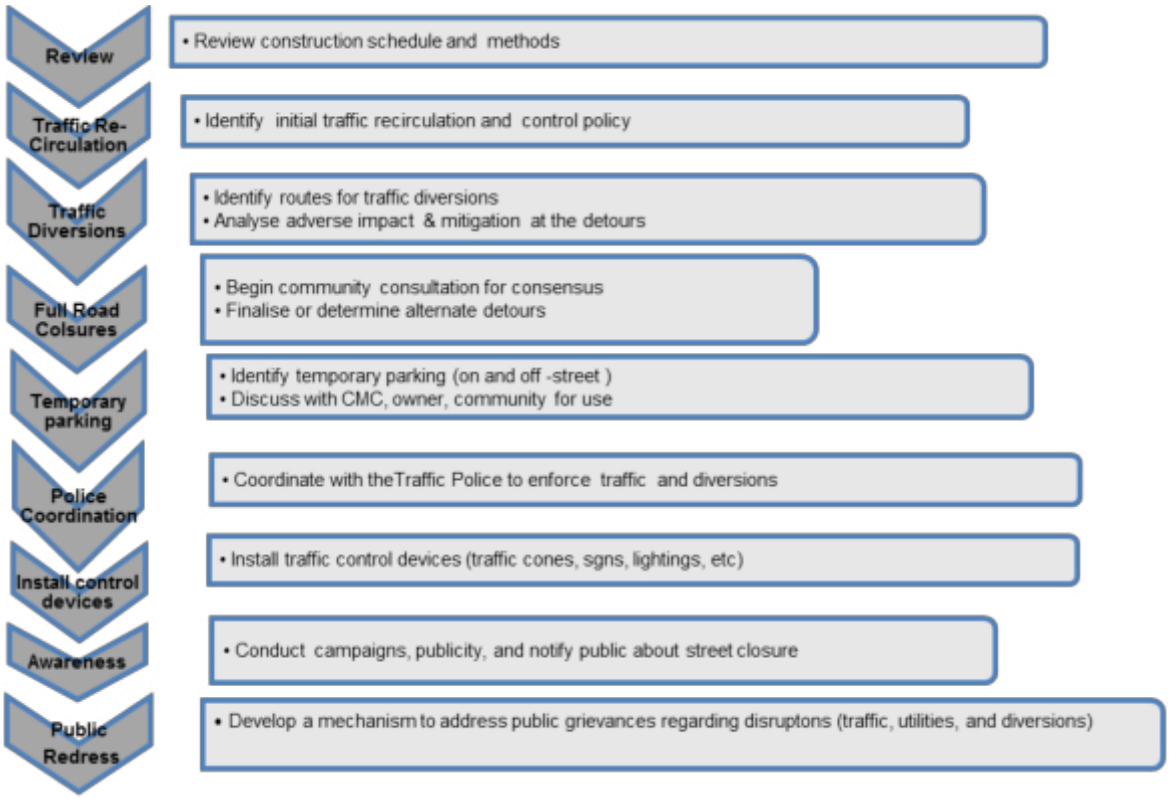
C. Analyze the impact due to street closure

Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- approval from the ICG, local administration to use the local streets as detours;
- consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- determining if additional traffic control or temporary improvements are needed along the detour route;
- considering how access will be provided to the worksite;
- contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A: Policy Steps for the TMP



D. Public awareness and notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

The ICG will also conduct an awareness campaign to educate the public about the following issues:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behavior along the work zones; and
- reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- Explain why the brochure was prepared, along with a brief description of the project;
- Advise the public to expect the unexpected;
- Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- Educate the public about the safe road user behavior to emulate at the work zones;
- Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- Indicate the office hours of relevant offices.

E. Vehicle Maintenance and Safety

A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of GoN. All vehicles to be used at STWSSP shall be in perfect condition meeting pollution standards of GoN. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Nepal.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can't leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

F. Install traffic control devices at the work zones and traffic diversion routes

The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

The ICG and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

ANNEX 2-D:
SPOIL MANAGEMENT PLAN

Spoil Management Plan (SMP)

Purpose and application: SMP is to describe how STWSSP will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

Objectives of SMP: The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
- Minimize any further site contamination of land, water, soil
- Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

Structure of SMP:
Section 1: Introduction of SMP
Section 2: Legal and other requirements
Section 3: Roles and responsibilities
Section 4: Identification and assessment of spoil aspects and impacts
Section 5: Spoil volumes, characteristics and minimization
Section 6: Spoil reuses opportunities, identification and assessment
Section 7: On site spoil management approach
Section 8: Spoil transportation methodology
Section 9: Monitoring, Reporting, Review, and Improvements

Aspects and Potential Impacts
The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and Groundwater	Contamination of water (surface and ground water)
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

Spoil volumes, Characteristics and Minimization

Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, MOWS mix materials, reusable materials

Adopt Spoil Reduce, Reuse Opportunities
An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

Storage and stock piling

Transportation and haulage route

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSMC for their review and approval.

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

Appendixes

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection Report
- Others

ANNEX E:
SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

INTRODUCTION

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be Reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
- What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
- Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Are their designated areas for concrete works, and refueling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/EMP

No.	Sub-Project Name	EMP/CEMP Part of Contract Documents (Y/N)	CEMP/EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed & Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT
Brief description on the approach and methodology used for environmental monitoring of each sub-project

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L	TN (mg/L)	TP (mg/L)

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

ANNEX F:
SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE:
TITLE: _____ DMA:
LOCATION: _____ GROUP:

WEATHER CONDITION:
_____

INITIAL SITE CONDITION:
_____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____

