

Updated Initial Environmental Examination

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NEP: Third Small Towns Water Supply and Sanitation Sector Project – for Beni, Myagdi District

Prepared by Small Towns Water Supply and Sanitation Sector Project, Department of Water Supply and Sewerage, Ministry of Urban Development, Government of Nepal for the Asian Development Bank.

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Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP)

**Updated Initial Environmental Examination Report
(IEE)**

for

**Beni Small Towns Water Supply and Sanitation Sector
Project
Myagdi District**



Kathmandu, July 2015

Submitted by:

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Table of Contents

EXECUTIVE SUMMARY	VII
1. INTRODUCTION	1
1.1 Background	1
1.2 Objectives of IEE	1
1.3 Rational of IEE Requirement	1
2. POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK	2
2.1 ADB Policy	2
2.2 ADB Safeguards policy	2
2.3 Nepal's Environmental Policy and Legal Framework	5
3. ANALYSIS OF ALTERNATIVES	10
3.1 ALTERNATIVES CONSIDERED IN THE APPROVED IEE REPORT 2006	10
3.1.1 No Action	10
3.1.2 Alternative Sources of Water Supply	10
3.1.3 Choice of Technology	10
3.1.4 Water Supply Service Levels	10
3.1.5 Sanitation	10
3.1.6 Period of Construction	11
3.1.7 Choice of Alternative	11
3.2 ALTERNATIVES FOR THE UPDATED IEE	11
4. DESCRIPTION OF SUBPROJECT	12
4.1 The Study Area	12
4.2 Existing Condition and Need for the Subproject	14
4.3 Sub Project Construction schedule	15
5. DESCRIPTION OF THE ENVIRONMENT	17
5.1 PHYSICAL PROFILE	17
5.1.1 Topography and Soil	17
5.1.2 Land Use	17
5.1.3 Drainage	17
5.1.4 Climate and Rainfall	17
5.1.5 Landslide and Slope Stability	17
5.1.6 Mining and Quarry Sites	17
5.1.7 Water Quality Analysis	17
5.1.8 Air Quality	18
5.1.9 Noise and Vibration	18
5.2 Ecological Profile	18
5.2.1 Conservation Status	18
5.2.2 Forest and Vegetation	18
5.2.3 Wildlife	19
5.2.4 Aquatic Life	19
5.3 SOCIAL AND SOCIOECONOMIC ENVIRONMENT	19
5.3.1 Population	19
5.3.2 Ethnicity	19
5.3.3 Size of Land Holding and Ownership	19
5.3.4 Literacy	19
5.3.5 Institutions	19
5.3.6 Migration	20
5.3.7 Transportation	20
5.3.8 Power Source and Transmission	20
5.3.9 Communication	20

5.3.10	Income and Expenditure.....	20
5.3.11	Assets and Commodities	20
5.3.12	Existing Water Supply Service Level	20
5.3.13	Public Sanitation.....	21
5.3.14	Waste Management Practice	21
5.3.15	Quality of Life Values.....	21
5.4	Resettlement, Relocation and Compensation Issue.....	21
6.	DESCRIPTION OF IMPACT ASSESSMENT	22
6.1	Physical Environment.....	22
6.1.1	Impact on land use pattern	22
6.1.2	Flooding and Stagnant Water Problem	22
6.1.3	Impact on water/land quality	22
6.1.4	Impacts of sediments and Disinfecting Chemicals	22
6.1.5	Water Volume/Quality.....	22
6.1.6	Impacts on Air Quality.....	22
6.1.7	Impacts on Acoustic Environment.....	22
6.1.8	Impacts on Traffic and Temporary disturbance	23
6.2	Biological Environment	23
6.2.1	Impact on natural vegetation and ecology.....	23
6.2.2	Impact on aquatic life	23
6.2.3	Loss of habitat	23
6.3	Socio-Economic and Cultural Environment.....	23
6.3.1	Land acquisition.....	23
6.3.2	Workers' Health and Safety Hazards	23
6.3.3	Water right Conflict	23
6.4	Beneficial impacts.....	23
7.	DESCRIPTION OF MITIGATION MEASURES	24
7.1	Physical Environment.....	24
7.1.1	Impact on land use pattern	24
7.1.2	Flooding and Stagnant Water Problem	24
7.1.3	Water/land quality	24
7.1.4	Impacts of sediments and Disinfecting Chemicals	24
7.1.5	Water volume	24
7.1.6	Impacts on Air Quality.....	24
7.1.7	Impacts on Acoustic Environment.....	24
7.1.8	Traffic and Temporary disturbance	25
7.2	Biological Environment	25
7.2.1	Impact on natural vegetation and habitat	25
7.3	Socio-economic and cultural environment	25
7.3.1	Land acquisition.....	25
7.3.2	Outside workforce conflict/health/pollution/culture	25
7.3.3	Workers' Health and Safety Hazards	25
7.3.4	Water right Conflict	25
7.4	Enhancement of Beneficial Impacts	25
7.5	Activities for Rehabilitation Work and its Mitigation Measures	26
8.	INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION... 35	
8.1	Consultation	35
8.2	Initial consultation: the existing project.....	35
8.3	The consultation during IEE update	35
8.3.1	Phase I	35
8.3.2	Phase II	36

8.4	Costs.....	36
9.	GRIEVANCE REDRESS MECHANISM	37
9.1	Purpose of the Grievance Redress Mechanism.....	37
9.1.1	First Level of GRM (WUSC-level)	37
9.1.2	Second Level of GRM (VDC/Municipality level)	38
9.1.3	Third Level of GRM (PMO Level).....	38
10.	ENVIRONMENT MANAGEMENT PLAN.....	40
10.1	Institutional Arrangement.....	40
10.1.1	Executing and implementing agencies.....	40
10.2	Safeguard Implementation Arrangement	40
10.3	Institutional Capacity Development Program	42
10.4	Staffing Requirement and Budget.....	43
10.5	MONITORING AND REPORTING	43
10.6	Environmental Monitoring Mechanism.....	43
10.7	Monitoring Reporting Mechanism.....	44
10.8	Monitoring cost, parameters, location and schedule	44
10.9	Contractors Compliance on EMP.....	44
10.10	Institutional Capacity Development Program	44
10.11	Environment Mitigation Cost.....	44
11.	CONCLUSIONS AND RECOMMENDATIONS	53
12.	COMMENTS INCORPORATION MATRIX.....	54

List of Tables

Table 2-1: ADB SPS, 2009 Safeguard Requirements 1: Environment	2
Table 2-2: Other Relevant Environmental and Core Labor Policies, Laws and Guidelines of Nepal Applicable to the Subproject,.....	6
Table 4-1: Technical Details	14
Table 7-1: Activities for Rehabilitation Work.....	27
Table 8-1: Lists of People and Institutions Consulted.....	36
Table 10-1: Mitigation measures and corresponding Monitoring plan	45
Table 10-2: Mitigation Measures and Monitoring Plan for Rehabilitation Activities	50

List of Figures

Figure 4-1: Location of the Subproject Area.....	13
Figure 4-2: Construction Schedule.....	16

Annexes

- Annex 1: Project Location Map and Water Supply Plan
- Annex 2: Water Tested Laboratory Analysis Report
- Annex 3: Rapid Environment Assessment (REA) Checklist
- Annex 4: Minute of Meeting

Abbreviations

°C	: Degree Centigrade
ADB	: Asian Development Bank
CBD	: Convention of Biological Diversity
CITES	: Convention on International Trade in Endangered Species of wild Fauna and Flora
cum	: Cubic Meter
DSC	: Design and Supervision Consultant
DWSO	: District Water Supply Office
DWSS	: Department of water Supply and Sewerage
EA	: Environmental Assessment
EARF	: Environmental Assessment Regional Office
EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
EPA	: Environmental Protection Act
EPR	: Environment Protection Regulations
GoN	: Government of Nepal
HHE	: Health and Hygiene Education Programs
HRF	: Horizontal Roughing Filter
IEE	: Initial Environmental Examination
JICA	: Japanese International Cooperation Agency
km	: Kilometer
BWSSSP	: Beni Water Supply and Sanitation Sub-Project
LGs	: Local Governments
lpd	: Liter per day
lps	: Liter per second
m	: Meter
MDG	: Millennium Development Goals
MOWR	: Ministry of Water Resources
MPPH	: Ministry of Physical Planning and Housing
MPPW	: Ministry of Physical Planning and Works
MoSTE	: Ministry of Science, Technology and Environment
NGO	: Non-Government Organization
NDWQS	: National Drinking Water Quality Standard
NPC	: National Planning Commission
NRs.	: Nepalese Rupees
O&M	: Operation and Maintenance
PAC	: Public Awareness Campaign
PCO	: Public Call Office

PF	:	Pressure Filter
Pop.	:	Population
PRA	:	Participatory Rural Appraisal
PMO	:	Project Management Office
RRA	:	Rapid Rural Appraisal
RPMO	:	Regional Project Management Office
SPSO	:	Sub-Project Site Office
SSF	:	Slow Sand Filter
SPS	:	Safeguard Policy Statement
STWSSSP	:	Small Town Water Supply and Sanitation Sector Project
TDF	:	Town Development Fund
VDC	:	Village Development Committee
WHO	:	World Health Organization
WSUC	:	Water Supply Users' Committee
WUSC	:	Water Users and Sanitation Committee

EXECUTIVE SUMMARY

General

The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will support the government of Nepal (the Government) in improving water supply and sanitation facilities and services to 24 small towns in Nepal. Out of the 265 small towns in Nepal, Asian Development Bank (ADB) has already supported the Government, through successful implementation of earlier two projects in 50 towns. These include the 24 project for enhancement.

The outcome will be inclusive and sustainable water supply and sanitation service delivery in this Beni small town of Nepal. The project will implement improvements/ rehabilitation works within the service area of already completed project. There will be minor civil works necessary for the enhancement of the components without changing the original technical and social concepts.

The Project will be implemented in 9 months period starting around first week of November, 2015.

The project will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Urban Development and the implementing agency is the Department of Water Supply and Sanitation (DWSS).

The sub project IEE report was approved by government of Nepal in 2005. Now the sub project is envisaged to undergo for rehabilitation of project components such as, intake treatment plant, transmission main and distribution line etc. The proposed updated IEE is prepared as an integral part of bid document. However consultant has updated the contents of IEE report already approved from government of Nepal.

This updated IEE Report summarizes anticipated impacts and corresponding mitigation measures, monitoring and also includes cost and time frame for implementation.

In this report, all the policy, legal and administrative framework requirements of ADB including ADB Safeguard Policy and the prevailing GoN Acts/rules & regulations have been considered.

Categorization

Beni town subproject is classified as Environmental Category B as per the SPS as no significant impacts are envisioned. Accordingly this updated Initial Environmental Examination (IEE) 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.

Subproject Scope

The subproject is formulated under the 3STWSSSP to improve water supply and sanitation service delivery in the existing Beni water supply and sanitation project constructed during STWSSP 1. Investments under this subproject includes; (i) rehabilitation of a piped water supply system including intake, water treatment plant, transmission main, and distribution main.

Implementation Arrangements

The Ministry of Urban Development is the executing agency. The Department of Water Supply and Sewerage (DWSS) is the implementing agency. Implementation activities will be overseen by a separate Project Management Office (PMO) which will be 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 safeguards specialists, will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMOs 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; and designing the infrastructure and supervising construction; and safeguards preparation.

