Initial Environmental Examination

September 2014

NEP: Third Small Towns' Water Supply and Sanitation Sector Project–Salyan Town Subproject

Prepared by the Ministry of Urban Development for the Asian Development Bank.

Initial Environmental Examination (IEE)

Project No. XXXX
June 2014

NEP: Third Small Towns' Water Supply and Sanitation Sector Project -Salyan Town Subproject

Prepared by the Ministry of Urban Development for the Asian Development Bank

CURRENCY EQUIVALENT

(Official exchange rate of the Nepal Rastra Bank as of 01 March 2014)

Currency Unit	-	Nepalese Rupee (NPR)
USD 1.00	=	NRs 98.51
NRs 1.00	=	USD 0.010151

ABBREVIATIONS

ADB	Asian Development Bank
AP	Affected person
C-EMP	Contractor's environmental management plan
DWSS	Department of Water Supply and Sewerage
EARF	Environmental assessment and review framework
EIA	Environmental impact assessment
EMP	Environmental management plan
EMR	Environmental monitoring report
EPA	Environment Protection Act
EPR	Environment Protection Rules
EO	Environmental officer
ES	Environmental specialist
ESA	Environmental safeguard assistant
ESE	Environmental safeguard expert
IEE	Initial environmental examination
GoN	Government of Nepal
GRM	Grievance redress mechanism
MoSTE	Ministry of Science, Technology and Environment
MUD	Ministry of Urban Development
NPR	Nepalese Rupee
PISU	Project Implementation Support Unit
PMO	Project Management Office
REA	Rapid environmental assessment
SPS	Safeguard Policy Statement
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
2ndSTWSSSP	Second Small Towns' Water Supply and Sanitation Sector Project
ToR	terms of reference
USD	United States Dollar
VDC	Village Development Committee
WHO	World Health Organization
WSSDO	Water Supply and Sanitation Divisional Office
WUSC	Water Users' and Sanitation Committee

WEIGHTS AND MEASURES

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

NOTES

In the report, "$" refers to US dollars, unless otherwise stated.

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

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

Table of Contents

ANNEXES……..

FIGURES……

TABLES……

EXECUTIVE SUMMARY

1. The Third Small Towns Water Supply and Sanitation Sector Project (3 STWSSSP) will support the Government of Nepal's 15-year Development Plan for Small Towns. The project will improve water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal over a period of five years (2015- 2020).

2. Salyan town sub project is one of the subprojects proposed under 3 STWSSSP. Salyan Town is served by three water supply systems that started operation in 1976 and 1997. However, all three systems do not sufficiently meet the needs of the people, both in terms of quantity and quality. Water is supplied through public taps. Long hours are spent by people in queuing for water, and with some queuing their pails way ahead of expected operating hours. This indicates the meager access to water supply in Salyan Town and the hardship that people face each day to have water. Outside the taps' operating hours, people resort to the nearby river to fetch water. Access to sanitation facilities is satisfactory. Majority of the households have their own water-sealed and flush latrines. The town has one public toilet situated at the bus park; however, it is wanting of rehabilitation or replacement. The town has no wastewater/sewage and solid waste management systems. Outside the small stretch of open lined drains at the core market area, there is no proper drainage system.

3. **Categorization.** Salyan town subproject is classified as Environment Category B as per the SPS as no significant impacts are envisioned. Accordingly the 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.

4. **Subproject Scope.** The subproject is formulated under 3 STWSSSP to improve water supply and sanitation to improve water supply and sanitation service delivery in Salyan. Investments under this subproject includes; i) construction of piped water supply system (tube wells, water treatment plant, construction of transmission mains, overhead tank, distribution main and household connections), ii) construction of household latrines and public toilet, and iii) establishment of septage disposal site.

5. **Implementation Arrangements.** The Ministry of Urban Development is the executing agency. The Department of Water Supply and Sewerage (DWSS) is the implementing agency. Implementing activities will be overseen by a separate Project Management Office (PMO) which 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 safeguard specialists will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMO will be staffed by qualified and experienced officers and will be responsible for the day-to-day activities of project implementation in the field, and will be under the direct administrative control of the PMO. Consultant teams are responsible for subproject planning and management and assuring technical quality of design and construction; and designing the infrastructure and supervising construction; and safeguards preparation.

6. **Description of the Environment.** Subproject components are located in Salyan town area or in its immediate surroundings which were converted into agricultural and urban use for many years ago and there is no natural habitat left at these sites. The subproject components will be located in WUSC sites, public road rights-of-way (ROW) and community managed forests (that are not declared as protected areas). There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

7. **Environment Management.** An environmental management plan (EMP) is included as part of this IEE, which includes i) mitigation measures for environmental impacts during implementation, ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting, iii) public consultation and information disclosure, and iv) a grievance redress . 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.

8. Locations and sitting of the proposed infrastructures were considered to further reduce impacts. The concepts considered in design of sub project 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 pipeline at least 10 meters from latrines, septic tanks and any main drains to avoid contaminations; vi) locating tube wells at least 30 m upstream from sanitation facilities, vii) locating household and public latrines and septic tanks at least 30 meters downstream from the nearest drinking water source; viii) piloting controlled disposal of septage in accordance to WHO and US EPA standards to reduce the likelihood of uncontrolled disposal as currently practiced; ix) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

9. During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil; and from the disturbance of residents, businesses, and traffic. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. These are common temporary impacts of construction in urban 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 t operational phases, 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.

10. 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 ensured 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.

11. 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 subproject. The IEE will be made available at public locations in the town and will be disclosed to 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 opportunity to participate in its development and implementation.

12. The Subproject will improve the water supply system of Wards 1 to 9 and improve the public sanitation facility of the bus park in Sitalpati, Khalanga Village Development Committee (VDC), Salyan District. The most noticeable net benefits to the population of the town will be positive and large as the proposed subproject will ; i) improve access to reliable

and adequate supply of safe drinking water, ii) increase access to increased sanitation resulting in the town becoming open defecation free (ODF), and iii) promote good hygiene and sanitation practices and safeguard public health.