Intervention Steps:
_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation

Site Restored to Original Condition Yes No

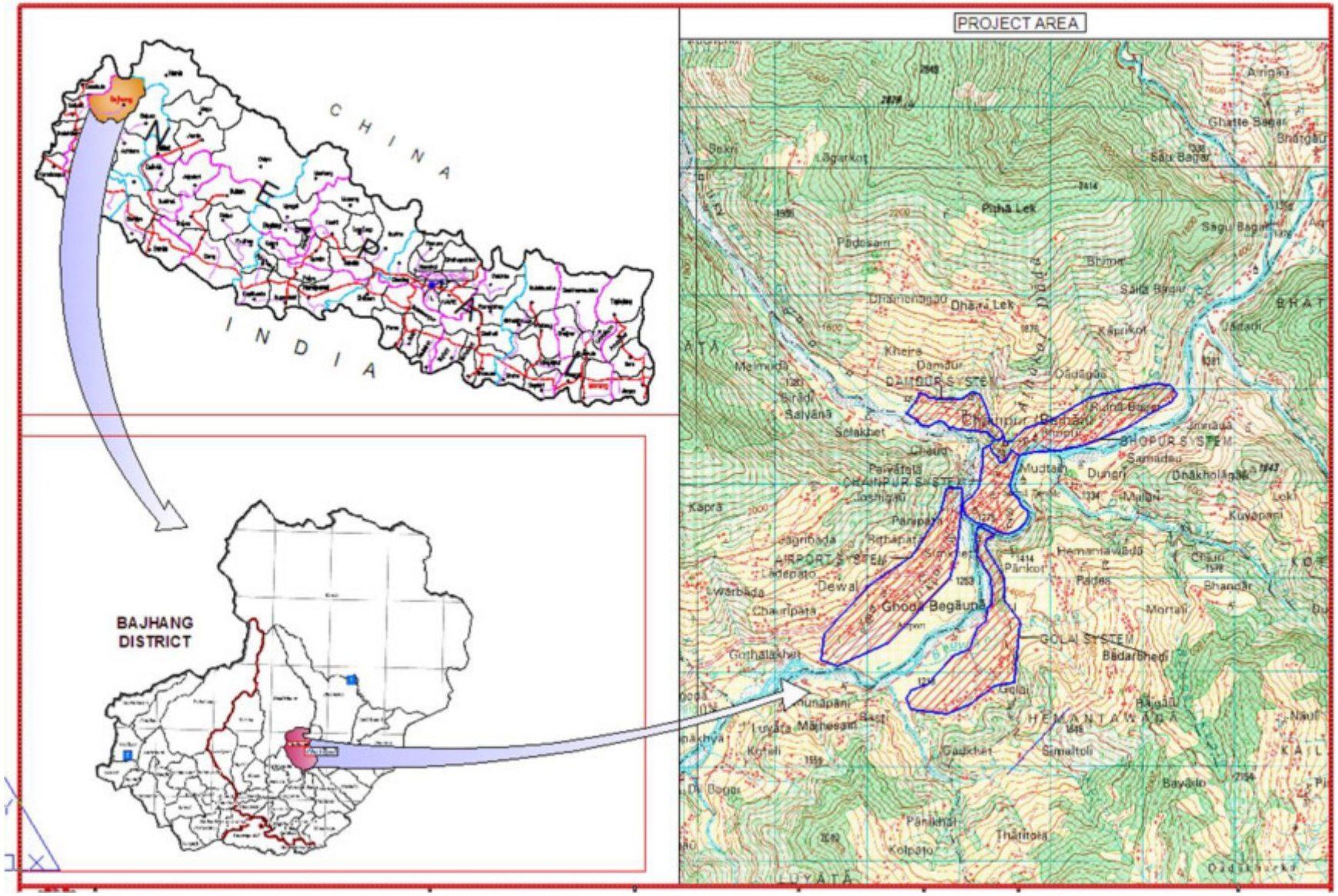
Signature
_____

Sign off

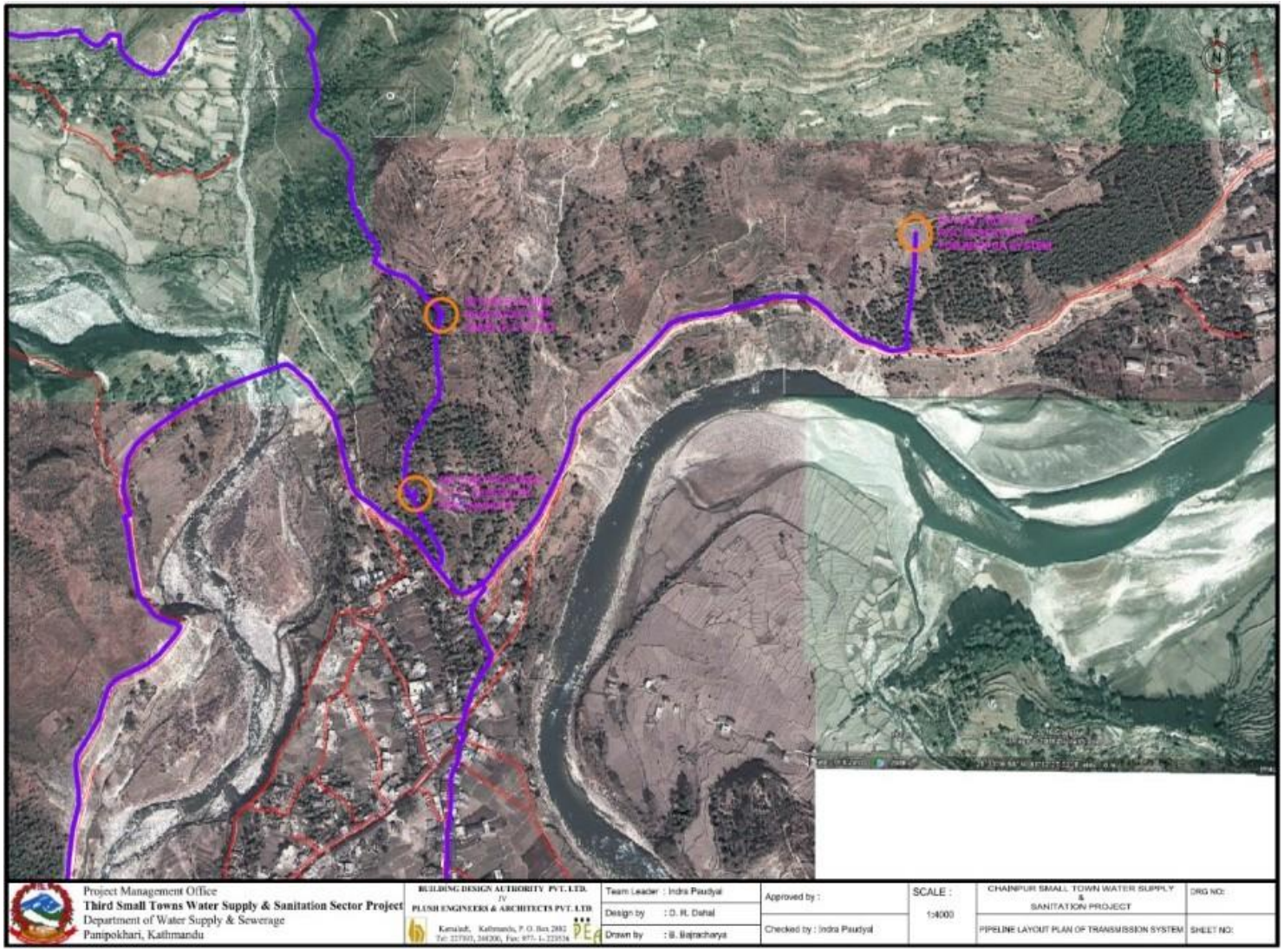
_____ _____

Name **Name**
Position **Position**

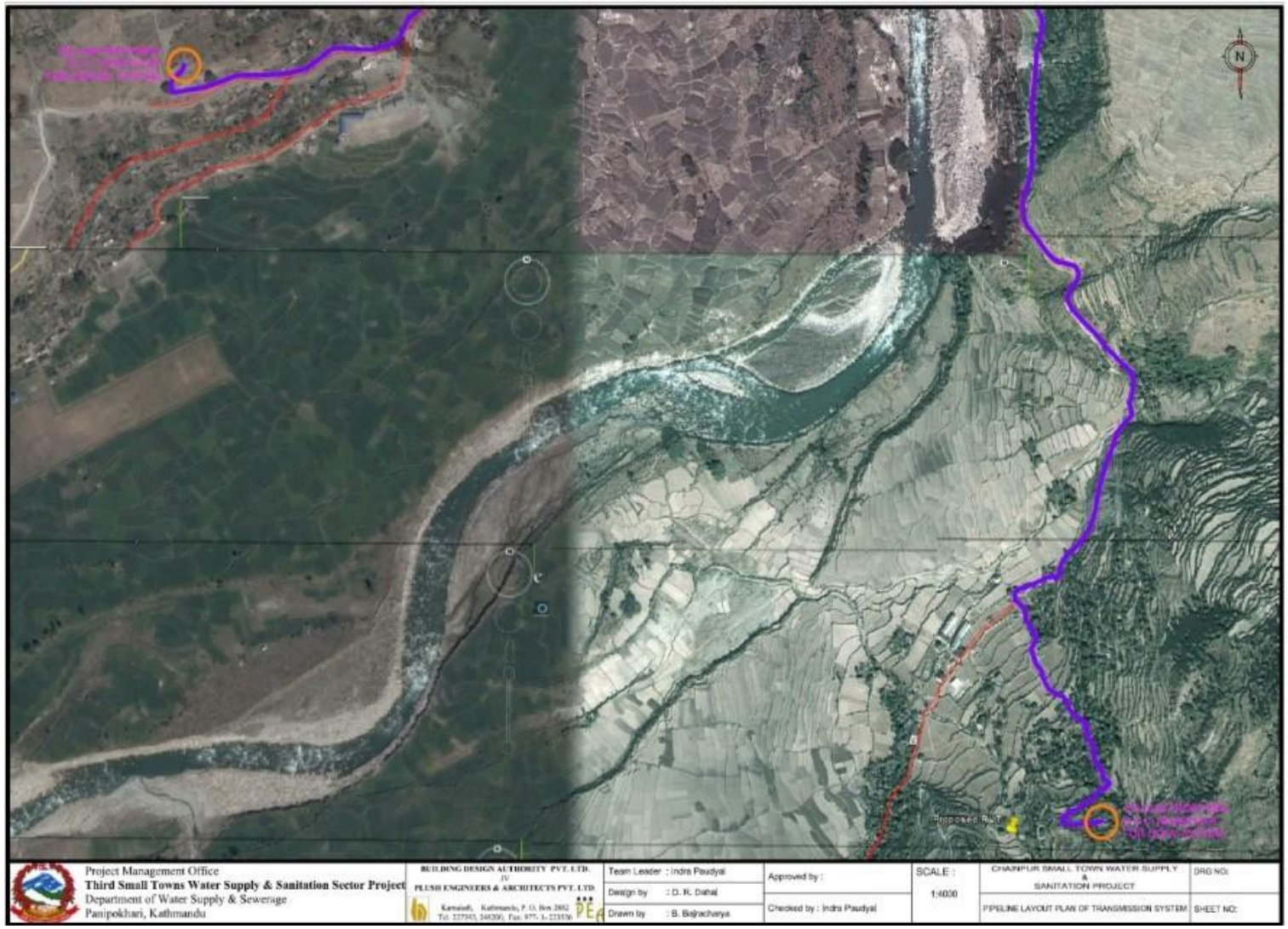
ANNEX 3:
PROJECT LOCATION, SERVICE AREA AND SCHEMATIC MAP