Description of the Environment

Subproject components are located in Beni town area and in its immediate surroundings. There is no presence of natural habitat in this project area. The project components will be located in WUSC sites, public road rights-of-way (ROW) and outside the community managed forest and the protected areas. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

Environmental 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.

Locations and sitting of the infrastructures were considered in the existing sub-project to further reduce impacts. The concepts considered in design of the subproject are: (i) demand for new piped water supply; (ii) maximum population coverage with pipe layout 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 from latrines, septic tanks and any main drains to avoid contamination; (vi) locating Intake point 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 and US EPA standards to reduce the likelihood of uncontrolled disposal as currently practiced; and (ix) ensuring all planning and design interventions and decisions were made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

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. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed. Traffic management will be necessary during pipe-laying on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

Mitigation Measures

Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to be conducted during construction. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB and DWSS websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

The project was initially launched to serve ward nos. 1 & 2 of Arthunge VDC, ward no. 6 of Ghatan VDC and ward no.1 of Piple VDC of Myagdi district. But recently GoN has declared Beni

Municipality and now the service area lies in the municipality. According to financial appraisal report of TDF, the project was designed to serve a total population of 4063 in base year 2006 and 7226 in the design year 2020. The service area basically includes Beni Bazar. The economy of the service area is predominately commercial and service based. According to consultant report, 85% of the population in the service area is engaged in trade, business and service activities.

The sub-project under construction is a rehabilitation project and the mitigation measures recommended in the approved IEE in 2006 have already been successfully implemented. During the updated IEE preparation process, all of the process mentioned above have been checked and followed. The design report has incorporated the recommended mitigation measures.

During construction phase, there are no major environmental impacts in the enhancement project. However there are minor impacts like landslide and soil erosion, impact of vegetation, embankment erosion of river, chemical contamination, air and noise pollution during construction, traffic disturbances and some disturbances in household water supply distribution. In order to minimize the impacts, specific arrangements have been made in the design and incorporated in the specification of work. The contractor is responsible to follow all the instruction given by the DSC and agreed specifications.

During operational phase also, there will be no significant impacts. However there may be minor impact on water right conflict (tap distribution) and occupational health and safety of workers. These issues will be addressed by and will be the responsibility of WUSC.

Consultation, Disclosure and Grievance Redress

Public consultations were done in the preparation of the project and IEE and throughout the project implementation period of the completed project.

During the preparation of this enhancement project and updated IEE, Public consultations were done at different phases. The first consultation was done during survey and design period. Further consultation was made with the stakeholders at project site after the project design report was approved.

The consultation was focused on environmental impacts, resettlement, social issues, relocation and compensation issues.

Monitoring and Reporting

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

Conclusions and Recommendations

The proposed subproject is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant 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 to comply with ADB SPS (2009).

1. INTRODUCTION

1.1 Background

1. The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will support the government of Nepal (the Government) in improving water supply and sanitation facilities and services to 24 small towns in Nepal. Out of the 265 small towns in Nepal, Asian Development Bank (ADB) has already supported the Government, through successful implementation of earlier two projects in 50 towns. These include the 24 project for enhancement.

2. The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will be implemented in 9 months period starting around first week of November, 2015 and will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Urban Development and the implementing agency is the Department of Water Supply and Sanitation (DWSS).

3. The outcome will be inclusive and sustainable water supply and sanitation service delivery in selected small towns in Nepal. The project will implement improvements/rehabilitation works within the service area of already completed 24 projects. There will be minor civil works necessary for the enhancement of the components without changing the original technical and social concepts.

1.2 Objectives of IEE

4. The updated IEE summarizes anticipated impacts and corresponding mitigation measures, monitoring and also includes cost and time frame for implementation.

1.3 Rational of IEE Requirement

5. The sub project IEE report was approved by government of Nepal in 2005. Now the sub project is envisaged to undergo for rehabilitation of project components such as, treatment plant (specific area) of transmission and distribution line etc. The proposed IEE is prepared as an integral part of bid document. However consultant has updated the contents of IEE report already approved from government of Nepal.

Methodology Used in Preparing IEE

- In the process of preparation of EMP, an extensive review of approved IEE and feasibility reports reviewed with some field based information
- Public consultations were held in the entire process of IEE study and during the disclosure of the draft IEE report to the local people. These processes have taken place and the results were documented. The involvement of the local people in EMP implementation activities have been recommended in EMP, 2000. Accordingly, in the process of EMP implementation, the following mechanism has been adopted to involve the local people in EMP activity:
 - Public Consultation and Involvement have been given highest priority in the implementation of Mitigation measures carried out by EMP; initially prior to the implementation, public consultation usually takes place and on the basis of decision of the consultation meeting, implementation of mitigation measures are being prioritized and carried out with the involvement of local people.
 - Monitoring is another component of EMP. Monitoring of Physical, Biological and Socio-economic components of Environment of the project is being carried out. In the process of compliance monitoring of the project construction, local people and construction workers are being involved and consulted

2. POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK

2.1 ADB Policy

6. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects undertaken as part of programs funded under ADB loans 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.¹

2.2 ADB Safeguards policy

7. ADB's environmental safeguards policy principles are defined in SPS, 2009, Safeguard Requirements¹ and the IEE is intended to meet these requirements, Table 2-1.

Table 2-1: ADB SPS, 2009 Safeguard Requirements 1: Environment

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 (Annex A), indicating that 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.
SPS 2009 - Safeguard Requirements	Secondary influence areas. Significant adverse impacts during construction will be temporary and short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient. The IEE including specific description of the environment and corridor of impact will be updated as necessary based on the final design and alignments.
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. (Section 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 "with-subproject" or "without subproject" is presented in Section III.

¹New Version of the "World Bank Group Environmental, Health, and Safety Guidelines", April 30 2007, Washington, USA. <http://www.ifc.org/ifcext/enviro.nsf/Content/EnvironmentalGuidelines>

SPS 2009 - Safeguard Requirements	Remarks
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. Section 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 (Annex C). A grievance redress mechanism for the resolution of valid project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft IEE (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. Copies of both SPS-compliant IEE and Government of Nepal-approved IEE will be made available at the offices of the PMO, Project Implementation Support Unit (PISU) and Water Users' and Sanitation Committee (WUSC) for public consultation. For the benefit of the community, the summary of the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring	EMP implementation, reporting and disclosure of monitoring reports are in this IEE.

SPS 2009 - Safeguard Requirements	Remarks
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 subproject does not encroach into areas of critical habitats.
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 subproject in the aspect of waste generation, e.g., effluent from septic tanks and generated sludge and sludge disposal from water supply and sanitation structures. The subproject will not involve hazardous materials subject to international bans/phase outs.
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.
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 subproject will not affect any physical cultural resource. The EMP recommends the measure/s to mitigate adverse impact on physical cultural resources (PCRs) in case of chance find.

2.3 Nepal's Environmental Policy and Legal Framework

8. The Interim Constitution of Nepal, 2007 defines the right to live in clean environment as one of the fundamental rights of its citizens (Article 16). 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 (Clause 5 of Article 35). Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislation that provides the framework within which environmental assessment is carried out in Nepal is the

- Environmental Protection Act (EPA), 1997, 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 Science, Technology and Environment (MoSTE), 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 (currently the MoSTE) 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.
- Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007. 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 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007.
- Other environmental and core labor policies, laws and rules that are relevant to the subproject are presented in Table 2-2.

Table 2-2: Other Relevant Environmental and Core Labor Policies, Laws and Guidelines of Nepal Applicable to the Subproject,

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Resources Act	1992	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 IEE& preparation of IEE Report before granting license to use water resources for any purpose.	Government of Nepal environmental assessment report will be prepared based on this IEE.
		Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	The source is groundwater to be drawn from the deep aquifer. Prevailing water source is the shallow aquifer and water drawn has Mn, Fe, Al and coliform levels exceeding National Drinking Water Quality Standard (NDWQS). Hence, people are eager to be connected to piped water supply system.
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Site for the intake well, treatment unit, overhead tank is government land (Dept. of Forest).
		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.	Environmental Management Plan prescribes the compliance with NDWQS and its Directives during operation.
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with arrangements for the use of protective devices and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from lifting of heavy weights.	EMP provides measures to mitigate workers' health and safety hazards.

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Forest Act	1993	The Act prohibits the extraction of boulders, rocks, pebbles, sand or coliform national forests, defined as all forests, excluding private forests, whether marked or unmarked with forest boundary, to include waste or uncultivated lands, or unregistered lands surrounded by the forest or situated near adjacent forests as well as paths, streams rivers, lakes, riverine lands within the forest.	Subproject will not impact on any forest. EMP stipulates no illegal quarrying of natural aggregate materials.
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.	Subproject 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.
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 the EMP following the NDWQS Directives.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties & powers to: (i) conserve & protect their local environment & natural resources; (ii) plan, implement &/or operate & maintain local WS projects; (iii) implement or arrange for implementation local sanitation/sewerage & drainage projects; (iv) protect cultural heritage & religious sites; &/or (v) monitor project activities within their respective jurisdictions.	Provides basis for Local Government to monitor the environmental performance of the subprojects. EMP provides the responsibilities of Local Governments (LGs) in EMP implementation.
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.	Government of Nepal Government of Nepal environmental assessment report, based on this IEE, will be prepared to ensure environmental conservation and protection.

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE 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.	Government of Nepal environmental assessment report will be prepared based on this IEE. This ADB IEE will be submitted to ADB for review and approval.
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, 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 the EMP following the NDWQS Directives.
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.
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.

9. The key Government of Nepal environmental quality standards are: (i) National Ambient Air Quality Standards for Nepal, 2003; (ii) National Noise Standard Guidelines, 2012; and (iii) National Drinking Water Quality Standards, 2006, which would also be applied to surface and ground water quality monitoring since these resources are used for drinking.

10. 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 1978; (ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), in 1987; (iii) Convention on Biodiversity, in 1992, (iv) Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London Amendment, in 1994, and (v) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, in 1996.

11. 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 Millennium Development Goals (MDG), the seventh goal of which is to “ensure environmental sustainability” targeting the reverse of loss of forest and environmental resources, reduction of biodiversity loss, and increase in the proportion of population with sustainable access to safe drinking water and basic sanitation.

3. ANALYSIS OF ALTERNATIVES

3.1 ALTERNATIVES CONSIDERED IN THE APPROVED IEE REPORT 2006

12. A number of alternatives are identified and analyzed for the proposed water supply and sanitation project. Alternatives regarding the sources, available technologies, sittings of different system components, service levels, period of construction etc. are taken into consideration. Analysis for no action scenario has also been dealt to signal out the importance of the proposed project. The alternative listed below provides a basis for taking decision on whether: The proposal should move forward for implementation to the project stakeholders.

3.1.1 No Action

13. It denotes that the proposed water supply and sanitation project will not be considered for implementation and the ever-increasing demand on water will be managed by the existing system. In this scenario the water supply service levels will degrade over the existing situation in years to come. Likewise, sanitation situation in the service area will not improve and be a source of water pollution and the place will converted to more unhygienic place for living than of today.