13. **Consultation, Disclosure, and Grievance Redress.** Public consultations were done in the preparation of the project and IEE. Ongoing consultations will occur throughout the project implementation period. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

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

15. **Conclusions and Recommendations.** Therefore 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 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). The Government of Nepal EA will incorporate the findings and recommendation of this IEE and prescribed environmental management in the EMP.

I. INTRODUCTION

A. Background

16. In 2000, the Government of Nepal (GoN) endorsed the 15-year Development Plan for Small Towns Water Supply and Sanitation in order to improve health and economic and environmental living conditions of people in small towns in Nepal. The Plan adopts a community managed demand responsive approach, where the community is involved in all aspects of planning and implementation of its town's project. In support of GoN's endeavor, the Asian Development Bank (ADB) funded the Small Towns' Water Supply and Sanitation Sector Project (STWSSSP) in 2001-2008. Twenty-nine (29) small towns of about 570,000 people benefitted from the improved water supply and sanitation services delivered under the Project. The positive impacts of the STWSSSP led the GoN to embark on the Second Small Towns' Water Supply and Sanitation Sector Project (2ndSTWSSSP), also financed by the ADB and which benefitted another twenty-one (21) small towns. Following these two projects, the Third Small Towns' Water Supply and Sanitation Sector Project is currently being prepared to further support GoN's continuing efforts to improve water supply and sanitation service delivery in small towns in Nepal. The Project will follow the government's 15-year Development Plan, as updated in 2009, to develop the water and sanitation sector for small towns.

B. Purpose of the IEE

17. This report gives an account of the initial environmental examination (IEE) of the proposed Salyan Town Water Supply and Sanitation Subproject (or, Subproject) to be implemented under the Improved Water Supply and Sanitation Infrastructure Output of the Third Small Towns Water Supply and Sanitation Project (or, Project).

18. The IEE was conducted to ensure the environmental sustainability of the Subproject, to integrate environmental considerations into the Subproject preparation process, and provide for environmental management during Subproject implementation. The ADB and GoN require all projects to undergo environmental assessment. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects 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. The rapid environmental assessment using ADB's REA Checklist has indicated that the Subproject is a Category B undertaking, requiring an IEE. On the GoN side, the statutory requirement that has to be adhered to is the Environment Protection Act (1997), and Environment Protection Rules (1997 and as amended in 1999 and 2007). Based on EPR Schedule 1, the Subproject is within the threshold of activities under the water supply and sanitation sector that will require IEE.

19. This IEE fulfills the policy requirements of both the ADB and the GoN

20. The IEE Report primarily: (i) provides information on the Subproject and its environmental requirements; (ii) provides the necessary baseline conditions of the physical, ecological, physical cultural and socio-economic environments and/or resources in and surrounding the Subproject's area of influence; (ii) identifies and assesses potential impacts arising from the implementation of the Subproject on these environments and/or resources; (iii) recommends measures to avoid, mitigate, and compensate for the adverse impacts; (iv) presents information on stakeholder consultations and participation during Subproject preparation (v) recommends a mechanism to address grievances on the environmental performance of the Subproject; and (vi) provides an environmental management plan.

21. Relevant reports/documents, sites reconnaissance, consultations with communities and relevant government agencies (annex C) and reference to relevant government policies, laws and regulations have provided bases to this IEE.

C. Need for the Subproject

22. Salyan Town is served by three water supply systems that started operation in 1976 and 1997. However, all three systems do not sufficiently meet the needs of the people, both in terms of quantity and quality. Water is supplied through 133 public taps, of which 34 taps are devoted to government offices; the remaining 99, for the public. Each day, water is supposed to be supplied or made available from the taps for 1.5 hrs in the morning and another 1.5 hours in the evening, Mondays through Sundays. In the dry season (as observed during the site visit in late February 2014), water is supplied for only 1.5 hours each day. Long hours are spent by people in queuing for water, and with some queuing their pails way ahead of expected operating hours. This indicates the meager access to water supply in Salyan Town and the hardship that people face each day to have water. Outside the taps' operating hours, people resort to the nearby river to fetch water. Cases of water-borne disease are reportedly on the rise, particularly during the dry season when access to water supply is scanty1.

23. The existing public toilet at the bus park in Sitalpati is in poor condition, wanting of rehabilitation or replacement. This is the only public toilet in Sitalpati, the core market area of Salyan Town. It is an important facility to promote public health and sanitation.

24. From consultations with key government officials and random interviews with people, business owners and medical practitioner in the Subproject area, it was apparent that all were one in expressing the urgent need for improved water supply and sanitation in their town.

D. Overview of the Subproject

25. The Subproject will improve the water supply system of Wards 1 to 9 and improve the public sanitation facility of the bus park in Sitalpati, Khalanga Village Development Committee (VDC), Salyan District.

26. The Subproject has two components. The water supply component proposes a water supply system that will: (i) tap the groundwater resource with a safe yield of about 16 lps at Shreenagar area, near DomariKhola, through a dug well; (ii) apply basic treatment at the intake site; (iii) pump to bring treated water up to four ground reservoir tanks, one of which will have a capacity of 100 m3 and the remaining three with 50 m3 each; (iv) deliver treated water by gravity flow through a network of distribution pipes with a total length of 30 km; and (v) connect to 1,243 households. The second component will construct a new public toilet to an existing public toilet at the Bus Park, and septage disposal site.

27. The Project Management Office (PMO) of Department of Water Supply and Sanitation (DWSS) is the proponent of the proposed Salyan Town Water Supply and Sanitation Subproject. Implementation period will be two years, including operation and maintenance.

[1] Consultation with Dr. Ram Krishna Regmi, owner of Kantipur Community Hospital, Sitalpati

II. POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK

A. Nepal's Environmental Policy and Legal Framework

28. 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 provide the framework within which environmental assessment is carried out in Nepal are the:

- Environmental Protection Act (EPA), 1997, which requires a proponent to undertake IEE or environmental impact assessment (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, define the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007.

29. Other environmental policies, laws and rules that are relevant to the Subproject are presented in Table II-1.

30. 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 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 (ii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Millennium Development Goals, 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.