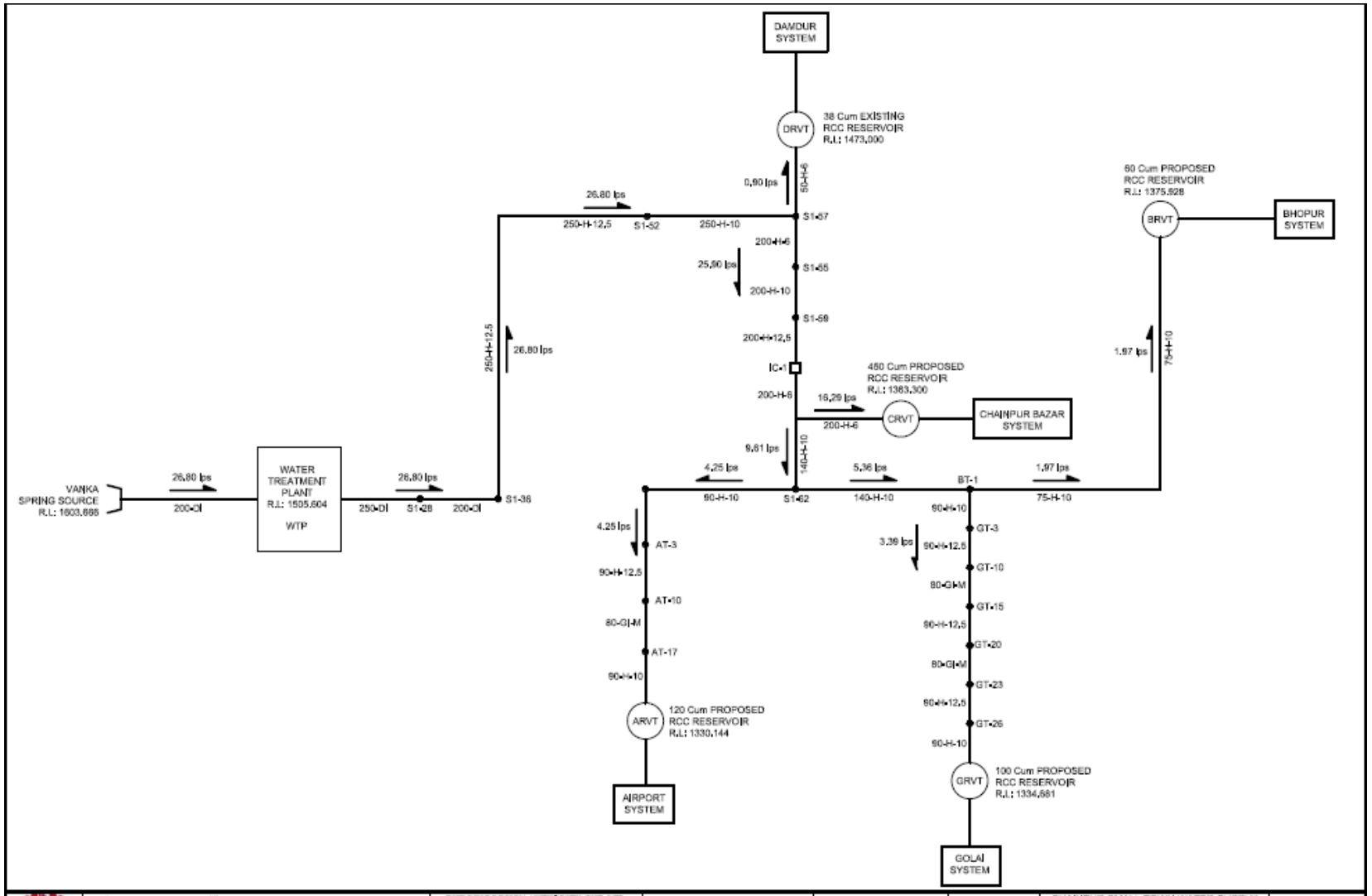
Project Area



Google Map with Project Component Sites (Map 1)



Google Map with Project Component Sites (Map 2)



Schematic Layout of the Project

ANNEX 4:
IBAT INFORMATION ON BIODIVERSITY SENSITIVITY IN PROXIMITY OF PROJECT AREA

ibat | FOR BUSINESS
Integrated Biodiversity Assessment Tool

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

There are no features within 1 km.

Features within 5 km

There are no features within 5 km.

Features within 10 km

National-level protected areas		
IUCN Category V-VI	Khaptad - Buffer Zone	27,054 ha
Priority Sites for Biodiversity		
Key Biodiversity Area	Khaptad National Park CR/EN, VU, endemic, other	22,500 ha

ANNEX 5:
PUBLIC NOTICE, MUCHULKA, MEETING MINUTES, AND RECOMMENDATION LETTER

वर्ष १३ । अङ्क २१३ । काठमाडौं । शुक्रबार, ४ जेठ २०७५ । Friday, 18 May 2018 । पृष्ठ ८+४ । मूल्य रू. १०

आर्थिक अभियान

हरेक दृष्टि, आर्थिक कोण

राष्ट्रिय दैनिक

तेश्रो सानाशहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना
चैनपुर सानाशहरी खानेपानी तथा सरसफाई आयोजना
जयपृथ्वी नगरपालिका, बझांग
प्रारम्भिक वातावरणीय परिक्षणको लागि राय सुझाव पेश गर्ने सम्बन्धी
सार्वजनिक सूचना
प्रकाशित मितिः २०७५/०२/०४

18th may 2018
Artwik Abhiyan

नेपाल सरकार र एशियाली विकाश बैंकको आर्थिक सहयोगमा प्रदेश नं. ७ को बझांग जिल्ला स्थित जयपृथ्वी नगरपालिकाको चैनपुर - वडा नं. ९, १० र ११ मा संचालन हुनुगइरहेको चैनपुर सानाशहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्नु पर्ने भएकाले सो आयोजनाबाट भौतिक, जैविक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रणालीहरुमा के कस्ता असरहरु पर्दछन् वा पर्न सक्दछन् सो बारे लिखित राय सुझाव सहित १५ (पन्ध्र) दिनभित्र आईपुग्ने गरी निम्न ठेगानामा पठाई दिनु हुन वातावरण संरक्षण नियमावली २०५४ को नियम ७ (२) अनुसार यो सूचना प्रकाशित गरिएको छ। साथै लिखित राय सुझावको प्रतिलिपी सम्बन्धित मन्त्रालय तथा विभागमा समेत दिन सकिनेछ।