14. Owing to the situation, the local people are in favors of implementing water supply and sanitation project by contributing some amount of their capital in project construction with full operation and maintenance responsibilities.

3.1.2 Alternative Sources of Water Supply

15. During the feasibility study stage, assessment of the existing water supply system and prospects for water augmentation through its improvement were looked upon before exploring other possible and cost effective feasible sources. Different four alternative sources were identified and studied. From the feasibility study level with environmental appraisal and screening of all the identified sources. it is found that the Pumdi Khola source. a combined spring and stream source. has been found to be the best alternative amongst the alternatives identified. The selected alternative was found to be the best in terms of the size of investment, operation and maintenance, level of tariff, water quantity and quality, reliability, continuity, source status and social and environmental grounds. Hence, the detailed engineering survey, design and other studies, including environmental studies required for investment have been carried out in concurrence with the community representatives and project personnel.

3.1.3 Choice of Technology

16. Alternatives from gravity-fed to pumping type water supply systems were identified. Based on the past experience, initial investment required and operation and maintenance costs to be incurred, depreciation of equipment and machines, skills required for O&M, choice of the 1JUSC etc. gravity-fed water supply system was recommended for implementation. An appropriate and locally available aria labor based technology with minimum or no use of equipment and machineries, for construction of the project will be adopted. Actually, the gravity-fed water supply system was chosen based on technical and economical grounds rather than solely on environmental aspects.

3.1.4 Water Supply Service Levels

17. Alternatives based on different water service levels ranging from the intermittent to continuous supply, untreated to fully treated water. per capita daily water supply, house connection facilities to yard and community taps, metered and un-metered supply system, progressive to flat tariff rates etc. Analysis on these aspects were carried out and discussed with the consumers before finalizing the mode of water supply service levels. Finally, the water supply service levels was fixed to provide treated water ensuring per capita daily volume of water on progressive tariff rate basis preferably with house connection facilities

3.1.5 Sanitation

18. Options on water-borne sewerage system, on-site sanitation system and private latrine with septic tank and soak away Pit system were looked upon and were analyzed in terms of applicability,

affordability, requirements, desired level of services by the communities, level of pollutions and associated impacts on health and hygiene. Considering all factors, latrines on individual households with limited storm water drainage facilities in densely populated areas are taken into consideration for implementation.

19. In order to minimize the effects of haphazard solid waste dumping practices, local people through WUSC will be trained for safe disposal techniques of waste encouraging them for reuse and composting of wastes.

3.1.6 Period of Construction

20. Longer period of time allocated for construction than required increase the cost of construction. It is therefore, suggested to allocate an appropriate period of construction by when the construction will be completed and the project will come into operation. Based on the type of project two years of construction period has been recommended consulting all stakeholders associated with the proposed project.

3.1.7 Choice of Alternative

21. Based on alternative analysis, Pumdi Khola source is found to be the best source amongst others considered for the study. The proposed Pumdi Khola water supply system, a combined stream and spring water source is located in Parbat district. The implementation modalities, which proposes for a two years of construction period with the assurance of supplying potable water based on daily per capita water demand combined with sanitation facilities is recommended amongst the alternative proposed.

3.2 ALTERNATIVES FOR THE UPDATED IEE

22. The water supply system for the town of Beni was constructed several years before under STWSSP 1, funded by ADB. The project is in operation at present. The WUSC is the operating agency. The project had anticipated a 24 hour service and water quality standards within the NDWQS. After a few years of operation, it was observed that this anticipation was not fulfilled due to some problems. The problems were observed both in technical as well as social and institutional field. Therefore some enhancement measures were necessary. This project is designed to cater for such enhancement works.

23. IEE had been carried out in accordance with the prevailing rules and regulations of ADB and the GoN incorporating the alternatives like “without –sub project or do nothing” and “with sub-project” was carried out in 2006.

24. As such, alternatives for the water supply project have not been studied in the design report.

4. DESCRIPTION OF SUBPROJECT

4.1 The Study Area

25. Beni Small Town Water Supply and Sanitation project is located in Myagdi district of Western Development Region of Nepal. Geographically it is located at 28°20'30" N Latitude and 83°33'30" E Longitude. Beni is one of the recently declared Municipality by GoN in May 2014. The municipality now comprises the area of former Ratnechaur, Jyamrukot, Arthunge, Ghatan, Pulachaur, Singa VDCs. Beni is also the district headquarter of Myagdi District.

26. Beni is located at the confluence of the Kali Gandaki River and Myagdi River at an altitude of 899 meters. It is located at a distance of 12 km North to Baglung, the zonal headquarter of Dhauligirizone. The latitude of the project service area ranges from 770 m to 950 m above the mean sea level.

27. The climate of the project area is semi tropical. The mean temperature is 15° C- 27° C. The maximum mean monthly rainfall is 509 mm, which is significantly less than 1400 mm average precipitation of Nepal.

28. The project was initially launched to serve ward nos. 1 & 2 of Arthunge VDC, ward no. 6 of Ghatan VDC and ward no.1 of Piple VDC of Myagdi district. But recently GoN has declared Beni Municipality and now the service area lies in the municipality. According to financial appraisal report of TDF, the project was designed to serve a total population of 4063 in base year 2006 and 7226 in the design year 2020. The service area basically includes Beni Bazar. The economy of the service area is predominately commercial and service based. According to consultant report, 85% of the population in the service area is engaged in trade, business and service activities.

29. The settlement pattern in the core service area i.e. Beni Bazaar is dense. Some areas especially Galeshowar Bazar has settlement pattern in between urban and rural settlement. Piple Bazar has more or less rural settlement with scattered houses apart from one another.

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4.2 Existing Condition and Need for the Subproject

30. The sub-project includes the following works;
- Construction of 200 m³ ground reservoir
 - One water treatment plant with PST facility and 25lps capacity
 - 18.8 km of pipe line laying
 - Construction of Chlorination unit
 - One surface water intake consisting of infiltration gallery at source river

The technical details are shown in Table 4-1.

GENERAL INFORMATION

1. Name of the Project : Enhance Functionality in Small Town Water Supply and Sanitation Sector Project
2. Name of Sub-project : **Beni Small Town Water Supply & Sanitation Project**, Myagdi
3. Service Area of the Project : Ward no. 1 & 2 of Arthunge VDC, ward no. 6 of Ghatan VDC and ward no.1 of Piple VDC (Now Municipality)
4. Total Project Cost : NRs. 70,035,198
- I. Water Supply Component : NRs. 70,035,198

B. TECHNICAL INFORMATION

31. Details of technical information are mentioned in Table 4-1.

Table 4-1: Technical Details

S.	Name of structure	Existing	Additional	Total
1	No. and capacity of Reservoirs:	3(305 cum)	1(200 cum)	4(505 cum)
2	Treatment Facilities	1(25 lps, HRF,SSF) Chlorination Unit	Chlorination Unit (Rehabilitation)	1(25 lps)
3	Pipeline Length:			
3.1	Transmission	14.0 km	11.3 km	25.3 Km
3.2	Distribution	14 km	7.5 km	21.5 Km
3.3	Total	28.0 Km	18.8 Km	46.8 Kms
4	Guard House	1	None	1
5	Generator / Operator House	1	None	1
6	Chlorination Unit with lab	None	1	1
7	Office Building:	One	One(extension)	One
8	Surface Intake/Borehole Drilling	Surface Intake 3	1(surface rehab)	3
9	Fire hydrant	One	Three	Four

Sr. No.	Description	Existing (2014)	Design year (2022)	Design year (2030)
10	Household connection	2,368	3,152	4,192
10.1	Fully plumbed	1,373	2,332	3,773
10.2	Yard connection	995	819	419
10.3	Community		5	6
10.4	Institutional	65	81	99

10.5	Total	2,433	3,238	4,297
11	Total Water Demand			
11.1	MLD	1.73	2.25	3.02
11.2	LPS	20	26	35

C. SOCIO- ECONOMIC INFORMATION

1. Total Household Number and Population (Pop.)
 - a) Present year (2014): 2,368/12,432
 - b) Design year (2022): 3,152/16,536
 - c) Design year(2030): 4,192/21,994

D. FINANCIAL INFORMATION

1. The financial planning for the enhancement project is as follows;
 - i. Total investment 100%
 - ii. Government: Grant 70%
 - iii. WUSC Contribution: 5 – 10% of total investment as cash (% to be decided later)
 - iv. TDF Loan: 20 – 25% of total investment to be provided to the WUSC (% to be decided later)
2. Weighted Average Tariff NRs 9 per cum
3. Cost Per Capita and per household

Description	Base year 2014	Design Year 2022	Design Year 2030
Cost per Capita	5,633.46	4,235.32	3,184.29
Cost per House hold connection	29,575.67	22,219.29	16,706.87

4.3 Sub Project Construction schedule

32. It is expected that the contract will be awarded by the last week of November 2015 and the construction work will be completed by the last week of August 2016. The detail of work is shown in Figure 4-2.