31. The Subproject does not and will not break or go against Nepal's commitment to these international agreements. It supports the country's effort to meet its committed target for MDG's seventh goal by 2015.

Table II-1:Other Relevant Environmental Policies, Laws and Guidelines of Nepal

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Water Resources Act	1992	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of EIA & preparation of EIA Report before granting license to use water resources for any purpose.	GoN IEE has been approved. Use of water resource has been granted by the District Office. 32.
		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 recharged by a perennial river. Existing wells are closer to the river than the proposed dug well for the Subproject.
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Sites for main structures have been acquired accordingly. Unidentified sites for office building, guard house, guard house cum building, will be acquired accordingly.
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	EMP prescribes the compliance with NDWQS and its Directives during operation.
Forest Act	1993	The Act prohibits the extraction of boulders, rocks, pebbles, sand or soil from 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.	Community Forest Users' Group has approved use of forest for the subproject. No trees will be cut. 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 eth EMP following the NDWQS Directives. GoN has approved the Subproject's IEE Report.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties & powers to: (i)	Provides basis for Local Government to

Policy/Law/Guideline	Year	Relevant Provisions	Remarks
		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.	monitor the environmental performance of the subprojects. EMP provides the responsibilities of 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.	ADB IEE is conducted to ensure environmental conservation and protection.
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE or EIA of proposed WSS projects in accordance with the EPA/EPR to: (i) incorporate consultations with key stakeholders, including end-point users; & (ii) specify measures to mitigate environmental impacts prior to, during construction & operation, as well as corrective measures.	GoN IEE has been approved. This ADB IEE will be submitted to ADB for review and approval.
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 eth 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.

(Year) Year last amended

B. Environmental Impact Assessment Requirements

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

1. Environmental Impacts Assessment Requirements of the ADB

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

35. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements 1 and the IEE is intended to meet these requirements.

Table II-2: SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that Subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction will be temporary & short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (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 alternatives is presented in Section III.
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	Key informant and random interviews have been conducted. A grievance redress mechanism (annex D)

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

SPS 2009 - Safeguard Requirements	Remarks
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.	for the resolution of valid Project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft EA (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	The draft IEE will be disclosed on ADB's website prior to Project appraisal. The GoN has approved the IEE Report. Copies of both SPS-compliant IEE and GoN-approved IEE will be made available at the offices of the PMO, PISU and WUSC for public consultation.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting and disclosure of monitoring reports are in this IEE.
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. Transmission main from RVT-Sitalpati to RVT-Intermediate passes through a community forest. The Community Forest Users' Group has given its consent for the Subproject to use the land for said component. No tree will be cut. However, ground cover and low shrubs in the subproject footprint and some work easement will have to be removed for the transmission main. Although in due time, ground cover is expected to naturally grow over the backfilled affected area, EMP recommends seeding of the re-surfaced area to accelerated re-growth.
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	The Subproject will not affect any physical cultural resource. The EMP recommends the measure/s to mitigate adverse impact on PCRs in case of chance find.

SPS 2009 - Safeguard Requirements	Remarks
of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	

2. Environmental Impact Assessment Requirements of Nepal

36. The Environmental Protection Rules (EPR) defines the environmental impact assessment process that should be followed in the preparation, review and approval of environmental assessment reports. The process applicable to the Subproject is summarized in Table II-3 below. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in Table II-4 and their details featured as Annex A.

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

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	Subproject requires an IEE.
If proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	Subproject has secured an approved ToR.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	Subproject carried out the IEE and prepared the IEE Report accordingly.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the concerned VDC or Municipality to the CSA.	Subproject submitted documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report. ➢ If review reveals project implementation to have no substantial adverse impact on the environment, CSA grants approval within 21 days from receipt of report. ➢ If review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.	Subproject's IEE Report has been approved, without having to undertake EIA.
Proponent implements approved IEE Report and any terms and conditions given with the approval.	Subproject has not started implementation.
CSA monitors and evaluates impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	Subproject has not started implementation.
MoSTE conducts environmental audit after two years of project commissioning/operation.	Subproject has not started implementation.

CSA Concerned Sector Agency
EPR Environment Protection Rules, 2054 (1997), with amendments in 1999 and 2007
MoSTE Ministry of Science, Technology and Environment
VDC Village Development Committee

Table II-4 Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005

Noise	National Noise Standard Guidelines, 2012	WHO Guideline Values on Noise Level
Drinking water quality	National Drinking Water Quality Standards, 2006	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011

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

III. ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

37. Salyan Town is the administrative center of the Salyan District and has developed as the market center for surrounding VDCs. It is facing significant development challenges: (i) the capacity of the existing water supply system is insufficient for its rapidly increasing population and urban development. Its residents, businesses and administrative and social services obtain water from 113 taps supplied by three existing sources with yield of about 4 lps (lesser in the dry season) and/or by fetching water from the rivers. (ii) Incidents of water-borne diseases are on the rise due to poor access to safe and potable water supply3; and (iii) the bus park is in urgent need of a sanitary public toilet.

38. **'Without-subproject' or 'do-nothing' alternative.** Doing nothing about these challenges would be allowing the Salyan Town to further develop as "under-serviced", the health of its residents and the general public at more risks, and its living environment, worsened. This would impede: (i) further social and economic development of Salyan Town and in effect, of Salyan District as the Town is the market center for surrounding VDCs; and (ii) Nepal's delivery of its commitment to MDG7 to increase the proportion of population with sustainable access to safe drinking water and basic sanitation.

39. **'With subproject' alternative.** With the Subproject, 1,243 households in Salyan Town will have convenient access to reliable and adequate safe and potable water supply and the Town's and surrounding VDC's bus commuters and workers will have access to a sanitary toilet facility. As a result, good hygiene and sanitation practices will be promoted; there will be reduced health and safety risks. Overall, the 'with subproject alternative' will bring about enhanced public health and living environment that will contribute to improved quality of life in Salyan Town. There will be indirect benefits to VDCs surrounding Salyan Town. Improved water supply and sanitation will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of Salyan Town will benefit from; thus, contributing to overall local economic development of the District.

40. The 'with subproject' alternative will contribute to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector and to the delivery of Nepal's commitment to MDG7.