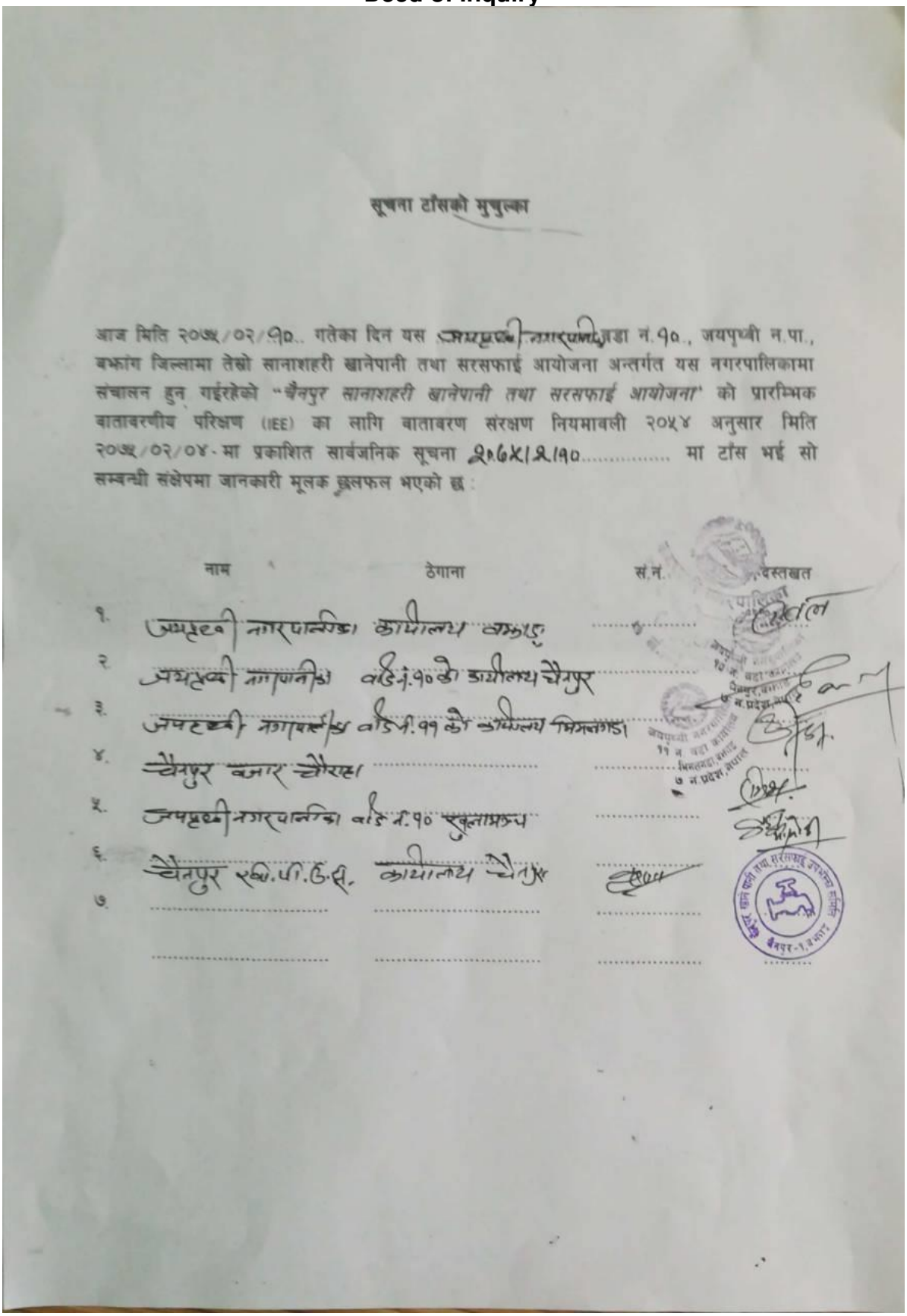
राय सुझाव पठाउने ठेगाना

तेश्रो सानाशहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना
आयोजना व्यवस्थापन कार्यालय
पानीपोखरी, काठमाण्डौ
फोनः ०१-४४१२३४८
फ्याक्सः ०१-४४१३२८०

खानेपानी तथा सरसफाई उपभोक्ता कार्यालय
चैनपुर, बझांग
फोनः ०९२-४२१२८१
फ्याक्सः ०९२-४२१२८१

बि.डि.ए.-पि.ई.ए. जे. भी.
कमलादी, काठमाण्डौ
पो.ब.नं.: २८८२
फोन नं.: ०१-४२४८२००
फ्याक्सः ०१-४२२३५३६
ई-मेलः bdapvtltd@gmail.com

Deed of Inquiry

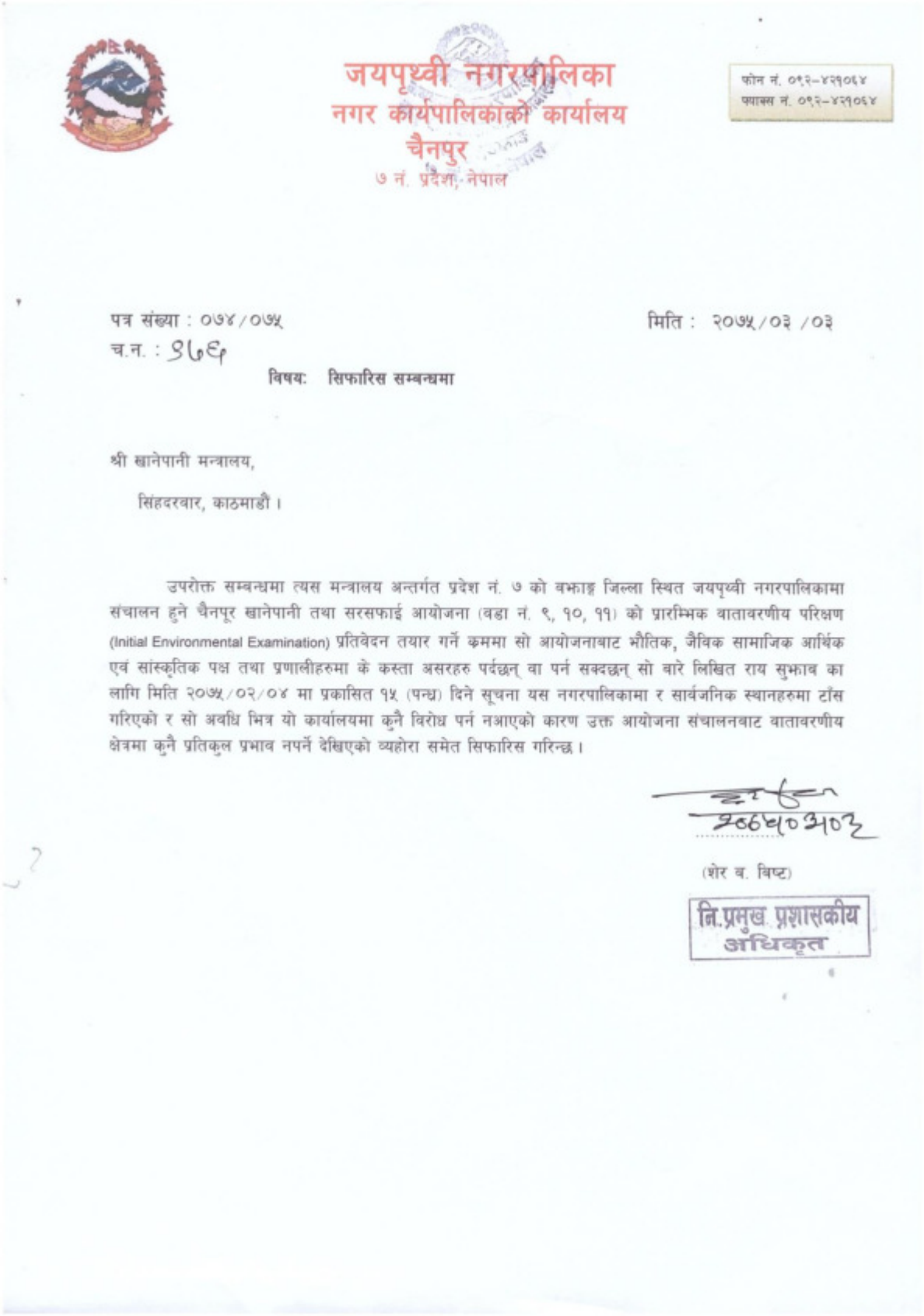


सूचना टाँसको मुचुल्का

आज मिति २०७५/०२/१०.. गतेका दिन यस जयपृथ्वी नगरपालिका वडा नं.१०., जयपृथ्वी न.पा., बझांग जिल्लामा तेस्रो सानाशहरी खानेपानी तथा सरसफाई आयोजना अन्तर्गत यस नगरपालिकामा संचालन हुन गईरहेको "चैनपुर *सानाशहरी खानेपानी तथा सरसफाई आयोजना*" को प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि वातावरण संरक्षण नियमावली २०५४ अनुसार मिति २०७५/०२/०४ मा प्रकाशित सार्वजनिक सूचना २०७५।११।१०..... मा टाँस भई सो सम्बन्धी संक्षेपमा जानकारी मूलक छलफल भएको छ :

	नाम	ठेगाना	सं.नं.	दस्तखत
१.	जयपृथ्वी नगरपालिका कार्यालय बझांग	.....	.....	
२.	जयपृथ्वी नगरपालिका वडा नं.१० को कार्यालय चैनपुर	.....	.....	
३.	जयपृथ्वी नगरपालिका वडा नं.११ को कार्यालय भिमतडा	.....	.....	
४.	चैनपुर बजार चौरहा	.....	.....	
५.	जयपृथ्वी नगरपालिका वडा नं.१० सुचनाफलक	.....	.....	
६.	चैनपुर खा.पा.ढ.नि. कार्यालय चैनपुर	.....	.....	
७.	.....	.....	.....	
	.....	.....	.....	.....

Recommendation Letter from JayPrithvi Municipaliy



जयपृथ्वी नगरपालिका
नगर कार्यपालिकाको कार्यालय
चैनपुर
७ नं. प्रदेश, नेपाल

फोन नं. ०९२-४२१०६४
फ्याक्स नं. ०९२-४२१०६४

पत्र संख्या : ०७४/०७५ मिति : २०७५/०३/०३
च.न. : ४७६

विषय: सिफारिस सम्बन्धमा

श्री खानेपानी मन्त्रालय,

सिंहदरबार, काठमाडौं ।

उपरोक्त सम्बन्धमा त्यस मन्त्रालय अन्तर्गत प्रदेश नं. ७ को बझाङ जिल्ला स्थित जयपृथ्वी नगरपालिकामा संचालन हुने चैनपुर खानेपानी तथा सरसफाई आयोजना (वडा नं. ९, १०, ११) को प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्ने क्रममा सो आयोजनाबाट भौतिक, जैविक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रणालीहरुमा के कस्ता असरहरु पर्दछन् वा पर्न सक्दछन् सो बारे लिखित राय सुझाव का लागि मिति २०७५/०२/०४ मा प्रकासित १५ (पन्ध्र) दिने सूचना यस नगरपालिकामा र सार्वजनिक स्थानहरुमा टाँस गरिएको र सो अवधि भित्र यो कार्यालयमा कुनै विरोध पर्न नआएको कारण उक्त आयोजना संचालनबाट वातावरणीय क्षेत्रमा कुनै प्रतिकुल प्रभाव नपर्ने देखिएको व्यहोरा समेत सिफारिस गरिन्छ ।