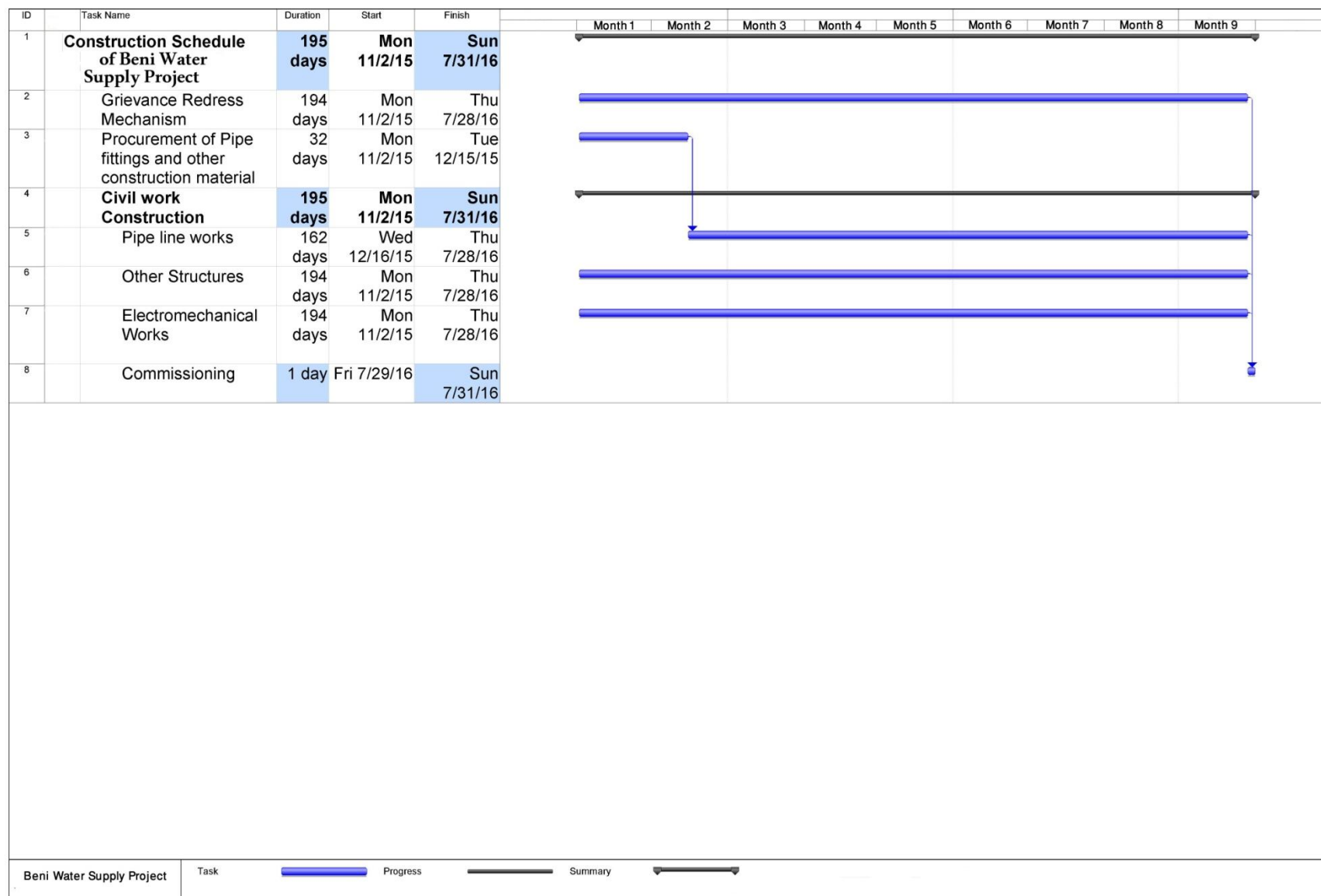


Figure 4-2: Construction Schedule

5. DESCRIPTION OF THE ENVIRONMENT

5.1 PHYSICAL PROFILE

5.1.1 Topography and Soil

33. Beni is located at 25.20' 30" N latitude and 33.33'30" longitude and is cornered by Myagdi Khoia in the south and 'Kali Gandaki River in the east. Beni Bazaar is 835 m above the mean sea level. Geomorphologically, Beni Bazaar area is situated in flat over terraces developed by Kali Gandaki River and is made up of thick gravelly deposit. The Surrounding Mountains are rocky and is made up of phyllites and quartzite of Kuncha Grout, Major Hazards at the major river basin is flood. Whereas En the mountain slope landslide and various mass wasting processes are dominant.

5.1.2 Land Use

34. Agriculture settlement and few patches of forest and rangeland dominate the land use in the project service area and the transmission line of the proposed water supply system. The valley terraces are dominantly agriculture and with dense (Beni and Galesnwor) to scattered settlements. The steep hill slopes are either forested or bush lands.

5.1.3 Drainage

35. The Major River like Kali Gandaki Myagdi and Ranughat Khola are deeply entrenched and characterized by V shaped valley profiles with limited terrace development on either flank the tributary streams have steep longitudinal profile and meet the major rivers rather abruptly.

36. At present there is no drainage system in the service area. As the area site is situated at the lower foothill on alluvial soil at the confluence of Myagdi and Kali Gandaki River the banks of two rivers neither the surface drainage nor the sewerage system exists. Due to high permeability of the soil water stagnation does not occur.

5.1.4 Climate and Rainfall

37. The climate of the project area; sub tropical in the valley bottom and temperate in the high mountains. The temperature at the river valley varies from 15°C to 27°C with total annual rainfall 1369mm (OHM. 1990).

38. There is one rainfall station at Beni Bazaar. Mygdi. The maximum 24-hour rainfall and mean monthly rainfall at this station have been collected from the Department of Hydrology and Meteorology for the period from 1976 to 1990. it has been observed from the data that the recorded maximum rainfall in 24 hours during 1976 to 1990 is 116 mm 113 Sept. 1982) and maximum monthly precipitation during the same period is 509 mm (August 1982). The precipitation with very high intensity generally occurs in the monsoon during June - September.

5.1.5 Landslide and Slope Stability

39. Sites proposed for intake structures, collection chambers. Trunk transmission line, and reservoir for construction are stable and do not exist within the existing landslide zones. A landslide zone exists in transmission line, where it runs in parallel with the road alignment. At present the road is under construction and may adopt landslide protection measures in future.

40. Riverbanks scouring is seemed to be a problem and maintaining stability of riverside located structures the town. River training measures have been adopted to control riverside .scouring and river water flow regime seems to be in stable condition these days.

5.1.6 Mining and Quarry Sites

41. Construction materials stone coarse aggregates and sand mining and quarry activities are confined to flood plains of the two rivers in the town. The effects on the river watercourses are not visible. Hence, it can be said that mining activities or construction materials have no impact on river environment up till the equilibrium is maintained by the riverbed load during different seasons of the year.

5.1.7 Water Quality Analysis

42. As the discharges of Niyagdi Khola and Kali Gandaki River are relatively high .compare to the pollution loads water quality of both the rivers seem to be: cod during the dry seasons of the

years. Both the sources could be raw water sources for water supply source with the provision of treatment facilities. The water quality of river Waters deteriorates due high concentration of suspended solids during the monsoon, as the settlement's based on agricultural economy. Substantial numbers of industries are not in operation vis-a-vis the pollution load is dominated by domestic wastes. In general it can be said that the state of water quality of these river throughout the year do not depend on the pollution load dishonored through the settlements.

43. Water quality of the existing water supply system, where treatment facilities do not exist was found to be bacteriological contaminated and not fit for drinking purposes. The water at the time of sampling from taps was also found to be turbid. However. the existing water supply meets the standard WHO guideline values for other chemical parameters 'fixed for drinking purposes.

44. In the enhancement project additional units of SSF and Chlorination are proposed. The detail analysis of the water quality report is presented in Annex 2 of this report.

45. Water quality analysis were done for all critical sub project components such as intake, water before and after treatment plant. Samplings were also done in the distribution networks as well as randomly selected HHs taps to assure the quality. Mainly Physical component testing was done as pH, Turbidity, Electrical conductivity temperature. Similarly the various chemical components were also tested mostly like Calcium, Iron, Magnesium, Arsenic, Ammonia, Chromium, Nitrate, Sulphate, Chloride, Fluoride and Total Hardness as well.

46. In biological mainly parameter like Total Coliform and Fecal Coliform were tested for. If any contamination is encountered simultaneously the chlorination unit, pressure filter unit, slow sand filter treatment units should be provided. In case of this Water supply sub project due to the presence of Coliform, SSF and Chlorination units are constructed and now functioning.

5.1.8 Air Quality

47. The air pollution sources in the water supply service area Include smoke emitted from some agricultural based cottage industries, biomass burning and cooking. Vehicular emission and agricultural farming activities. Fugitive dust pollution, winch varies from one to the other season. is the major contributor in deteriorating air quality in the town. During the unsaturated soil condition situation along with farming activities dust particulates rises and the air quality deteriorates. This is a seasonal effect and it neutralizes naturally during the monsoon period. However as the town no recently linked with the national road network system the air quality will largely depend with the increase in traffic volume and on the level of vehicular emission in the years to come.

5.1.9 Noise and Vibration

48. The noise generated due to river murmuring is the main sources of noise pollution in the town. In contrary to other towns the noise level especially during the night hours is noticed to be high cue to waters flown in these rivers. Other sources of noise are generated due to vehicle operations. Industrial operations and other human activities.

49. The movement of flowing waters in rivers and vehicle operations in the streets are the sources of vibration. But there is no effect of vibration due to these sources. In general, the level of noise pollution and vibration in Beni are within the threshold limits.

5.2 Ecological Profile

5.2.1 Conservation Status

50. The proposed project development site is not a designated site of nature conservation interest. and there are no other such ecologically important sites in the project area.

5.2.2 Forest and Vegetation

51. By the nature of water supply and sanitation price different components are divided into three sections- water source and transmission. water treatment and storage and water distribution in the service area. including sanitation situation.

52. Apart from sparsely located fodder trees with some Lirticadicta (sisau) trees there is no forestland in the project area. The vegetation species found in the project site are quite common and abundant in the hills of Nepal. The vegetation type around the project area (at the river valley) is

dominantly subtropical. Dominant species are Shcrearobusta. Eombexmalabericum. Schima, Castanopsis Indica. Rhussuccessidianacona, Pinuswallichianaand, Picea, smithinana.

5.2.3 Wildlife

53. The project area habitat is disturbed and is seldom visited by wild mammals. Occasional visitor animals are Canisaureus (Jackal). Felix chaus (Jungle cat), Wood rat (Pattusnitidus) etc. Birds living in and around the settlement areas are found such as crow (Corvusmacrorhynchos). Common cuckoo (Cuculuscanorus). House sparrow (passer domestics)

5.2.4 Aquatic Life

54. Except the major rivers such as Kali Gandaki. Myagai, and Rahughat Kholas the small tributaries with steep gradients are devoid of biologically significant fish and amphibians. The Kali Gandaki River. a snow fed river is biologically rich with diverse species of fishes. Ranging from migratory to local types and other aquatic lives in it. However the inventory was not carried out about the species that exist in these rivers as the project scope is limited to small activities of physical intervention.

5.3 SOCIAL AND SOCIOECONOMIC ENVIRONMENT

5.3.1 Population

55. The total population of the three affected village development committees (Raughat Piple, Ghatanand Arthurge VDCs) is 15.829, with 3.083 numbers of households.

56. During the time of field survey the water supply ant sanitation service area population of the project area is found to be 4.063 including rental populations. 774 household numbers. Of the total population 50.6 percent are male with the average family size of 5.2. Among the three VDCs covered by the project Arthunge (i.e. proper Beni) occupies the highest number of population (88.2%) followed by Ghatan (10.3%) and Raughat Piple (1.5%) respectively, The ratio of male population is slightly higher (50.55) compared to that of female (49.45%).

5.3.2 Ethnicity

57. People representing 14 different castes are dwelling in the project service area. This composition of different ethnic groups also represents with the project affected VDCs. In the project service area. three major caste group dominate the population: Newar (25.7). Magar (23.9%) and Chhetri.

5.3.3 Size of Land Holding and Ownership

58. As the area is densely populated. The average size of land holdings in the project service area is below 0.5 ha. which is comparatively less to The average size of and holding in project affected VDCs area. Due to extreme land division. Number if landowne's even in a plot of hectare could be more than 30. Most of the service area people are business community with few members of family still continuing agriculture,

5.3.4 Literacy

59. The district literacy rate in Myagdi is 43% and the average literacy rate in the project affected VDCs is found to be 55.74%. in contrary to the priest affected VDCs and district average literacy rate. Project service area literacy rate is higher. From the field survey it is revealed that about 66 percent population of the project service area Illiterate.

60. The total number of higher secondary. Secondary, Lower secondary and primary schools in project affected VDCs are found to be 22 numbers. Out of which most of the schools are located in the project service area.

5.3.5 Institutions

61. Beni town toeing the district headquarter of Myagdi district, most of the government district level offices. Banks Telecommunication and electricity offices are located in the Project service area present. There are altogether 46 offices. 18 educational institutions including schools and colleges. and 12 factories.

5.3.6 Migration

62. The settlement history of the project affected VDCs indicates that most of the residents are the local ones and have been residing from generations to generations. But the project service area community people are composed of from both migrants and local. The settlement history of the project service area indicates that the area is influenced by old and new migrants and there is increasing trend of new migrants, Majority of the sample population (87.1%) of the project service area is dwelling in their own houses while 12.9 percent population lives in rental ones. Majority of the sample population is found to be dwelling in the project area from their early hoods.