B. Alternatives Relative to Planning and Design

1. Alternative Sources

[3] From random interview with Dr. Ram Krishna Regni, owner of the Kantipur Community Hospital, a 15-bed hospital located in Sitalpati. Interview was conducted by PPTA Environmental Specialists on 25 February 2014.

41. **Jarkhu Khola Source as Option 1.** The proposed Jarkhu Khola source is a perennial source located in Ward 9 of Hiwalcha VDC. It is more than 670 m below the Salyan VDC;hence gravity flow option to serve Salyan Town, as well as VDCs along the way would not be possible unless lifting of two to four stages is involved.

42. **Dug Well near Domari Khola in Sitalpati as Option 2.**Shallow wells dug in this area are observed to have been providing for daily water needs.

2. Water Quality

43. Water samples from the two alternative sources and an existing tap in Domri, Sitalpati were collected and tested during the feasibility study stage. The tests revealed quality of water from the three sources to be within the National Drinking Water Quality Standards and WHO Guidelines for Drinking-water Quality for the few physical/chemical parameters the samples were tested for.

Table III-1:Water Quality Data of Salyan

Parameter	Unit	Source of Samples			Standard/Guideline Value	
		JarkhuMul	Shallow Tube Well 2 - Sitalpati	Tap Water in Domri, Sitalpati	NNDWQS	WHO Guidelines
pH (23^{o}C)	-	8.0	7.3	7.3	6.5-8.5	None
Turbidity	NTU	1.0	<1.0	<1.0	5(10)	-
Electrical conductivity	uS/cm	421.0	327.0	288.0	1500	44.
Total hardness (CaCO3	mg/l	100.0	148.0	128.0	500	-
Ammonia	mg/l	0.02	<0.02	<0.02	1.5	NE
Chloride	mg/l	6.9	13.8	11.8	250	NE
Iron	mg/l	0.05	<0.02	0.02	0.3 (3)	-
Magnesium	mg/l	117.2	14.0	11.1	-	-
Calcium	mg/l	28.0	36.0	32.8	200	-
Arsenic	mg/l	<0.005	<0.005	45. <0.00 5	0.05	0.01

Source: Final Detailed Engineering Study of Salyan Town Water Supply and Sanitation Project

3. Water Supply System

46. Three options for the supply of water to cover Marke, Hiwalcha, Sizwal Takura, Khalanga and Sitalpati of the Salyan District were worked out and their respective energy requirements for effective operation were assessed.

47. **Option 1.**For the design period 2030, about 33.2 lps is required to cover the population of the covered areas. Option 1 proposes to integrate the existing source, about 5 lps, with the new system. About 16.5 lps is pumped from the JarkhuKhola spring source and about 12 lps ground water is pumped from the proposed dug well at Sitalpati to cover the population of Sitalpati area only.

48. **Option 2.**In this option, groundwater from Sitalpati will cover Wards 1-9 of Khalanga VDC and the spring water from JharkhuKhola will cover Sizwal Takura, Marke and Hiwalcha. However, implementation of this Option 2 will involve two phase

- In the first phase, the groundwater from deep tube wells (about 17.6 lps) at Sitalpati will cover Wards 1-9 of Khalanga VDC.
- In the second phase, the spring water from JharkhuKhola (10.6 lps) in Hiwalcha VDC needs to be lifted to cover the remaining service area in Hiwalcha, Marke and Sizuwal Takura.

49. **Option 3.**This option will pump about 28.2 lps of spring water from JharkhuKhola to cover the whole all five areas in Salyan District.

50. Among the three options, Option 2 will require least amount of electricity and fuel for effective operation.

Table III-2:Daily Power Required (in KWH)

Option	JarkhuKhola Source				Groundwater Source, Sitalpati		
	1st Stage	2nd Stage	3rd Stage	4th Stage	1st Stage	2nd Stage	3rd Stage
1	1521.84	1790.40	1700.88	1163.76	1253.28	0.00	0.00
2	1253.28	1432.32	1342.80	895.20	1611.36	358.08	358.08
3	2685.60	3133.20	2954.16	1969.44	0.00	0.00	0.00

Table III-3:Daily Power Required for Option 2 by Phase (in KWH)

	Second Priority per Water Supply Master Plan				First Priority per Water Supply Master Plan		
Option	JarkhuKhola Source				Groundwater Source, Sitalpati		
	1st Stage	2nd Stage	3rd Stage	4th Stage	1st Stage	2nd Stage	3rd Stage
1	984.72	1163.76	1163.76	716.16	1790.40	626.64	626.64

4. Selected Alternative Scheme

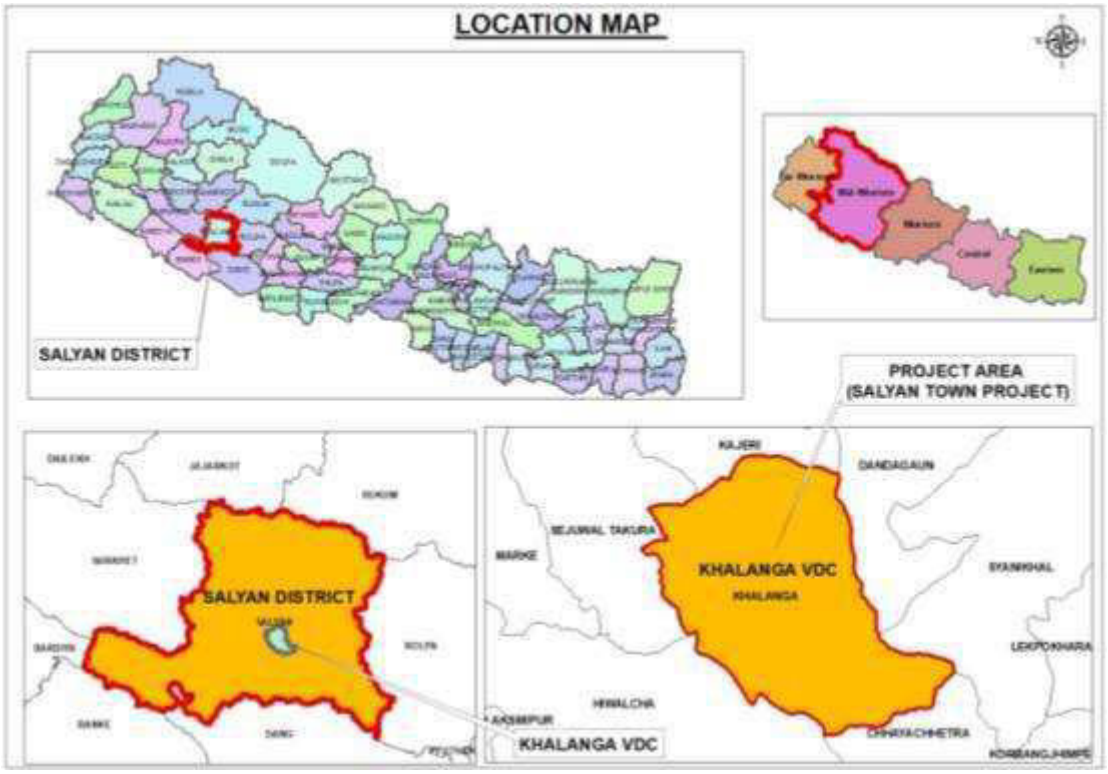
51. Considering the following: (i) source availability and reliability; (ii) water quality; and (iii) required energy requirements for effective operation, Option 2 has been selected. The first phase, using groundwater through a new dug well near DomaliKhola, has been selected for implementation under the 3rdSTWSSSP, following the priority ranking of the Water Supply Master Plan