२०७५०३०३

(शेर ब. विष्ट)

नि.प्रमुख प्रशासकीय अधिकृत

Public Consultations

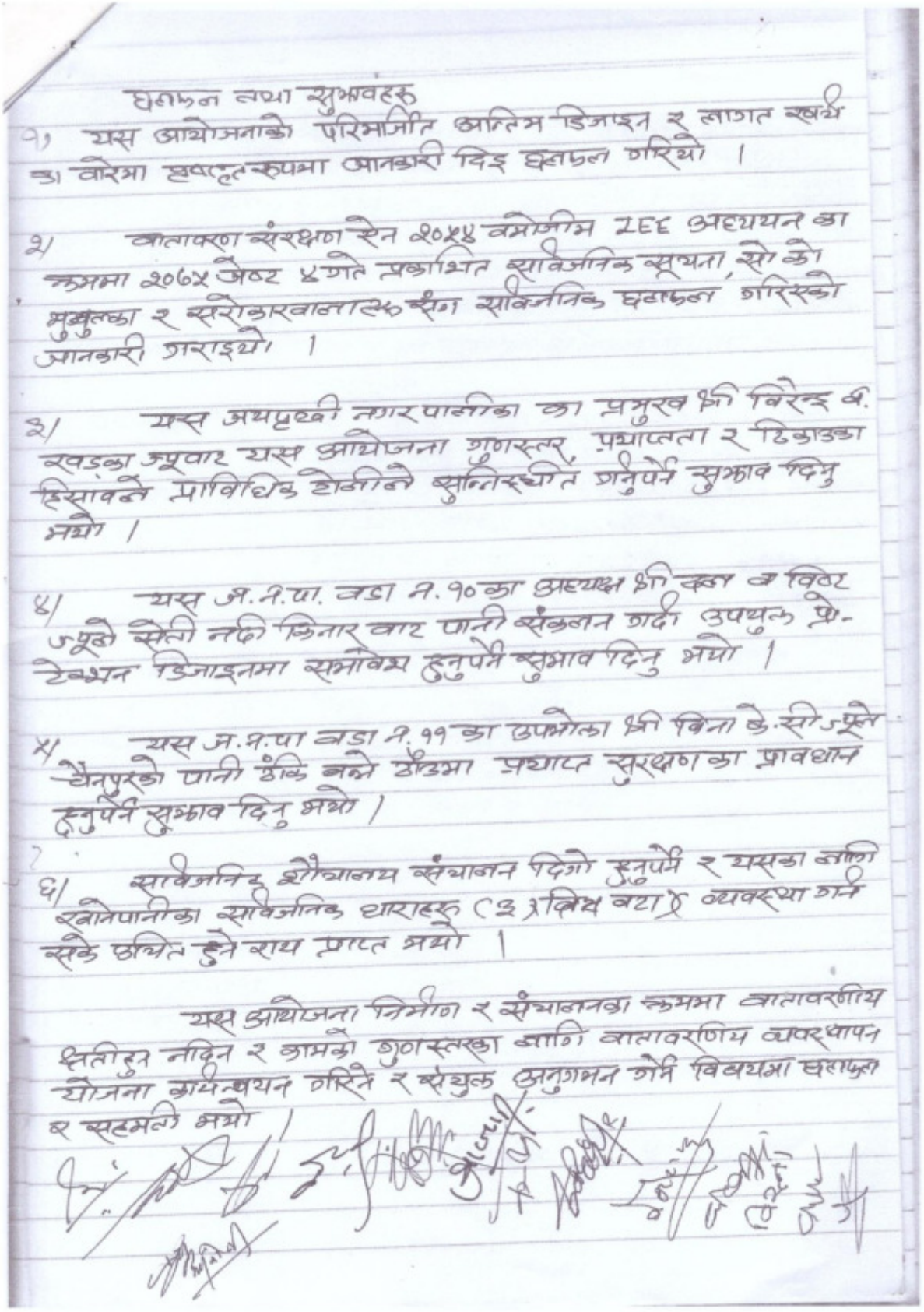
आज मिति २०७५ साल आषाढ ३ गते आइतवारका दिन चैनपुर तेस्रो साना शहरी खानेपानी तथा सरसफाइ उपभोक्ता समितिका - अध्यक्ष श्री लोकेन्द्र ब. बिष्ट ज्यूको अध्यक्षतामा यस खानेपानी - आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (IEE) अध्ययनका क्रममा यस आयोजना बाट पर्न सक्ने प्रभावहरु तथा यसका सकारात्मक पक्षहरुका बारेमा परामर्शदाता फर्म B.D.A-P.E.A. J.V र स्थानीय सरोकार वाला बिच निम्नानुसार छलफल कार्यक्रम संचालन भएको छ।

उपस्थित

१	अध्यक्ष	श्री लोकेन्द्र ब. बिष्ट	९८६८४०६३०५
२/	सचिव	श्री प्रेम प्रकाश घल्याल	९८४८४३६७२८
३/	कोषाध्यक्ष	श्री जुना आग्री	९८४१००२५९२ (आजाग्री)
४/	सदस्य	श्री कान्छे खड्का	९६८५०८२१५६
५/	"	श्री पवित्र ब. सिंह	९८६८८११९८३
६/		श्री कुवर ब. बम	९८४८४३६५२४

आमन्त्रित

१/ प्रमुख अतिथि ज.न.पा. प्रमुख श्री बिरेन्द्र ब. खड्का
२/ अतिथि जि.न.पा. ९ वडा अध्यक्ष श्री कबिर खड्का
३ " " १० " " श्री दल ब. बिष्ट
४ " " ११ " " श्री केशव ब. रोकाया
५ श्री शेर ब. बिष्ट
६ श्री हरि शंकर जोशी
७ श्री बिना के.सी
८ श्री सबिता सुवर्णकार
९ श्री बिस्ना नेपाली
१० श्री देवकी सिंह
११ श्री कमल कुमार जोशी
१२ श्री ध्रुव रोकाया
१३ श्री कृष्ण गिरी
१४ " योगेश शाक्य BDA/PEA JV 984320335



घलाइन तथा सुझावहरु

१) यस आयोजनाको परिमार्जित अन्तिम डिजाइन र लागत खर्च बारेमा छलफल गरियो ।

२) वातावरण संरक्षण ऐन २०५४ बमोजिम IEE अध्ययन का क्रममा २०७५ जेष्ठ ४ गते प्रकाशित सार्वजनिक सूचना, सो को मुल्यांकन र सरोकारवालासँग सार्वजनिक छलफल गरिएको जानकारी गराइयो ।

३) यस जयपृथ्वी नगरपालिका का प्रमुख श्री विरेन्द्र वि. खड्का ज्यूबाट यस आयोजना गुणस्तर, पर्याप्तता र डिजाइन हिसाबले प्राविधिक टोलीले सुनिश्चित गर्नुपर्ने सुझाव दिनु भयो ।

४) यस अ.नि.पा. वडा नं. १० का अध्यक्ष श्री बद्री ब विष्ट ज्यूले सेती नदी किनार बाट पानी संकलन गर्दा उपयुक्त प्रे-ट्रेटमेन्ट डिजाइनमा समावेश हुनुपर्ने सुझाव दिनु भयो ।

५) यस अ.नि.पा. वडा नं. ११ का उपप्रमुख श्री बिना के.सी ज्यूले चैनपुरको पानी टंकि बनने ठाँउमा पर्याप्त सुरक्षण का प्रावधान हुनुपर्ने सुझाव दिनु भयो ।

६) सार्वजनिक शौचालय संचालन पछिको हुनुपर्ने र यसका लागि स्रोतपानीका सार्वजनिक धाराहरु (४ वटा) व्यवस्था गर्न सके उचित हुने राय प्राप्त भयो ।

यस आयोजना निर्माण र संचालनका क्रममा वातावरणीय क्षतीहुन नदिन र कामका गुणस्तरका लागि वातावरणीय व्यवस्थापन योजना कार्यान्वयन गरिने र सोयुक्त अनुगमन गर्ने विषयमा छलफल र सहमती भयो ।

ANNEX 6:
SURVEY QUESTIONNAIRE

Household Survey

!= kl/ro

!=! cGtjf{tf lbg] AolQmsf] gfd 7]ufgfM

-s_ lhNnfM -v_ uf=lj=;M

-u_ 6f]n /:yfgM -3_ jf8{ g+=M

!=@ kfl/jfl/s ljj/0f

-s_ 3/d'lnsf] gfdM >Ldfg\ / >LdtL

==========

-v_ hftLM -u_ pd]/M -3_ lnËM □ k'?if dlxnf □

-ª_ j}jflxs l:yltM -r_ wd{M -5_ Joj;fo -3/d'nLsf]_M

-h_ a;]sf] jif{M -em_ lzIff **M**

-`_ s'n kl/jf/ ;+Vof **========**

pd]/ ;d'x	**k'?if**	**k]zf**	**Dlxnf**	**k]zf**	**hDdf**
)–% aif{					
^–!) aif{					
!!–!% aif{					
!^–$% aif{					
$%–^) aif{					
^) eGbf dfly					
hDdf					

!=# ljBfno hfg] pd]/sf afn aflnsf -^–!% aif{_

hDdf	**ljBfno uPsf**		**ljBfno guPsf**	
	k'?if	**dlxnf**	**k'?if**	**dlxnf**

@= ;flf/tf M -tkfO{sf] kl/jf/df_

	n]vk9 ug{ ;Sg]	**P;=Pn=;L= plQ0f{**	**:gfts**	**:gftsf]Q/**	**hDdf**
dlxnf					
k'?if					
hDdf					

#= s[lif -e'–pkof]u_

#=! tkfO{ jf kl/jf/ ;b:osf] gfddf uf=lj=;=**/** j8f leq hUuf 5 ?