5.3.7 Transportation

63. The project service area is connected with all-weather road facility and is under upgrading stage for a reliable transportation facility having linkages with national and strategic road network in the kingdom of Nepal.

5.3.8 Power Source and Transmission

64. Electric power supply facility exists in the project area and has connected to the national grid system of the country.

5.3.9 Communication

65. At present, five wards with 50% coverage of one additional ward of Arthunge VDC has 500 telephone lines. Ghatan VDC has a total of 5 telephone lines and five wards (1-5) of Raughat Piple VDC has telephone facilities.

5.3.10 Income and Expenditure

66. Majority of the sample households (75.7%) reported that their annual average income exceed to NRs. 120.000. which is categorized as a high income. About 14.4 percent households earn income ranging from NRs. 90.001 to NRs. 120.000 (medium category). While approximately 1 percent household earn less than NRs. 36.000 in a year (low category). Other 3 percent households have the income ranging from Rs54. 001 - 90. 000 are 1.5 percent have NRs 36.001-54.000 respectively. The average annual income of the project area household is estimated to be Rs' 33. 890 major snares of which is derived from business .07.5%) followed by foreign income (35.7%). including remittances.

67. The expenditure pattern of the sample households shows the annual expenditure of the lame number of households (37.1%) ranges between NRs. 54.001-90.000. Almost same numbers of 'households spend above NRs 120.000/annum. Significant numbers of households (12.9%) have annual expenditure within the range of NRs 90.000-120.000. It is found that 44.02% of the total expenditure is made on food stuff. 19.7% on education. 3.54% on transportation and communication. 7.7% on clothing, 5.75% on electricity. 2.71% on medicine and treatment respectively. is interesting to note here that the sample household uses their 1.12 percent of the total expenditure for paying water charge.

5.3.11 Assets and Commodities

68. The project area being a market centre and tours', area there is good resale value of the houses. During the study more than 60 percent sample household reported that that the resale value of their houses is above NRs 10.00.000.

69. The project area populations hold different household assets and commodities. Radio, stove and Televisions are the most common assets hold by majority of the sample households. These three assets are hold by 96. 92 and 86 percent copulation respectively. The third types of assets kept by majority of the sample household (66.3%) are water filters. Similarly, 57.9 percent households are also using the refrigerators.

5.3.12 Existing Water Supply Service Level

70. At present. piped water supply coverage is 29.3%. 65% and 35% in Raughat Piple. Ghatan and Arthunge VDCs respectively. From the field study it is revealed that in the proposed project service area about 50% of the households receive water from public tap stand. 42% have private connections and the remaining people use spring sources and collect water from the rivers. Water

supply operation responsibilities lie with VA/USC. 'union will continue its responsibilities in future as well. The beneficiaries of the project area spend average time ranging from 3.4 minutes to 12.0 minutes for fetching water.

5.3.13 Public Sanitation

71. Households having toilet facilities in Raughat Piple. Ghatan and Arthunge VDCs are 32%, 54%, and 90% respectively. But in the project service area majority of the households (96.5) in the project area have toilet facility. Among the 3 locations the maximum number of household's having toilet access is reported to be in Arthunge 2 (97.7 %). Arthunge 1 (96.6%) while in Ghatan slightly lower number of people uses toilet facility. Majority of the households in the project area use ventilated pit latrine (46.9%) followed by pit latrine (24.7%): pour flush with water seal (21.5%) and cistern flush (5.2%).

5.3.14 Waste Management Practice

5.3.15 Quality of Life Values

72. Socio-economic Values although the project service area copulation is a mixture of rural with exposure to the outside word and business oriented in nature socio-economic pattern is guided by traditional 'values. The society is cohesive in nature and love to work in a group as well.

73. Occupation and Employment: From the field survey it is revealed that over 90% of the population residing in Ghatan and Raughat Piple VDCs rely on agriculture. Whereas about 57% of the total population of Arthunde VDCs have adopted agriculture as their- occupation.

74. The sample survey conducted in project service area reveals that majority of the beneficiary populations have been involved in business 37.6%). Pension (28.2%) and service (19.3%). Other minor populations are engaged in wage work (1.5%). industry (1 .0°10). agriculture (5.0%). other (6.9) etc.

75. Health and Hygiene: The town has one district hospital with 15 beds facilities. The project area population reasonably better knowledge regarding the food hygiene due to: heir exposure to outside world. Primarily due to the flow of national and international tourists in their area. However in real life all the knowledge's are not practiced by all and with100 percent accuracy. For instance although the entire sample household has knowledge on the stale food none of them are found to be following the practice.

76. Hand washing is found practiced by more than 90 percent households before and after eating, defecation and fieldwork. However, only about 70 percent household use soap for hand washing. Other materials used for hand washing is reported to be ash (15%). water only (12%) and flour (2.5%).

77. Archeological and Historical Values: The project service area is not a site having archeological and historical values. However, some Hindu temples exist in the project service area and people frequently visit these temples especially during important religious occasions.

78. Cultural Values: Culturally the service area is a mixing ground of high altitude Magar with low altitude Chettri and commercial community Newars. Though peoples of other ethnic background also lie in the service area have a unique cultural harmony where one respect others traditions and culture.

5.4 Resettlement, Relocation and Compensation Issue

79. The various project components do not require resettlement of households or relocation. The system network has followed public property line and hence the issue of resettlement or relocation is not evident. The minutes of stakeholder consultation meeting also suggests that there is no need of resettlement or relocation.

80. The land required for construction of treatment plant and reservoir has been purchased by the WUSC and there is no need to provide compensation from the project side.

6. DESCRIPTION OF IMPACT ASSESSMENT

81. No significant impacts of project construction and operation were anticipated (IEE, 2005), but the following impacts were likely to occur. The project is now in operational phase and that all the physical and biological and socio-economic cultural impacts have been mitigated. In the enhancement project as well the same type of impacts are likely to occur.

6.1 Physical Environment

82. Physical Impact covers impacts on physical resources such as air, water, soil, rocks etc. The positions of a water table keep on fluctuating up and down in relation to wet and dry weather. Porous sand and gravel aquifers yield more water than silt or clay deposits. Hence physical testing of soil structure will help understanding the water availability.

6.1.1 Impact on land use pattern

83. Intake structure, reservoir and treatment plant would require some land area in addition to permanent site to facilitate construction activities, which is envisaged to alter the land use during construction period. The implications of such land use may effect on soil, productivity and land use pattern.

6.1.2 Flooding and Stagnant Water Problem

84. During monsoon season the project area will be affected from flooding and may create the condition of stagnant water. Absence of drainage system in the project area will create flooding problems. This might create public health problem due to increase in number of vector species like mosquito, snails and others.

6.1.3 Impact on water/land quality

85. Excavation and construction spoils are the major outcomes of construction activity. Besides, the workforce camps and their sanitary behavior might produce unwanted waste materials. The spoils and waste materials may have adverse implications on adjoining water sources.

6.1.4 Impacts of sediments and Disinfecting Chemicals

86. Issues like release of sediments from treatment plants, and the use of disinfecting chemicals might affect the water quality. Such effects are minor in nature and can be easily mitigated during the operational phase.

6.1.5 Water Volume/Quality

87. Over extraction water may decrease the volume of water and improper treatment of water also decrease the quality of water which may arise issues affecting the ground water sources of water.

6.1.6 Impacts on Air Quality

88. Dust will be generated from inadequately managed or haphazard: (i) earthworks such as clearing, grubbing, excavations and drilling; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iii) transport, loading and unloading of natural aggregates; (iv) movement of construction-associated vehicles; and (v) on-site rock crushing, cement mixing/concrete batching, borrowing. The significance of dust impact will be high in the bazaar area where more population reside and work and where urban socio-economic activities concentrate. Increase in concentration of vehicle- and process related pollutants will arise from the movement and operation of construction vehicles, equipment and hot-mix plants.

6.1.7 Impacts on Acoustic Environment

89. Noise and vibration emitting construction activities include earthworks, rock crushing, concrete mixing, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise and vibration impacts will be high in areas where noise-sensitive institutions such as health care and educational facilities are situated. These impacts will be temporary and short term.

6.1.8 Impacts on Traffic and Temporary disturbance

90. During construction phase, implementation of distribution network pipeline will create disturbance to local transport system. The significant impact will be seen in market and busy area only. These impacts will be temporary and short term.

6.2 Biological Environment

6.2.1 Impact on natural vegetation and ecology

91. The natural vegetation and ecology of the project area may be disturbed due to construction activities of the different project components. Besides, the activities of workforce on the adjoining forest may affect the habitat of wildlife.

6.2.2 Impact on aquatic life

92. The source being ground water no impact on aquatic life is envisaged due to implementation of the project

6.2.3 Loss of habitat

93. Clearance of vegetation along the bulk distribution pipeline, and trunk transmission pipeline, may result loss of some forested habitat of wild life and consequently affect the endangered species.

6.3 Socio-Economic and Cultural Environment

94. Many of the adverse impacts on socio-economic and cultural aspects will be limited to construction stage. The following socio-economic issues have been considered in IEE.

6.3.1 Land acquisition

95. The land required for the construction of permanent facilities has been managed by WUSC and no disputes are observed. Similarly there is no necessity of relocation or resettlement. Outside workforce conflict/health/pollution/culture

96. Involvement of outside workforce in the local area may initiate conflict between the locals and outsiders due to cultural reasons. Disease transmission, pollution and competition for the available resources with outsiders might arise.

6.3.2 Workers' Health and Safety Hazards

97. Like communities, workers will also be exposed to the cross-cutting threats of the aforementioned impacts during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and nonobservance of health and safety measures, pose additional threats to the health and safety of construction workers. Construction workers may also be potentially exposed to communicable and transmittable diseases in the community and in the workforce.

6.3.3 Water right Conflict

98. Involvement of outside workforce in the local area may initiate conflict between the locals and outsiders due to cultural reasons. Disease transmission, pollution and competition for the available resources with outsiders might arise.

6.4 Beneficial impacts

99. However there are some benefits of the project implementation; particularly on the following:

- Increase in agricultural and livestock products
- Employment generation
- Maintaining the health and sanitation activities
- Increase in quality of life values
- Change in cropping pattern

7. DESCRIPTION OF MITIGATION MEASURES

7.1 Physical Environment

7.1.1 Impact on land use pattern

100. The STWSSSP is located in Beni municipality in the private land of about 1 ropani and with boundary wall constructed. The WTP and reservoir sites are well protected and it was ensured in design, that the water retaining structures are well protected with good drainage and is located on stable ground. Therefore, the project implementation would have less or no effect on soil, productivity and on the land use pattern.

7.1.2 Flooding and Stagnant Water Problem

101. Proper management of drainage system needs to be improved. Contractor should be instructed not to store construction materials along the water ways.

7.1.3 Water/land quality

102. The project uses sub surface water that will be taken from below the water bed of the river by using infiltration gulley technique. Therefore the quality of water is expected to be clean. However the pollution in the surface water may have negative effect. The intake point is upstream from the settlement area and hence external pollution is also not foreseen. Therefore there is ground water pumping, there is less or minimum effect on water quality. Proper drainage system should be made to avoid water logging and the quality of water sources should be protected. Urination, defecation and dumping of solid and liquid waste in open areas, and water ways may be the potential cause of the pollution of surface and sub-surface water and such activities should be strictly prohibited.