IV. DESCRIPTION OF SUBPROJECT

A. Subproject Site

52. The proposed Salyan Town Water Supply and Sanitation Subproject will be implemented in Wards 1-9 of Khalanga VDC. The subproject site lies in the mid-west hills of Nepal along the Rapti Zone at an elevation of 1500 meters above mean sea level. It hosts the administrative headquarters of the Salyan District.

Figure IV-1. The Subproject Area



B. The Subproject

53. The Salyan Town Water Supply and Sanitation Project have been designed as a ground water based water supply system that will provide sufficient quantity and good quality of water to the residents of Khalanga VDC. The water supply component of the project consists of following construction components.

- Tube Well
- Pumps and Pumping System
- Borehole Platform
- Electrical Facilities
- Ground water Reservoir
- House (Private) Connection
- System Appurtenances
- Generator/ Pump Houses
- Water Quality Testing Laboratory
- Guard Quarter/Office Building
- Boundary Wall

54. The sanitation component of the project consists of a construction of a public toilet (1 No.) at the Bus Park. There is also procurement of one solid waste collecting vehicle and one septage carrying vehicle. It also has a provision for construction of sludge drying bed to deal with all the sludge generated from the waste water.

55. The salient feature of the project is given in Table IV-1

Table IV-1: Salient Feature

S.N.	Items	Description
A	**Project Detail**	
1	Name of the Project	Salyan Water Supply and Sanitation Project
2	Type	Ground Water
3	Study Level	Detailed Engineering Study
4	Location Area	
	Region	Mid-Western Development Region
	Zone	Rapti
	District	Salyan
	VDC/Municipality	Khalanga,SitalpatiKhalanga
	Ward	KhalangaSalyan VDC, Ward no.1- 9
5	Available Facilities	
	Road	Rapti Highway
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
B	**Detail of System & Design Component**	
1	Source Characteristics	
	Source Type	Ground Water at Sitalpati
	Number of Well required for design demand	1 Tube Well
	Standby well	1 Tube Well
	Source Location	Salyan VDC
	Safe Yield (lps)	16.73 lps
2	Type of Structures	
	a. Tube well	2
	b. Electricity line, Transformer and Generator	1
	c. Water Storage Tank (Capacity / Nos.)	100,50,50,50 Cum.
	d. Valve Chamber	47
	e. Guard House	2
	f. Guard House Cum Office Building	1
	g. Gen Cum Pump House	3
	h. Dosing house cum chemical storage	2
	i. Household Connection	1243
	j. Fire Hydrant	6
3	Pipe Line	
	HDPE Pipe (Km)	13.43
	GI Pipe (Km)	13.60
	DI Pipe (Km)	3.95
	Total	30.98
4	Social Status	
	Present Population (2012)	7817
	Base Year Population (2015)	8476
	Design Year Population (2035)	14779
	Growth Rate %	Khalanga-Sitalpati- 3.5% Khalanga- 1.7% **Average Growth Rate: 2.79%**
	Household Numbers (2012)	1256
5	Total Cost of the Water Supply Scheme	**NRs. 148,491,045**
6	Cost Sharing Arrangement	
	GoN Component (70 %)	NRs 103,943,731.20
	TDF Loan (25%)	NRs 37,122,761.14
	WUSC's Contribution for upfront (Cash 5 %)	NRs 7,424,552.23
7	Economic Analysis	
	FIRR	4.35%
	EIRR	18.61%
8	Environment	
	ADB Category	B, Only IEE necessary

S.N.	Items	Description
	IEE finding	No significant adverse impact.
9	Cost Per Unit/Per Capita Cost	
	For Base Year Population	17633
	Design Year Population	10113
10	**Total Cost of Sanitation Components**	
	Total Cost of Waste Water Management System of Immediate Needs	**NRs 13,274,340.61**
	GoN Component (85 %)	NRs 11,283,189.52
	Local Body contribution (15%)	NRs 1,991,151.09
11	**Total Cost of the Water Supply Scheme excluding Sanitation Components**	**NRs. 148,491,045**
12	**Total Cost of Project including Sanitation Components**	**NRs. 161,765,385.18**

Figure IV-2 Schematic Layout Plan of the Proposed Salyan Town Water Supply System