5 □ 5}g □

#=@ olb 5 eg] slt 5 < /f]kgLdf eGg'xf]; M

s|=+;=	:jfldTj	v]t	af/L	v/jf/L	jg	s}lkmot
!	cfkm\g}					
@	;uf]nsf]					
#	sdfO{ cfPsf]					
$	sdfpg lbPsf]					
%	hDdf					

#=# uf=lj=;= jf j8f aflx/ s'g 7fpFdf hUuf 5 ?

s|;=	7fpFsf] gfd	hUuf				s}lkmot
		v]t	jf/L	v/jf/L	jg	

#=$ tkfO{sf] hUuf cfof]hgf leq k5{ ? (Please mention the component of project where HH falls)

3/
□ nDafO{ -lkm6df_
□ rf}8fO{ -lkm6df_
□ 5fgf
□tNnf
□ sf]if

v]t
□ kfvf] af/L
□ h+un
□ cGo
□ cGbfhL d"No -rngrNtLdf_ g]?=

-s_ cfof]hgf lf]q leq tkfO{sf] sltj6f 3/ / uf]7 5g\ .

3/ ☐ uf]7 ☐

s|=;+=	lsl;d	lf]qkmn
3/ !		
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-!_ sRrL–v/n] 5fPsf] -@_ kSsL -9'Ëf, O{6fsf] kvf{n / 9nfg lemu6L jf l6gsf] 5fgf] _

	;+Vof	lf]qkmn
uf]7		

cGo -v'nfpg]_		

#=% -s_ tkfO{sf] cfof]hgf lf]q leq kg{] hldgdf s'g s'g km;n nufpg' x'G5 ?

s|+;+=	vfBfGg jfnL	jfnL nufPsf] lf]qkmn	pTkfbg kl/0ffd
!= vfBfGg afnL			
	wfg		
	ux'		
	ds}		
	sf]bf]		
	bfn u]8fu'8L		
	cGo		
@= gub] jfnL			
	cfn'		
	tf]/L		
	t/sf/L		
	cGo		

-v_ pQm hUufdf nufPsf] kmnkm"n / cGo af]6 lj?jfsf] ljj/0f lbg'xf]; ?

s|+;+=	af]6lj?jf	lj?jf ;+Vof		hDdf
		kmn nfPsf]	kmn gnfPsf]	
!	kmnkm"n			
@	sfutL			
#	;'Gtnf			
%	cfFk			
^	d]jf			
&	cDaf			
*	lnRrL			
(	s6x/			
!)	s]/f			
!!	cf?			
!@	gf:kftL			
!#	cf?jv8f			
!$	cGo			
!%	8fn] 3fF;			
!^	kfv'/L			
!&	sfe|f]			
!*	j8x/			
!(	vgfof]			
@)	6fsL			
@!	lub/L			
@@	cGo			

s|+;+=	af]6lj?jf	lj?jf ;+Vof		hDdf
		kmn nfPsf]	kmn gnfPsf]	
@#	OGwgsf] nflu k|of]u ug]{ af]6 lj?jf			
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ANNEX 7:
CHLORINE USE GUIDELINES

CHLORINE GUIDELINE VALUE

In humans and animals exposed to chlorine in drinking-water, specific adverse treatment related effects have not been observed.

Chlorine in drinking water is safe for consumption .The small amount of chlorine typically used to disinfect water does not pose risks to human health. The World Health Organization (WHO) has established a guideline value of 5 mg/L for chlorine in drinking water, meaning that such concentrations are considered acceptable for lifelong human consumption. Furthermore, WHO concludes that this value is "conservative," as no adverse effects from chlorine in drinking water were observed in studies reviewed by WHO.

Guideline values for chlorine WHO Guidelines for drinking water quality (2004)

Chlorine	**below 5 milligrams per liter (mg/L)***

*For effective disinfection, there should be a residual concentration of free chlorine of 0.5 mg/L after at least 30 min contact time at pH<8.0

Chlorination does not harm aquatic environments

Chlorinated drinking water is unlikely to be harmful when discharged into aquatic environments. An extensive risk assessment conducted under European Union guidelines examined potential harm from various processes to make drinking water using sodium hypochlorite. This assessment found no significant environmental risks from chlorine or byproducts formed during drinking water chlorination. The DBPs formed in drinking water depend on the nature and quantity of organic matter present as well as on the disinfectant and other treatments used. In drinking water the principal byproducts are trihalomethanes (THMs; mainly chloroform) and halo-acetic acids (HAAs), with smaller amounts of other byproducts. Direct 'whole effluent' experiments representing various uses, including drinking water, have shown that no significant amounts of persistent and potentially bio-accumulative substances are formed. Toxicity tests on these mixtures demonstrated that the presence of DBPs did not increase the toxicity.

A major concern from the past was the formation of some highly-chlorinated, high-hazard molecules, such as dioxins, resulting from chlorine used in paper pulp bleaching. However, dioxins were only formed from 'active chlorine' under specific conditions: acid pH and in the presence of certain phenols such as those abundant in the lignin component of wood. There is no significant formation of dioxins or other high-hazard molecules at neutral or alkaline pH. All current uses of 'active chlorine' for microbial control and cleaning take place at alkaline or neutral pH.

ANNEX 8:
WATER QUALITY TEST

NS Lab Accreditation No.: 08/065-66
VAT/PAN No.: 300124309
Regd. No. 5180/052/053

"Training For Success"

SAVE WATER **Water**
Engineering & Training Centre (P.) Ltd.

Tel : 977-1-4475674
Fax No: 977-1-4479642

Laboratory, R & D on Total Water Management, Treatment & Consultancy

Name of Sender: BDA - PEA JV	**Source: River Water (Seti River)**
Sample No: 3910 /2074/075	**Analyzed date: 07/05/2018-13/05/2018**
Date of Receipt: 07/05/2018	**Location: Bajhang**
Project: Third Small Town Water Supply & Sanitation Project	**Sampled by: WUSC, Chainpur, Bajhang**

Parameters	Units	WHO GV	NDWQS	Result	Methods used
PHYSICAL					
Color	Hazen	15	5 (15)	**<5.0**	2120 B, APHA, 21ST EDITION
Turbidity	NTU	5	5 (10)	**18.0**	2130 B, APHA, 21ST EDITION
Conductivity	µS/cm	-	1500	**164.0**	2510 B, APHA, 21ST EDITION
pH	-	6.5 - 8.5	6.5-8.5*	**7.6**	4500-H+ B, APHA, 21ST EDITION
Lab Temperature	°C	-	-	**25.1**	2550 B, APHA, 21ST EDITION
Taste	TFN	-	Not Objectionable	**N. O.**	2160 B, APHA, 21ST EDITION
Odor	TON	-	Not Objectionable	**N. O.**	2150 A., APHA, 21ST EDITION
Total Dissolved Solid	mg/l	1000	1000	**103.0**	2540 C., APHA, 21ST EDITION
CHEMICAL					
Total Hardness	mg/l as $CaCO_3$	500	500	**92.0**	2340 C, APHA, 21ST EDITION
Carbonate Hardness	mg/l	-	-	**68.0**	Calculation
Calcium	mg/l	-	200	**23.2**	3500 - Ca B. APHA, 21ST EDITION
Total Alkalinity	mg/l as $CaCO_3$	500	-	**68.0**	2320 B, APHA, 21ST EDITION
Bicarbonate Alkalinity	mg/l as $CaCO_3$	-	-	**68.0**	2320 B, APHA, 21ST EDITION
Chloride	mg/l	250	250	**1.9**	4500-Cl- B, APHA, 21ST EDITION
Ammonia	mg/l	1.5	1.5	**0.06**	4500-NH_3 C., APHA, 17TH EDITION
Nitrate	mg/l as NO_3	50	50	**1.6**	4500-NO3- B., APHA, 21ST EDITION
Fluoride	mg/l	1.5	0.5-1.5	**0.2**	4500F- D. APHA, 21ST EDITION
Sulphate	mg/l	-	250	**112.0**	4500-SO4. APHA, 21ST EDITION
Iron	mg/l	0.3	0.3 (3)	**2.0**	3111 B, APHA, 21ST EDITION
Manganese	mg/l	0.5	0.2	**0.07**	3111 B. APHA, 21ST EDITION
Arsenic	mg/l	0.01	0.05	**<0.005**	3114, APHA, 21ST EDITION
Cadmium	mg/l	0.003	0.003	**<0.003**	3111 B., APHA, 21ST EDITION
Mercury	mg/l	0.001	0.001	**<0.001**	3112 B., APHA, 21ST EDITION
Chromium	mg/l	0.05	0.05	**<0.05**	3111 B. APHA, 21ST EDITION
Lead	mg/l	0.01	0.01	**<0.01**	3111 C, APHA, 21ST EDITION
Copper	mg/l	2	1	**<0.01**	3111 C, APHA, 21ST EDITION
Aluminium	mg/l	-	0.2	**<0.01**	3500-Al B. APHA, 21ST EDITION
BIOLOGICAL					
E. coli	CFU/100ml	Nil	Nil	**300**	9222 B, APHA, 21ST EDITION