7.1.4 Impacts of sediments and Disinfecting Chemicals

103. The water quality should be maintained within WHO/NDWQS standards. Filtration and chlorination should be provided to bring the water quality to acceptable levels. Similarly, a manual on water testing and chlorine dosing should be prepared and provided to WUSC.

7.1.5 Water volume

104. The water should be equally distributed to all the users in a controlled way. The amount of water that required should only be extracted.

7.1.6 Impacts on Air Quality

105. Some mitigation measures include: (i) confining earthworks according to a staking plan and excavation segmentation plan that should be part of the working documents and/or C-EMP; (ii) watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary; (iii) if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces; (iv) during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris; (v) hoarding active work sites in populated areas; (vi) requiring trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2' freeboard; (vii) limiting speed of construction vehicles in access roads and work sites to maximum of 30 kph; and (viii) providing pollution controls in batching and hot-mix plants.

7.1.7 Impacts on Acoustic Environment

106. Some mitigation measures include: (i) using equipment that emit least noise, well maintained and with efficient mufflers/exhaust silencers; (ii) restricting noisy activities to daytime and overtime work to avoid using noisy equipment; (iii) limit engine idling to a maximum of 5 minutes; (iv) spread out schedule of material, spoil and waste transport (v) minimizing drop heights when loading and unloading coarse aggregates; and (vi) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.

7.1.8 Traffic and Temporary disturbance

107. Some mitigation measures include: (i) distribution pipeline work will be done during night time, (ii) diversion need to be made if work is of long duration.

7.2 Biological Environment

7.2.1 Impact on natural vegetation and habitat

108. The loss of vegetation from construction activities of contractors and construction workforce is recommended to be minimized through the enforcement of the following provisions.

- Prohibition on illegal felling of trees and encroachment of the community forest should be made mandatory.
- Progressive rehabilitation and afforestation of the areas not acquired by the project structures after the completion of the construction activities should be carried out. Such afforestation program is recommended to plant saplings of trees, shrubs and herbs by establishing a nursery or pre-arrangements of such saplings from the local or district level nurseries.
- To enhance the conservation of endangered, protected and threatened species, it is recommended to plant the saplings 2 times the number of felled trees.

7.3 Socio-economic and cultural environment

7.3.1 Land acquisition

109. The land required for the construction of permanent facilities has been managed by WUSC and no disputes are observed. Similarly there is no necessity of relocation or resettlement. Vegetation and agricultural products should be compensated through the afforestation and agricultural enhancement programs in the STWSSSP area.

7.3.2 Outside workforce conflict/health/pollution/culture

110. Outside workers should be provided with the facilities of camps and should be instructed to not to; i) indulge with local people ii) involve themselves for hunting of wildlife iii) involve themselves in social disharmony activities.

7.3.3 Workers' Health and Safety Hazards

111. Some of the mitigation measures for community health and safety hazards: (i) strictly enforce on workers the use of protective wears; (ii) provide safe access to and from work sites; (iii) provide adequate housing at the workers' camp with adequate basic services and provide adequate water supply and sanitation facilities at work sites; (iv) arrange with nearest health center and hospital for health care and emergency care of workers. Overall, the contractor should comply with IFS EHS Guidelines on Occupational Health and Safety.

7.3.4 Water right Conflict

112. The temporary settlement for the workers should be provided with temporary water taps. Open defecation should be controlled. Temporary toilets need to be constructed.

7.4 Enhancement of Beneficial Impacts

113. Some of the beneficial impacts from the implementation of the project should be enhanced by;

- Community mobilization and people's participation in health and sanitation programs should be promoted,
- Training an awareness programs in health and uses of water and its importance (water cost, saving, reuse, recycle, water pollution etc.) should be given,
- Technical training to the local people on plumbing, chlorination, water testing, pump maintenance and repair should be conducted.

7.5 Activities for Rehabilitation Work and its Mitigation Measures

114. As this rehabilitation project is for previously implemented and operated in a satisfactory order with minimal rectification works. Physical, Biological and Social environment are described respectively in Section 7.1, 7.2 and 7.3. Slight changes are in social that is increased population, number of stakeholders for which additional distribution lines with ancillary works are to be done. Major focused were given for the technical rectification which need to be done during enhancement work are summarized in Table 7-1 in details. Most of the recommended mitigation measures will be incorporated in the contractual obligations and constructions works to be completed by the contractors. Facilities like water treatment plant, water testing laboratory etc are also either existing or to be installed is also included in the contract. Mitigation measures and monitoring plan of each rehabilitation activities is mentioned in Table 10-2, in Chapter 10.

Table 7-1: Activities for Rehabilitation Work

S.No	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
1	Civil Structures					
1.a	Pumdi Khola (stream fed source)	Gravity water	0.0	3	• frequently choked by debris, Intake washed away by flood	• Construct new RCC wall from downstream of 2.5 m high, length of 4 m, and 350 mm thick wall. • Construct another new intake just below the existing intake • provide RCC foundation at right bank of Pumdi Khola and construct 2mX3m RCC slab including side wall
1.b	Danda Kharka (Spring source)	Gravity water	3.0	6.0	• At dry season discharge is nil	• No intervention
1.c	Rittha Kharka (spring source)	Gravity	12		• At present only 7 lps has been tapped however	

S.No	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
					another 8 lps extra has not been tapped.	
1.d	Kopre Khola (stream fed)		2	2		Construct new intake (Customized)
1.e	Dudhe Khola (Stream fed source)		2	2		Construct new intake (Customized)
	Transmission line	GI	63/6 90/4 140/6	750 m 750 m 200m	Risk of fire due to exposure Risk of fire due to exposure less water available	Use the existing pipe and lay parallel pipe for more transmission capacity.
	Pumdikhola	GI	100 mm dia	2200 m		Install 4" dia WO at Kopre CC Install 6" dia at 5" dia WOs at GI main of Raghuganga

S.N o	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
	system					crossing
	Dudhe Koprekhola system (old & new)	HDPE	125 mm dia	9800 m	overflow from Pumdikhola collection chamber throughout the year due to under size transmission main	- Construct 150 new anchor blocks at Pumdikhola system - Construct 20 new anchor blocks at Kopre Dudhe transmission system - Poor slope, so increase slope by redoing PCC - Grouting along cracked area - sand level decreased by 10 CM while washing and reloading therefore add extra volume of sand at SSF
		GI	Exist	13.7 KM	Maintenance problem	
		Transmission main	Exist	50 mm dia 450m 63 mm	Water hammering	

S.No	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
				dia 3510 m 75 mm dia 1100 m 90 mm dia 30 m 110 mm dia 1500 m 100 mm dia 3500 m Total 10.09 KM	Water hammering	
2	air valve Wash out Anchor block	Transmission main Pumdi Khola	Does not exist Galeswor- 5" dia one number Tilkeni -4" dia one number Naya pool- 5" dia one number MyagdiKhola crossing-4"dia , one number Dudhe Khola intake 2" dia one	100 cum 100 cum	wash out problem	

S.No	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
	Sedimentation tank	Transmission main	200 number of anchor blocks exist 40 number of anchor blocks exist			
	Slow Sand Filter	Kopre and Dudhe Khola Transmission main Transmission main Transmission main Transmission main	Exists Exists Exists Do not exist		Small seepage due to crack along side wall of SSF Frequent chocking at SSF	
	Bulk meter				Unable to assess actual inflow at sedimentation tank	

[illegible]

S.No	Name of Structure	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Design Capacity	Major problems	Required Intervention
					Garage area	
4	Fire Hydrant Valve chambers	Distribution pipe RCC cover	• 0 not exist 25 nos exists (3'X3')		• Risk of fire hazards • Broken concrete	• 3 fire hydrant to be installed • Construct 1.5'X3' double layer reinforced 6" thick (18 pcs)
5	Chlorination plant				difficult to climb up staircase	Due to chlorination effect stair case broken install new wooden stair case
6	Building				Shortage of workin	• Add one storey at existing building 1100 sq ft • Construct L-shaped ground floor building of 900 sq Ft

S.N o	Name of Structur e	Type	Existing Capacity(Q=lps, RVT=cum, WTP lps)	Desi gn Capa city	Major proble ms	Required Intervention
					g space in office buildin g Shorta ge of store , guard house, kitche n	

8. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

8.1 Consultation

115. Stakeholder consultation and participation was an essential process in project preparation and this updated IEE. The process in engaging stakeholders and affected people during the conduct of the IEE involved key informant interviews, joint sites reconnaissance and on-site discussions with WUSC, and field random interview of stakeholders.

8.2 Initial consultation: the existing project

116. During the Feasibility Study, consultations were undertaken by the Design and Supervision Consultants. Stakeholder consultations have been continued through subprojects implementation and operation. All stakeholders were invited and encouraged to participate in community consultations. To facilitate the engagement of stakeholders, the PMO and RPMOs maintained good communication and collaboration with the WUSC and VDC. The PMO, RPMOS, Contractors and/or WUSC were opened to contact by the public on matters concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances.

- Prior to construction, the PMO and TPO have conducted 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 TPO, and status of compliance with Government's environmental safeguard requirements, among others, are attained/provided. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO, TPO and Contractors 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 PMO, TPO, WUSC and VDC.
- During construction, regular random interviews were conducted by the TPO every month to monitor environmental concerns of subproject communities.
- During operation, periodic random interviews were conducted by the PMO and
- TPO and WUSC to monitor the environmental concerns of subproject communities.

8.3 The consultation during IEE update

117. The consultation was done in two phases

8.3.1 Phase I

118. During the engineering survey and design phase, the consultations met with the top level management of DWSS, WUSC officials, WS division officials in Kathmandu and concerned municipality offices, WS customers and general public in field. The main persons consulted during this phase are listed below;

Table 8-1: Lists of People and Institutions Consulted

S No.	Name	Designation
1	Mr. Ram Deep Sah	Director General
2	Mr. Tires Prasad Khatrai	Acting Project Director
3	Mr. Dr. Mahesh Bhatrai	PMC, Project Co-ordinator
4	Mr. Keshav Raj Bista	Deputy Project Director
5	Mr. Subash Shrestha	Chairman
6	Mr. Tulsita Shrestha	V. Chairman
7	Mr. Madhav Prasad Regmi	Secretary
8	Mr. Yam Bdr. Shakya	Member
9	Mr. Shankar Hamal	Member

8.3.2 Phase II

119. After approval of Detail Design report, second level of public consultation was made to discussion issues regarding the environmental impact, resettlement, relocation and compensation with immediate stakeholders. Meeting was held on 2072/06/06 at site. In this phase overall project outcomes were discussed with all concerned stakeholders. Details of participants are presented in Annex 4.

8.4 Costs

120. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/town) level will be borne by the concerned focal organizations at each level: WUSC at town level; PIU at regional level and PMO at central level.

9. GRIEVANCE REDRESS MECHANISM

9.1 Purpose of the Grievance Redress Mechanism

121. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of APs' concerns, complaints, and grievances related to social and environmental issues of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

122. A common GRM will be in place for social, environmental, or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Every grievance shall be registered and careful documentation of process with regard to each grievance undertaken, as explained below. The environmental and social safeguards officer (ESO/SSO) at project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Development Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at VDC/Municipality level.