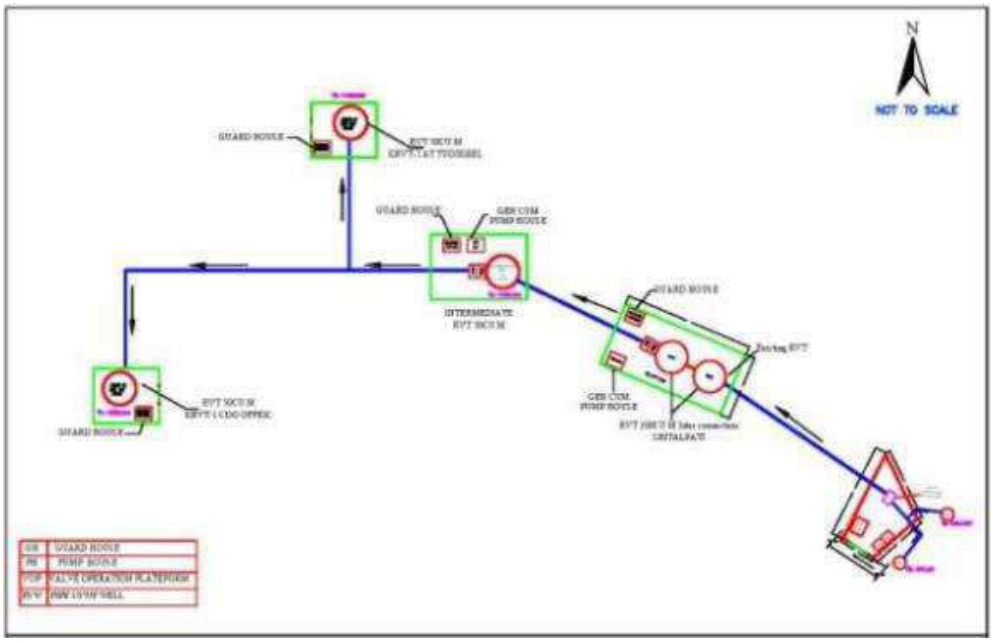


Figure IV-3 Subproject Layout within the Service Area

C. Description of Site and Surroundings

56. The specific sites of the main components are described below

Table IV-2: Description of Sites and Surroundings

Component	Description
Dug well	Located in a 0.0509 ha land belonging to WUSC. Land was purchased and registered in WUSC's name in 2013. Land remains to be cultivated by the former owner under the agreement that she can continue to cultivate the land until such time when construction starts. Surrounding areas are rice fields. A pedestrian bridge traverses over the site. Some bridge cables are overhead the site. Irrigation channels and 
Component	**Description**
Pump 1 and RVT-Sitalpati	Will be sited in Government land on a plateau. Site is used by the Community Forest Users' Group (CFUG). A no-objection letter has been issued to the WUSC for the use of the land for water supply works. The site will be beside an existing RVT. No sign of erosion of the vegetated plateau slopes. 
Pump 2 and RVT-intermediate	Site is over a plateau, where the Tribhuvan Higher Secondary School is situated. The RVT site is beside the school. No sign of erosion of the vegetated plateau slopes. Few trees and shrubs will have to be removed.

Pump 3 and KRVT 1	Site of 2 existing RVTs near a playground with a stage. Site is a plateau. No sign of erosion of the vegetated plateau slopes.


Component	Description
KRVT2	Site is beside an existing RVT situated within the District Office. (or foreground of the existing RVT as shown in the left photo below, which is currently used as shown in the right photo)


Transmission main	Through rice fields, open shrub lands. Figure III-3 shows water bodies crossed by some sections of transmission main and distribution pipeline. Slopes are stable. No signs of erosion as far as observed during site visit. WUSC also reported no erosion in Sitalpati and Khalanga.
Distribution pipes	Through the VDC core, within road rights-of-way. Existing road ROWs are narrow and without sidewalks. People are walking, vehicles are parked and informal economic activities operate on road carriageways. Power supply poles are immediately adjacent to or over road carriageways.

Sitalpati Bazaar

Khalanga

Component	Description
KRVT2	Site is beside an existing RVT situated within the District Office. (or foreground of the existing RVT as shown in the left photo below, which is currently used as shown in the right photo)

Existing public toilet at bus park to be replaced. Machine shop within 15m from existing public toilet.

Septage Management

57. Septage management site is planned by WUSC in consultation and consent of CFUG. There is no need to clear tress and the proposed site is barren land surrounded by trees. However for expansion of this facility, tree clearance is required for which prior approval and consent of CFUG shall be obtained. Since there is no private houses and property within the proposed site, the issues related to aesthetic, smell and other grievances may not arise. To give serious considerations for septage management in this subproject and to protect urban water, environmental and public health, an area has been identified in ward no 5 of Khalanga VDC close to Janaki Community Forest User's Group. An area of approximately 150 sq. meters is available to establish the septage disposal pit. Septage from household and public septic tanks will be collected by existing private contractors and disposed at this site.

58. The detail management plan is included in EMP of this project.

D. TheIEE Study Area

59. The IEE study area covers the environment that will potentially be affected by the horizontal (installation of transmission mains and distribution pipes) and construction/installation of point objects (dug wells, treatment unit, ground reservoir tanks, pumps and appurtenances such as office building, laboratory unit, guard house and generator house). The study area is also referred to as Subproject's "main area of influence", covering component sites, i.e., footprints as shown in Figure III-3 and areas within 200 m from their edges, considering the potential reach of noise, dust and socio-economic impacts. From visit to component sites and review of satellite maps, the potentially affected resources within the main areas of influence include natural and artificial resources as shown in the table below.

Table IV-3:Identified Potentially Affected Resources in the Main Areas of Influence

Component Site	Resource
Dug well	Rice farmers, rice fields and rice plants
	Irrigation channels
	Cables of the pedestrian bridge
	Accesses to the rice fields
Pump 1 and RVT-Sitalpati	Existing RVT

	The community forest section within 200 m from the edge of the component's footprint
Pump 2 & RVT-Intermediate	Tribhuvan Higher Secondary School
	Students, teachers and visitors of the school
	Few trees and low shrubs
Pump 3 and KRVT 1	2 existing RVTs
	RVT caretaker's house
	Existing playground stage
	Existing orphanage beside the entrance to the site
	Residents within 200 m from the component's footprint
Pump 4 and KRVT 2	District Office building/s, officials, staff & visiting public
	Existing RVT
	Residents within 200 m from the component's footprint
Septage Management	Ward no 5, Khalanga VDC, Close to Janaki Community Forest User Committee

E. Environmental Category and Requirements

60. **Environmental Category and Environmental Assessment Requirements.** Under ADB classification, the Subproject is a Category B undertaking and an initial environmental examination (IEE) is required for ADB review and approval. Under GoN policy, the scope/scale of the Subproject is within the threshold of subprojects requiring an IEE as listed in Schedule 1 of the EPR. The GoN has approved the Subproject's IEE Report.