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water,
WHO GV: World Health Organization Guideline Value, 2006 Update, NDWQS: National Drinking Water Quality Standard, 2062 (Nepal),

Comment: Turbidity is high and fluoride content is found below NDWQS limit with presence of Iron. The sampled water is contaminated with E. coli.

Analyzed by *Checked by* *Authorized Signature*

Note: 1. The result refer only to the parameters tested of the samples provided to our laboratory or collected by us for analysis as specified. Endorsement of the product is neither inferred nor implied.
2. Any duplication of this report can not be used as evidence in the court of law and should not be used in any advertising media without prior written permission to us.
3. The total liability of our company for the product is limited to the invoiced amount only.

132, Ratopul, P O Box # 8975 EPC 5205, Kathmandu, Nepal. E-mail : wetc@info.com.np, wetcpl@gmail.com

ANNEX 9:
CHECKLISTS

Checklist for Physical Environment

A. Topography/Physiography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed project
2. Verify the topographic characteristics of the land in the field
3. Soil Type

B. Climate and Meteorology

1. Study of published data of regarding temperature, rainfall, humidity, wind speed and direction, solar radiation
2. If possible classify the climatic zone and its verification
3. Visit the meteorological office of the district and get latest information

C. Air Quality

1. Collect any data on air quality of the area from previous literature
2. Investigate on the air polluting activities of the area (traffic, biomass burning, industries, other anthropogenic activities

D. Erosion and land Stability

1. Identification of erosion prone area along the road alignment
2. Investigate the erosion features and potentials of the local streams and gullies

E. Land Use

1. Investigate on the land use of the Project Blocks from the topo-maps, and other available land use maps
2. Investigate the land use affected by the project structures and subsidiary facilities
3. Investigate on the land use potentials of the area

CHECKLIST OF PLANT RESOURCES

Date:

S.No.	Name of plants	Uses			Others
		Fuel-wood	Fodder	Medicine	

Note:……
……
……
……
……...

CHECKLIST OF WILDLIFE ANIMALS

Date:

S.N.	Wild Animals	Remarks

Note:……
……
……
……
……...

CHECKLIST OF (Birds)

Date:

S.No.	Birds	Remarks

Note:……
……
……
……

Checklist for Socio-economic Environment

A.Consultative Meeting in affected VDCs

Focus Group Discussion, Rapid Rural Appraisal or Participatory Rural Appraisal method shall be applied to gather the community concern regarding the development of the Project

Process:

1. **The IEE team will present the development of the project focussing on:**

   a. Location of the project to the communities

   b. Explain the subsidiary facilities required for the construction of the project

   c. Explain how the local people will be affected during construction and in operation period
      - Land and property acquisition of permanent project occupied areas
      - Obstruction of irrigation canals, foot trails, suspension bridge etc. during construction
      - Construction related risks
      - Vehicular movement and related risks
      - Job and employment opportunities
      - Influx of outside people and social and cultural risks
      - Improvement of access and related benefits to education, health, and economy

   .

2. **Discussions on the proposal with the locals – Question and Answer**

3. **Seek following information from the locals**

About Project:

a. Willingness to cooperate in the land acquisition process and willingness to give land and property for the for project
b. Willingness to give land on compensation for permanent area occupied
c. Envisaged mode of compensation for the land and property
   - Cash compensation
   - Land to land
   - Some other methods (if any)
d. Approximate current value of land in the VDC in the project sites
e. Availability of labour for construction from the VDC, approximate number of labour force available for such works
f. What type of arrangement needed for obstructed infrastructures during construction
g. Willingness to give land for temporary use
h. Mode of compensation to the temporarily occupied land and conditions

About People

i. Demographic Feature of the project area along with male and female population
j. The major ethnic groups in the close proximity of the project sites and their demography along with male and female population
k. Relationship between the ethnic groups
l. Any cultural difference between the ethnic groups
m. Economic status of people (In general, by ethnicity)
n. Major Health problems of the area (Frequently observed disease, among child, old, young, women)
o. Education status of people (In general, by ethnicity)
p. Health status of people (In general and by ethnicity)
q. Occupational status of people (in general, by ethnicity)
r. Any in migration and out migration in the last five years and reasons for migration

About Agriculture

s. What is the current season wise intercropping practice in the area

t. What is the production per unit of the land for each crops
u. What are the fertilisers used currently by the farmers and what is the approximate quantity of use in a year by an average farmer household
v. Do you use pesticide? Name the types of pesticide used and quantity used by a farmer household.
w. Food security and food sufficiency (is the local production sufficient to feed area people, if not sufficient the mode of coping)
x. What potential exists for vegetable and horticulture or other agro-based economic opportunity

About Community User group:

y. Community Forest within project affected area
   - Name
   - Area VDC wards
   - No of User Households VDC wise break
   - No of Male Households
   - No of Female Households
   - Year of establishment:
z. Community Forest outside Project area (details same as above)

Any other community User groups (Details same as community forests

About Infrastructures

Any infrastructure (foot trail, suspension bridge, existing water supply line, water springs, irrigation they think will be affected by the project

About culture and historical places

Name the temples in the VDC and what is their religious significance
Is any of the temple lies close to the project sites
What are key festivals of the VDC people and the observation day of festival (how many people visit the site)
Is there a site of historical and touristic significance in the area

About development

Name the primary schools in the VDC – students and teachers number
Name the Middle schools in the VDC – students and teachers number
Name the Secondary schools in the VDC– students and teachers number
Name the higher secondary schools in the VDC – students and teachers
Name the health posts in the VDC – number of health workers
Telephone numbers in the VDC
Name the post office in the VDC
Name the industries in the VDC – number of workers
Water supply system and coverage (mode of water fetching for household use)
Energy Use and types of energy use
   - for cooking (average consumption per household)
   - for lighting (average consumption per household)

Tourism ? Market Development Opportunities:

Tourism development opportunities (reasons)
Market development Opportunities (reasons)

Market Price:

Rice/kg (produce of)
Wheat/kg (produce of)
Maize/kg (produce of)
Barly/kg (produce of)
Buck wheat/kg (produce of)
Other grains/kg (produce of)

Meat mutton /kg
Chicken.kg
Pork/kg
Fish/kg
Milk/lt
Sugar/kg
Tea/Cup
Others

About Development Needs

What are the first five development needs of the VDC
What is expected by the people from the project (at the minimum)

About Gender

Educational status of women compared to man counterpart and reason
Social status of women

- in household decision making
- in household works
- in land and property
- livestock
- in social organisation

How the status of women could be upgrade

ANNEX 10:
PHOTOGRAPHS

Photo 1: Vanka Mul Spring Source and Proposed Intake Site at Surma Rural Municipality -7

Photo 2: Proposed site for 450 Cum RVT with guard house for Chainpur Bazar system. The Land is located withing the premises existing water supply system at Chainpur. Same site is proposed for Treatment Unit

Photo 3: Site for Proposed 100 Cum RVT with guard house for Golai system

Photo 4: Discussion / Interaction with WUSC members and Beneficiaries

SOUTH ASIA REGIONAL DEPARTMENT
SAFEGUARDS INFORMATION LOG FOR SAUW PROJECTS

Project:	**Nepal: Urban Water Supply and Sanitation Project (UWSSP): Chainpur Urban Water Supply and Sanitation Subproject**		
Loan No.:	3711	**Package No.:** W07	
Components:	**Construction of a Piped Water Supply System as follows:**		
	Construction/Development of raw water sources	2 sump wells with tapping yield of 23.41 lps to be constructed/developed at the bank of Seti river	
	Construction of water treatment plant (WTP)	WTP to be constructed with design capacity of 23.41 lps or approximately 2,020 cu. m (2.02 MLD)	
	Rehabilitation and construction of storage reservoirs	4 service reservoirs with total capacity of 625 cu. m.	
	Construction of transmission mains	Length = 5.043 km	
	Construction of distribution network	Length = 18.473 km	
	Household connections	1,165 (during construction phase) 2,131 in design year 2038	
	Other small allied components	Valve chambers, fire hydrants (13 nos.)	
Contract Type:	**NCB**		
Date of IEE:	March 2018		

Draft IEE	**Updated/Revised IEE**	**Others**
		This is final IEE. The IEE is based on final detailed design per bidding documents prepared.