123. A town-level public awareness campaign will be conducted to ensure that awareness on the project and its grievance redress procedures is generated. The social safeguards expert of the project management consultant (PMC) and DSMC's safeguards specialists will support the WUSC and DSMC community mobilisers with information/collateral/awareness material etc. to conduct the town-wide awareness campaign. The campaign will ensure that the poor, vulnerable and others are made aware of grievance redress procedures and project's entitlements.

124. A Grievance Redress Committee (GRC) will be formed at VDC/Municipality level, comprising District Chief WSS as Chairperson and Member of Secretary of concerned WUSC as the GRC secretary. The GRC members will be comprise of (1) RPMO social development officer, (2) representatives of affected persons, (3) DSMC's safeguards specialist (social/environment as relevant), (4) a representative of reputable CBO/SHG/organization working in the project area, and (5) contractor's representative. The secretary of the GRC, who will be responsible for convening timely meetings and maintaining minutes of meetings. The concerned social safeguards expert of DSMC will support the RPMO SDO and Regional Director DWSS to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Representatives of APs, civil society and eminent citizens are to be invited as observers in GRC meetings.

125. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUSC; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC. The grievance redress mechanism and procedure is depicted in Figure 9-1.

126. The GRM for the project is outlined below, with each step having time-bound schedules and responsible persons to address grievances and indicating appropriate persons whose advice is to be sought at each stage, as required:

9.1.1 First Level of GRM (WUSC-level)

127. The first level and most accessible and immediate venue for quick resolution of grievances will be the contractors, DSMC field engineers and PIU supervision personnel, who will immediately inform the WUSC. Any person with a grievance related to the project works can contact the Project to file a complaint. The WUSC will document the complaint within 24 hours of receipt of complaint in the field, and WUSC will immediately address and resolve the issue at field-level with the contractor, supervision personnel of PIU and DSMC field engineers within 5 days of receipt of a complaint/grievance. The assigned DSMC social mobilizer will be responsible to fully document: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved. If the complaint remains unresolved at the local level within 5 days, the WUSC will forward the complaint issue to the VDC/Municipality level GRM.

9.1.2 Second Level of GRM (VDC/Municipality level)

128. The complainant will be notified by the WUSC that the grievance is forwarded to the VDC/Municipality –level GRM. The Grievance Redress Committee (GRC) will be called for a meeting. The GRC meeting will be called and chaired by the District chief of WSS. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUSC. If the grievance remains unresolved within 10 days of receipt of complaint by WUSC, the matter will be referred to the third level. The RPMO SDO will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued and the decisions carried out. If the complaints are related with IP/dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities should be involved.

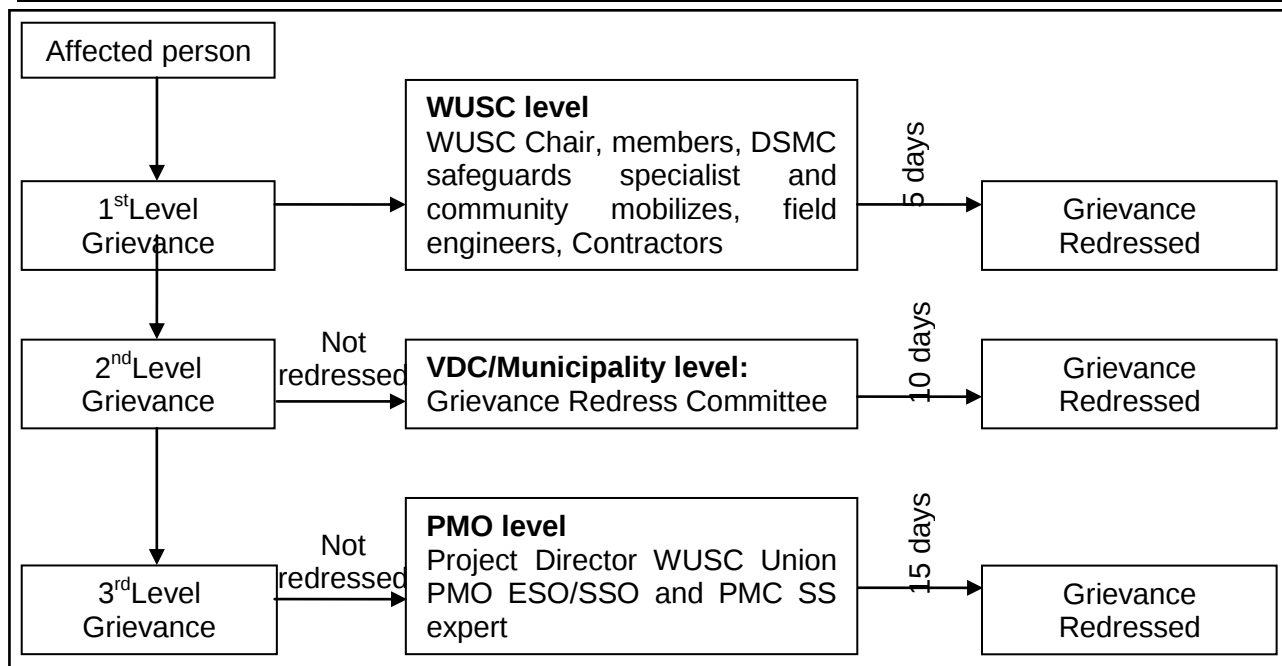
9.1.3 Third Level of GRM (PMO Level)

129. Any unresolved or major issues at Municipality/VDC level will be referred to the PMO for final solution. The PMO's Project Director and WUSC Union representative will have special meeting to find solution. Decision has to be made within 15 days of receipt of complaint by WUSC. The Project Director will sign off on all grievances received by the PMO. The environmental and social safeguards officers (ESO & SSO) will be involved with support from the PMC Social/Environment Safeguards Experts. The Project Director will sign off on all grievances received by the PMO. The PMO Safeguard Officer will be responsible to convey the final decision to the complainant.

130. All paperwork (details of grievances) needs to be completed by the WUSC member secretary and circulated to the WUSC Chairperson and members. At VDC/Municipality level, the VDC/Municipality SDO will be responsible for circulation of grievances to the Regional Director, DWSS and other GRC members, prior to the scheduled meetings. The PIU SDSO will be responsible for follow-through of all escalated grievances. All decisions taken by the GRC and PSC will be communicated to the APs by the PIU social development and safeguards officer.

131. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

132. 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 any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

**Figure 9-1: Grievance Redress Process**

DSMC: Design, supervision and management consultant; ESO: Environmental and social safeguards officer;
 GRC: Grievance redress committee; PD: Project director; PMC: Project management consultant;
 PMO: Project management office; WUSC: Water user and sanitation committee.

Record keeping and disclosure

133. Records at the town-level will be kept by the concerned WUSC Member Secretary, of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date of the incident and final outcome. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the RPMO office, WUSC/municipal/VDC office, and on the web, as well as reported in the safeguards monitoring reports submitted to ADB on a semi-annual basis. For any grievance escalated to RPMO/VDC/Municipality level, the RPMO SDO will be responsible for record-keeping, calling of GRC meetings and timely sharing of information with WUSC. For grievances escalated to PMO and above, the PMO safeguard officers will be responsible for maintenance of records, sending copies to RPMO and WUSC for timely sharing of information with the person filing complaint.

134. Periodic review and documentation of lessons learned. The PMO social safeguard officer will periodically review the functioning of the GRM at town/WUSC level and PIU level and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances. Indicators pertaining to grievance redress (no. of grievances received, no. redressed/resolved to be reported by Member Secretary, WUSC to PIU SDO, and by PIU SDO to PMO ESO in monthly progress reports.

Periodic review and documentation of lessons learned

135. The PMO social safeguard officer will periodically review the functioning of the GRM at town/WUSC level and PIU level and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances. Indicators pertaining to grievance redress (no. of grievances received, no. redressed/resolved to be reported by Member Secretary, WUSC to PIU SDO, and by PIU SDO to PMO ESO in monthly progress reports.

Costs

136. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/town) level will be borne by the concerned focal organizations at each level: WUSC at town level; PIU at regional level and PMO at central level. Cost estimates for grievance redress are included in EMP cost estimates.

10. ENVIRONMENT MANAGEMENT PLAN

137. The purpose of the environmental management plan (EMP) 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 assessment 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.

138. 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.

10.1 Institutional Arrangement

10.1.1 Executing and implementing agencies.

139. The Ministry of Urban Development (MUD) will be the executing 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 Users' and Sanitation Committees of participating towns are the implementing agencies.

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

Prior to construction

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

During construction and operation

- The DWSS, through the PMO, will oversee the EARF and EMP implementation of all subprojects.
- The WSSDO, through the RPMOS, will oversee the EARF and EMP implementation at subproject/town level.

10.2 Safeguard Implementation Arrangement

Project Management Office (PMO)

141. The safeguard officers (environmental safeguard officer and social safeguard officer) of the PMO will receive support from the safeguards experts (environmental and social) of the Project Management Consultants (PMC) 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 recommend 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.

Regional Project Management Offices (Eastern and Western RPMOs)

142. 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 mobilizes 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.

Civil Works Contracts and Contractors

143. EMP is 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 provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (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 sites. Contractors will only starts the civil works activities in the section/subproject sites that has IR/IPP impacts upon the completion of RP/IPP implementation and after receiving clearance from the WUSC and endorsed by RPMO's SDO.

Capacity Building

144. The PMC 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 considerations 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 worksites.

Water Users and Sanitation Committees (WUSCs)

145. WUSCs are the eventual operators of the completed subprojects. The key tasks and responsibilities of the WUSCs are, but not limited to:

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.

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.

During operation

- Implement the EMP and the Water Safety Plan.
- Regularly monitor the water quality
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism

Licensed and accredited laboratory

146. 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.

10.3 Institutional Capacity Development Program

147. 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.

148. WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Albeit 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 manpower. 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 the WUSC actively participating to develop WUSC capacity. The conduct of 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 capacity of the 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 the WUSC. A Water Safety Plan is included in subproject design and will oblige the operator to carry out water quality monitoring accordingly. The amount of NPR 500,000 will be provided

annually to implement the Plan. There will be sufficient fund to include training by the licensed and accredited lab, while monitoring water quality.

149. The PMO will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations 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.

10.4 Staffing Requirement and Budget

150. 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.

151. The infrastructure involved in each scheme is generally straightforward to build. 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 assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO.

152. 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 operation phase mitigation measures are again of good operating practices, which will be the responsibility of the WUSC. All monitoring during the operation and maintenance phase will be conducted by WUSC. The Water Safety Plan, included in each subproject design, will allocate NPR 500,000 annually for operation and maintenance particularly water quality monitoring. If a licensed laboratory will be engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan.