61. **Other Approval/Clearance/Permit Requirements.**The Subproject requires and has acquired the following: (i) approval to use/extract groundwater resource from the District Office; (ii) consent from the Community Forest Users' Group to use portions of the community forest for water supply works, and septagedisposal. No trees in the affected community will be cut to clear the way for the transmission main; hence, no tree-cutting permit is needed.

V. DESCRIPTION OF THE ENVIORNMENT

A. Physical and Chemical Environment and Resources

1. Landforms and Topography

62. Salyan is a hilly district, lying about 320 km west in Rapti zone of Nepal mid-western region, extending between 28° 31' to 28° 53' north latitude and 82°0' to 82°46' east longitude. The district has a steep terrain valley with the Siwalik Range surrounding the district.

63. Sitalpati and other fringe settlements are on the flat to nearly flat plain west of the SaradKhola. flat to nearly flat. The main Shreenagar Road which traverses through the Sitalpati/Shreenagar Bazaar very gently slopes towards the south and towards the SaradKhola in the east. The dug wells and treatment unit will be over flat plains. The transmission main will run a long stretch of the flat plain before rising through moderate and slightly steep slopes towards the plateaus on which the four ground reservoir tanks will be sited. From site reconnaissance, existing transmission mains to the reservoir tanks have not exhibited signs of erosion. Slopes are assessed as stable, and are largely vegetated.

2. Geology and Soils

64. Salyan is mostly dominated by clay soil along with boulders. Based on field observations during Subproject feasibility study, the project area has flat alluvial land consisting of 1-1.5 m thick top soil underlain by gravel, cobble and boulder of about 25.0 to 30.0 m thick in the center and slightly thinning outward to the foothills around the Srinagar valley and followed by bed rock. Highly fractured sufficient joints and faults show highly permeable rocks around the areas

3. Climate

65. The climate of Salyan ranges from sub-tropical to mild temperate. The mean air temperature recorded in the district in 2000 was a maximum of 23.4°C and minimum of 13.6°C. Mean daily temperature was 18.5°C. Extreme temperature records show a maximum of 35°C in May 1999 and minimum of 1.6°C in January 1999. In 2000, precipitation totaled to 1,483 mm, with the month of July registering a maximum precipitation in 24 hours of 69 mm.

66. The subproject area is located at the foot of Salyan Hills. The annual mean temperature is around 20°C with max temperature of 35°C and minimum temperature of 6°C. May is the hottest month. Annual rainfall is about 1,700 mm. About 80% of annual rainfall occurs during monsoon period.

4. Water Quality

67. The more prominent rivers in Salyan District include the: (i) Babai River that flows through the southwest section of Siwalik Range after draining Dang Valley; (ii) SharadKhola that drains the eastern half of Salyan's hill region including the District's administrative center in Khalanga VDC, then exits these hills by traversing through the Mahabharat Rang to its confluence with the Babai River. The Bheri River drains the western half of Salyan's hill region. The Sharad River is close to Sitalpati. It is a source of water to Sitalpati residents.

68. The Subproject footprints are crossed by streams at several sections of the distribution pipelines.

69. During feasibility study of the Salyan Town Subproject, water samples from three sources, namely JarkhuMul, Shallow Tube Well 2 in Sitalpati and Tap water in Domri, Sitalpati, were collected and tested for a few physical and chemical parameters. The results, presented in Table III-1, show that the tested parameters were within the limits set in the NDWQS. The water samples were not tested for microbiological parameters. For drinking, residents boil their water. However, according to an interview with a doctor the owner of Kantipur Community Hospital in Sitalpati, water borne disease cases are on the rise, especially during the dry season.

5. Air Quality

70. There are no industries in Salyan Town. Air pollution is caused by fugitive dust from vehicle movements particularly over unpaved roads and other unpaved grounds, construction activities, street sweeping and wind action on unpaved exposed surfaces. Gas emissions come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered/spread apart both in terms of locations and timing. From field observation, the ambient air quality of the area is considered to be within the National Air Quality Standard of Nepal.

6. Acoustic Environment

71. The sources of noise in Salyan Town are the construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market places in Sitalpati and Khalanga and only in the daytime. At nighttime, noise is generated with the arrivals and departures of buses at the bus park. From field observation, noise level in Salyan District is within the national and international permissible standards at daytime and nighttime.

B. Ecological Environment and Resources

72. **Flora.** Salyan Khalanga is blessed with natural beauty of floral diversity. The most dominant species include uttis (*Alnus nepalenesis*), Kattus (*Castonopsis indica*), Sal (*Pinus roxburghii*), Jamun (*Syzygium cuminii*), Churee (*Bassia butyracea*). The forests are mainly categorized as government forest and community forest. People of the district are mainly dependent on the forest for NTFP products. The forests provide timber, wood, agriculture implements, fuel wood, fodder, animal beddings, fruits, food items, forage for grazing, medicines and so many other products and services. Salyan located in the mid-western region occupies a total of 195,178 ha of land area, of which 128,204 ha (or 65.68 per cent) of total land area is forest.[4] Salyan is rich in Chirpine (local name: Khote Sallo), covering more than 75 per cent of the total forest land. Chirpine, a multipurpose tree species is found between 900m and 1950m above sea level. In Salyan, Chirpine forests are important resources of livelihood to local people. Its major products are timber and resin, firewood, twigs and needles for animal bedding and mulching especially for ginger, torch light from heartwood (locally called diyalo or jharko). It can grow on dry, low fertile and degraded lands where other broadleaf species rarely grow. On the western side of the Salyan district, a very renowned medicinal plant Timur (*Zanthoxylum armatum*) is found, whose fruits, seed and bark are commonly used in wide range of pharmaceutical preparation

Pump 1 and the RVT-Sitalpati will be sited in the Patneri Community Forest. The transmission main from Pump 1 to Pump 2 will cross through the same community forest. This community forest covers an area of 55 ha and has approximately 5,300 trees of different species in it.5 The community forest is well protected and no such hazards were noted within the boundary of community forest. The construction works will not involve cutting of trees. The transmission main alignment is sparsely treed.