	Section	**Status**		**Comments/Remarks (include date accomplished or obtained, if applicable)**
1.	Environmental assessment report (EIA/IEE/envi due diligence) has been prepared?	**Yes**: X	**No**:	
2.	EIA/IEE/envi due diligence based on project components and detailed engineering design?	**Yes**: X	**No**:	
3.	Statutory Requirements		Forest Clearance	Table II-1 page 7 mentions that the District Office has granted the use of water resource. **Further actions:** Attach in the first semi-annual environmental monitoring report (SEMR) to ADB the following: (i) Permit from the District Office on the use of water resource; and (ii) all other permits and/or NOCs issued by local government for the implementation of the subproject.
			No Objection Certificate	
			Site Location Clearance	
		???	Environmental Compliance Certificate	
		???	Permit to Construct (or equivalent)	
		???	Permit to Operate (or equivalent)	
		???	Others	
5.	Policy, legal, and administrative framework	Adequate: X	Not Adequate:	
		EIA/IEE/envi due diligence included discussion on:		
		X	National regulation/law on EIA	
		X	Environmental agency	

	Section	Status				Comments/Remarks (include date accomplished or obtained, if applicable)
		X	Relevant international environmental agreements			
		???	Environmental standards (IFC's EHS Guidelines)			ADB SPS requirements on environmental standards are not discussed. Insufficient information that contractor's measures and practices are in line with internationally-accepted practices (as required by ADB SPS). **Further action:** Confirm in the first SEMR that contractor's site-specific EMP satisfactorily meet ADB SPS requirements.
6.	Anticipated environmental impacts and mitigation measures	EIA/IEE/envi due diligence satisfactorily discussed impacts and risks on:		Mitigation measures provided? Yes	Mitigation measures provided? No	
			Biodiversity conservation		n/a	Endangered species and habitats not present in subproject area.
			Pollution prevention and abatement	???		Section VI discusses impacts and mitigation measures applicable to the subproject. However, reference to the EHS guidelines on pollution control and prevention has not been included. **Further action:** Confirm in the first SEMR that EHS guidelines on pollution control and prevention are being followed under the subproject.
			Health and safety	X		Section VI discusses impacts and mitigation measures of all health and safety issues that may arise in the implementation of the subproject.
			Physical cultural resources (PCR)	X		The IEE explicitly mentions that no PCRs in the subproject area.
			Cumulative impacts	X		No mitigation measures required.
			Transboundary impacts		n/a	Not applicable
7.	Impacts from Associated Facilities	Addressed	Not Addressed	Not applicable		Considered as associated facilities are the existing water supply systems of Chainpur. However, all these existing facilities will be rehabilitated and part of the various components of the subproject.
		X				
8.	Analysis of Alternatives	**Yes**	**No**			Section VII provides discussion on alternatives. However, this is not required for Cat B and no need to include in IEE.
		X				
9.	EMP budget included	**Yes**	**No**			The EMP provides indicative budget of NPR 3,500,000 for EMP implementation, which includes expert monitoring costs.
		X				

	Section	Status		Comments/Remarks (include date accomplished or obtained, if applicable)
				Further action: Prior to award of contract, ensure that this amount is included in the contract.
10.	EMP implementation integrated in PAM, and in bid and contract documents	**Yes**	**No**	Included in PAM during loan processing. Included in Section 8 of bid documents. Section IX includes discussion on the inclusion of the EMP in the bid and contract documents. PMO and the RPMO will have the responsibility to ensure compliance with this requirement.
		X		
11.	Consultation and Participation	**Yes**	**No**	An initial municipal level consultation was done on 17 June 2018 and no other consultations have been made after that. - Minutes of this consultation is in Annex 5. - However, no translation in the English language is provided. **Further action:** Continue to conduct meaningful consultations as defined by ADB SPS throughout the duration of the subproject implementation. Ensure to include more participants from the communities to be consulted and encourage the participation of women. Include discussions in the next SEMRs and ensure to provide translations in the English language.
		X		
12.	Grievance Redress Mechanism	**Yes**	**No**	GRM mechanism included in IEE. **Further action:** Confirm in the first SEMR that GRM is notified and GRC members have the capacity to address project-related grievances/complaints. Confirm in the first SEMR that contractors are given instructions and orientation on GRM. Attach in the first SEMR copy of GRM notification.
		X		
		Description of GRM		Included in IEE (main text)
		Identification of GRC members		Done.
13.	Disclosure		Endorsement to disclose on ADB website	Pending. This will be requested when the IEE has been cleared by ADB.
			Disclosed on project website	Pending. This will be requested when the IEE has been cleared by ADB.
			Relevant information available to stakeholders and affected people in language and form they understand	Pending. This will be requested when the IEE has been cleared by ADB.
14.	Mobilized PMO Environment Officer	**Yes**	**No**	**Further action:** Include in the first SEMR the status of appointment PMO Envi Officer.
		???		
15.		**Yes**	**No**	

	Section	Status		Comments/Remarks (include date accomplished or obtained, if applicable)
	Mobilized RPMO Environment Specialist	???		**Further action:** Include in the first SEMR the status of appointment RPMO Envi Specialist.
16.	Mobilized DSMC Environment Specialist	**Yes**	**No**	**Further action:** Include in the first SEMR the status of DSMC Environment Specialist. If he/she is not available, provide reasons and include corrective actions with timeframe to appoint DSMC Environment Specialist.
		???		
17.	Confirm bid and contract documents and/or EMP include requirement for the contractor to appoint EHS supervisor and/or nodal person for environmental safeguards	**Yes**	**No**	This role and responsibility of the contractor is discussed in Section IX.
		X		
18.	If contract awarded already, confirm contractor's appointment of EHS supervisor and/or nodal person for environmental safeguards	Yes	No	This role and responsibility of the contractor is discussed in Section IX.
		X		
19.	Awareness training on compliance to safeguard requirements	**Yes**	**No**	Section IX discusses the institutional capacity development program, schedule, and topics for the subproject, which DRTAC-ESS will supervise for the entire UWSSP.
		X		
20.	Monitoring and Reporting	**Yes**	**No**	
		???		Section X discusses the roles and responsibilities of PMO and RPMO in reporting the implementation of EMP. However, the role of contractors on reporting is not included. **Further action:** Include in the first SEMR discussion on the role of contractors in the reporting to RPMO, including the frequency of reporting.
21.	Others/Remarks	**Summary of Suggested Next Steps:** Include in the first semi-annual environmental monitoring report (SEMR) to ADB the following: 1. Confirmation that contractor's site-specific EMP satisfactorily meet ADB SPS requirements. 2. The document from the District Office approving the use of water resource; 3. All other permits and/or NOCs issued by local government for the implementation of the subproject; 4. Confirmation that the GRM is notified and GRC members have the capacity to address project-related grievances/complaints. 5. Confirmation that contractors are given instructions and orientation on GRM. 6. Copy of GRM notification. 7. Confirmation on the status of appointment PMO Envi Officer, RPMO Envi Specialist, and DSMC Envi Specialist. 8. Discussion on the role of contractors in the reporting to RPMO, including the frequency of reporting. 9. English translation of Survey Questionnaire.		

	Section	Status	Comments/Remarks (include date accomplished or obtained, if applicable)
		10. English translation of minutes of meetings. Prior to award of contract: 1. Ensure that the contract includes provisions on the responsibilities of contractor in the implementation of the EMP; 2. SEMP has been submitted by contractor and approved by RPMO; 3. Ensure that the amount for EMP/SEMP implementation is included in the contract. Other actions: 1. Continue to conduct meaningful consultations as defined by ADB SPS throughout the duration of the subproject implementation. Ensure to include more participants from the communities to be consulted and encourage the participation of women.	

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Noted and Checked By: Zarah Pilapil, ADB SAUW Safeguards Officer
Ninette Pajarillaga, ADB SAUW Environment Specialist

Documents/References: 1. Draft IEE for Chainpur Water Supply Subproject sent by UWSSP
2. EARF of UWSSP