10.5 MONITORING AND REPORTING

153. RPMOs will monitor and measure the progress of EMP implementation with assistance from DMSC. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEE for the projects. In addition to recording

10.6 Environmental Monitoring Mechanism

154. Under the chairmanship of Beni municipality, a Monitoring Committee should be formed. The committee should be represented by the chairman of concerned service wards of the VDC, representative from environment related NGOs, local community, Water Users' Committee and local entrepreneur. Secretary of the Beni municipality should act as member secretary of the Monitoring Committee. This committee should be assigned following duties and responsibilities:

- The committee should meet at least twice a month;
- The committee should collect all complaints from the local people concerning distribution, pipeline etc and should discuss in the meeting for the final decisions;
- The monitoring committee should identify the mistakes and deficiency regarding the project and should discuss in the meeting for the purpose of correction;
- Any negligence regarding the water quality should be considered and take necessary action;
- The committee should also supervise and provide instructions for activities such as:
 - Distribution of qualitative water,
 - Storage of water in the reservoir tanks,
 - Treatment plant,
 - Handling of toxic/chemical matters,

- Training for the locals, and
- Examine monitoring reports periodically and take necessary actions if required etc.

10.7 Monitoring Reporting Mechanism

155. As proposed by approved EMP, the reporting system should include site supervision and reporting as well and primarily connected with Monitoring plan. The construction contractors are responsible for implementing approved EMP. The supervising consultants are responsible for monitoring to oversee whether or not the contractors have complied with the approved conditions as stated in EMP and also receive the monthly progress report from construction contractors. Based on this information the consulting engineers prepare the front line monitoring report and submit to DWSS for review

10.8 Monitoring cost, parameters, location and schedule

156. During rehabilitation, the cost for monitoring will be minimum and it should be allocated as and when required from the project contingency.

10.9 Contractors Compliance on EMP

157. The recommended mitigation measures are shown in the Table 10-1. The contractor should comply with the recommended mitigation activities.

10.10 Institutional Capacity Development Program

158. 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.

159. In the Table 10-1 given below, the types of impact as predicted, corresponding mitigation measures, monitoring parameters, monitoring indicators, location and sources, responsibility and frequencies of monitoring have been included. The monitoring protocols given below are based on the Environmental Management Plan (IEE Bani, 2005) approved by Government of Nepal 2005.

10.11 Environment Mitigation Cost

160. Most of the recommended mitigation measures are incorporated in the contractual obligations and constructions works to be completed by the contractors. Facilities like water treatment plant, water testing laboratory etc are also either existing or to be installed is also included in the contract. Therefore mitigation cost of the enhancement project will be negligible. However in order to strengthen the existing facilities 2% of total project cost is proposed should be allocated.

Table 10-1: Mitigation measures and corresponding Monitoring plan

Impact and mitigation prescription		Monitoring plan for implementation						Status	
Environmental Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present ²
Physical Environment									
Construction Phase									
Land use pattern	Acquire only required land	Change in cropping pattern	Quality and quantity of yield	Project area	Local people	WUSC	Half yearly	Completed	Not applicable
Flooding and water stagnant	Drainage management	Observation of the project area	Increase in mosquito Increase in vector born diseases	Project area	Field inspection	DSC/Contractor	During and after monsoon	Completed	Recommended
	The excavated material must be safely disposed.	Ensure proper management of excessive spoil materials in place	Evidence of landscape erosion and river turbidity undisturbed	Project area	Field inspection	DSC/Contractor	After monsoon	Completed	Recommended
Impacts of sediments and Disinfecting Chemicals	Safe disposal	Water quality	Chemicals and pathogen exceeding national standards	Project area	Water quality test	DSC/Contractor	Quarterly	Completed	Recommended

²Recommended for EMP compliance

Impact and mitigation prescription		Monitoring plan for implementation						Status	
Environment al Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present ²
Water Volume/ Quality	Limited extraction/ regular testing	Measurement of River flow and underground water table level	Change in quantity	Project area	River and ground water	DSC/Contractor	Quarterly	Completed	Recommended
Air Quality	Confine earthworks according to a staking plan and excavation segmentation plan and a part of the document	Visibility due to presence of dust	Location of stock pile	Project area	Local people and surrounding environment	DSC/Contractor	Twice in a week	Completed	Recommended
		Amount of dust present in surrounding environment	Number of complaint from sensitive receptors	Project area	Local people and surrounding environment	DSC/Contractor	Twice in a week	Completed	Recommended
Acoustic environment	Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating	Sound intensity during day and night time	Number of complaints from sensitive receptors;	Project area	Local people and surrounding environment	Contractor	Twice in a week	Completed	Recommended

Impact and mitigation prescription		Monitoring plan for implementation						Status	
Environment al Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present ²
	equipment.								
		Sound intensity at and nearby of source	Use of silencers in noise-producing equipment and sound barriers;	Project area	Local people and surrounding environment	Contractor	Twice in a week	Completed	Recommended
Traffic movement	Pipe line work need to be done during night and during less traffic time	Number of vehicles diverted	Number of vehicles movement	Project area	Local people and surrounding environment	WUSC/DSC/Contractor	During pipeline work	Completed	Recommended
Biological Environment									
Impact on natural vegetation and habitat	Construction area should be well demarked and proper instruction to be given for the workers.	Vegetation density, number and types of wild animals	Change in vegetation density and number of wild life	Project area	Project area	WUSC/DSC/Contractor	Quarterly	Completed	Recommended
Socio-economic and cultural environment									
Impairment to Infrastructure	Not applicable								

Impact and mitigation prescription		Monitoring plan for implementation						Status	
Environment al Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present ²
Land acquisition	Project has to make sure that adequate compensation for the land acquired from private citizens (if required) is made	Compensation measures	All affected	Project area	Records and Interview	WUSC/Contractor	Yearly	Completed	Completed
Outside workforce conflict/ health/ pollution/ culture	Disease transmission, pollution and competition for the available resources to outsiders should be thoroughly checked.	Situation of social disharmony Awareness program	Decreased social disharmony Effective awareness program	Project area	Records and Interview	WUSC/Contractor	Yearly	Completed	Recommended
Operation Phase									
Water right Conflict	Public taps should be established in appropriate places.	Number of public taps installed	Adequate water supply to the public	Project area	Field inspection and Interview	WUSC	Quarterly	Completed	Recommended
Workers	Comply with	Health of	Site-	Project	Workers	WUSC	Quarterly	Complete	Recommended

Impact and mitigation prescription		Monitoring plan for implementation						Status	
Environment al Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present ²
health and safety	requirements of Labor Act of GoN and standards on workers' health and safety (H&S).	workers Dress and first-aid facilities stations	specific H&S Plan	area	health status and Interview			d	d
	Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances	Health of workers Dress and first-aid facilities stations	Condition of sanitation facilities for workers	Project area	Workers health status and Interview	WUSC	Quarterly	Complete d	Recommend d

Source: IEE Beni 2005

2. Recommended for EMP compliance

Table 10-2: Mitigation Measures and Monitoring Plan for Rehabilitation Activities

Overview of Impacts		Required mitigation measures			Monitoring plan for implementation				
Project activities	Possible impacts (on all baseline parameters)	Mitigation associated with project location	Mitigation in project design features	Residual mitigation measures (not addressed by location and design)	Parameter to be Monitored	Indicators	Location	Responsibility	Frequency
Water source									
Intake									
Construction of new intake	Landslide and erosion	Construction of check dam, gabion and bioengineering works	Protection measures are included in drawing		Landslide and slope stability	Reduction in landslide and erosion	Site specific	Contractor and WUSC	During construction and operation
	Impact on vegetation	Removal of vegetation	Not applicable		Density of vegetation to be removed	Number of removed vegetation	Site specific	Contractor	During construction
Protection and maintenance	Diversion of River	Construction of check dam and gabion	Protection measures are included in drawing		River flow	River flow intensity	Site specific	Contractor	During construction
Transmission line									
Landslide stabilization work	Landslide and erosion	Construction of check dam, gabion and bioengineering works	Protection measures are included in drawing		Landslide and slope stability	Reduction in landslide and erosion	Site specific	Contractor and WUSC	During construction and operation
Pipe line change	Impact on vegetation	Removal of vegetation	Not applicable		Density of vegetation to be removed	Number of removed vegetation	Site specific	Contractor	During construction

Overview of Impacts		Required mitigation measures			Monitoring plan for implementation				
Project activities	Possible impacts (on all baseline parameters)	Mitigation associated with project location	Mitigation in project design features	Residual mitigation measures (not addressed by location and design)	Parameter to be Monitored	Indicators	Location	Responsibility	Frequency
Treatment plant									
Installation of chlorination unit	Excessive use may be detrimental	Avoid excessive use							
	Leakage through storage	Maintain proper storage to avoid leakage			Chlorine contamination	Health problem in local people	Site specific	WUSC	Operation
Construction of reservoir									
Construction of new reservoir	Impact of excavation of earth	Proper disposal of excavated materials and use of protection measures	Location of disposal site		Inspection of disposal site	Number of Landslides and erosion created by disposal	Site specific	Contractor	During construction
	Impact on landscaping and slope	Adequate excavation in proper way/ ownership			Landslide and slope stability	Increase in landslide and erosion	Site specific	Contractor	During construction
Distribution line									
Installation of fire hydrant	Minor impact (site specific)	Traffic diversion	Not applicable				Site specific	Contractor	During construction
Network rehabilitation activities/	Traffic disturbance	Arrangement for traffic diversion with	Traffic diversion		Arrangement of vehicular movement	Smooth running of vehicles	Site specific	Contractor	During construction

Overview of Impacts		Required mitigation measures			Monitoring plan for implementation				
Project activities	Possible impacts (on all baseline parameters)	Mitigation associated with project location	Mitigation in project design features	Residual mitigation measures (not addressed by location and design)	Parameter to be Monitored	Indicators	Location	Responsibility	Frequency
Additional distribution network		traffic			during construction	through diversion			
	Air pollution due to operation of power generator	Dust reduction and emission should be controlled	Not applicable		Air quality	Particulate matter in air	Site specific	Contractor, WUSC and Locals	During construction
	HHs water distribution	Intermittent supply	Supply water through other sources		Water supply continued	Adequate amount of water supply in each households	Site specific	Contractor and WUSC	During construction

Note: Table 10-2 is prepared according to Table 7-1 of Chapter 7.

11. CONCLUSIONS AND RECOMMENDATIONS

161. The proposed subproject is not an environmentally critical undertaking. The IEE indicates that:

- The proposed subproject, its components, are not within or adjacent to environmentally sensitive areas.
- The extent of adverse impacts is expected to be local, confined within the subprojects' main areas of influence, quarry or borrowing sites, waste disposal sites, and the routes to and from these sites. Fine aggregates, sediments and/or wastes would not be transported beyond the aforementioned sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed prior to the onset of the rainy season, the potential adverse impacts during construction would be highly/more site-specific.
- The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction period). These will not be sufficient to threaten or weaken the surrounding resources. The preparation and implementation of a Contractor's EMP that would address as minimum the requirements of the SPS-compliant subproject EMP will mitigate the impacts and lower their residual significance to acceptable levels. Simple/uncomplicated mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are known to Contractors. Hence, mitigation measures would not be difficult to design and institute.
- During operation, the potential delivery of unsafe water can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as prescribed in the National Drinking Water Quality Standards Directives.
- The proposed subproject will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced public health, improved quality of life and safe communities as outcomes.

162. Based on the above findings, the classification of the 3rdSTWSSSP as Category B is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with the Safeguard Policy Statement of the ADB. The Government of Nepal will incorporate the findings and recommendations of this IEE and prescribed environmental management in the EMP.

12. COMMENTS INCORPORATION MATRIX