73. **Fauna.** The District reports Ghoral (*Nemorhaedus goral*), Chituwa /common leopard (*Panthera pardus*), Ratuwtuwa/Barking deer (*Montiacus muntjak*), Rabbit (*Oryctolagus cuniculus*), Jackal (*Canis aureus*), Jungle Cat (*Felis bengalensis*), Bandar/Monkey (*Macaca mulata*), Nyauri/Mongoose (*Herpestes fuscus*) to be some of the fauna that can be found in Salyan District. Bird species include Koili/Asian Koel (*Eudynamys scolopaceus*), Fisto/Dusky Leaf warbler (*Phylloscopus fuscatus*), Kaag/House crow (*Corvus splendens*), Bhangera/house sparrow (*Passier domesticus*), Kanthe Dhukur/Eurasian Collared Dove (*Streptopelia decaocto*), Bakulla/cattle egret (*Bulbulcus ibis*).

The River Sarda is habitat for such fish species as Asala (*Schizothorax progastus*), Raj Bam (*Angullia bengalensis*), Buduna (*Schizothorax plagiostomus*), Cabre (*Pseudecheneis sulcatus*),

[4] Source: DFO/ Salyan 2008

[5] Field observation and consultation with the Chairman of the community forest

Jhingay, Charungoo, Potay, Chilnay, Garela, Jhojo according to the local respondents near Sarda River and its tributaries. The common butterflies in the project area include, among others, common sailor (*Neptis hylas*), common peacock (*Achillide spolyctor*), small grass yellow (*Eurema brigitta*), common mormon (*Papilio polytes*).

74. **Protected Area.**The Subproject will not encroach into, or be in close proximity to, any protected area. The Banke National Park, the nearest protected area, is about 69.34km away from Salyan Town.

C. Physical Cultural Resources

75. Salyan is known for KubindaDaha. It is one of the most important cultural heritage sites. Many tourists yearly visit this place. The district is known for its Hindu temples including Shiva temples in Chhayachhetra and Laxmipur and the Devi temple at Khairabang in Hiwalcha VDC, one of nine in Nepal. The Subproject will not encroach into, or be in close proximity to any physical cultural resource.

D. Socio-Economic Environment and Resources

1. Land Use Pattern, Sectors of the Economy and Accessibility

76. The land use pattern of the Salyan District shows transformation from rural to urban areas, especially in the Khalanga VDC. Salyan bazaar has expanded along Khalanga VDC, particularly when the existing water supply system was made operational. Within the cultivation area, there are clusters of compact settlements connected with earth or graveled roads, indicating the inclination towards urbanization and increase in the settlement growth.

77. Only a few industries are found in the Salyan District. These are: (ii) agro-processing industries, such as grinding mills for rice, mustard seed and other agricultural produce (ii) six poultry farms; and (iii) fifteen brick kilns. The agricultural sector contributes largely to the local economy. The size of cultivated land in Salyan District is 34,383 ha, of about 23 percent of total land area of the District. Wheat, maize, paddy rice, barley, millet, potato, ginger and beans are the major crops. Other various crops, such as radish, French beans, bitter gourd, onion, garlic and long yard beans are also grown. Activities in the services sector are concentrated in the bazaars at Sitalpati and near the District Office.

78. Accessibility. Salyan Town is accessible by land through the Rapti Highway. The Town has bus connections to Tulsipur, Ghorahi and Mahendra Highway. The nearest airport is in Dang District, which borders the Salyan District on the south, and which has flight connection to and from Kathmandu.

2. Population

79. Salyan District has a total population of 293,700 in 2012. The settlement pattern in the District is such that population tends to concentrate along or near to the district headquarter in Khalanga VDC. There are 15,230 people in Khalanga VDC, including rental (or non-permanent resident) population. The permanent resident population totals 7,817 (or a little over 50%). The subproject area, Wards 1-9 of Khalanga VDC, has a total number of 1,256 households in 2012, or an average family size of 5.2. Of the nine wards, Ward 3 has the highest number of household followed closely by Ward 5.

Table V-1:Total Number of Households per Ward in the Subproject Area

Ward	Total

1	2	3	4	5	6	7	8	9	
118	177	235	141	220	104	49	86	126	1,256

Source: FS Socio-Economic Survey 2012

3. Caste and Ethnicity

80. The Brahman, Chhetris, Giris, Puris, Rais, Magars, Gurungs, Kamis, Damais and Sharkis are the main cast/ethnic groups. According to the FS Socio-Economic Survey in 2012, Chhetris/ Brahmans/Sanyashis (others) jointly constitutes about 78.96 percent of the total project area population. Besides these groups, Rais, Magars, Newars, Sarkis, Damais, and Muslims are the minor ethnic groups. The surrounding villages are populated by a variety of castes and ethnic group. In total Chhetris cover up mostly half of the population while Newars, Brahmins, Dalits and other ethnic minorities make up roughly the rest half.

4. Occupation/Employment and Income

81. According to the FS Socio-Economic Survey in 2012, heads of households in the subproject area have shown diversity in occupation. Some 25 per cent of the total population is involved in agriculture; another 25 percent in business; and yet another 25 per cent in services. A small portion, less than 1 per cent, is in the industry sector. About 3.50 percent are employed overseas; while a little over 10 percent are employed. is involved on daily wages and 10.35 % on others.

5. Access to Basic Services

82. **Health.**There are one district hospital with 18 beds, one community hospital, one ayurvedic hospital, one veterinary hospital and four primary health posts within the district. Apart from the aforementioned, there are two private hospitals, one of which is the Kantipur Community Hospital with 15 beds located in Sitalpati.

83. **Education.**In Khalanga VDC, the educational facilities are satisfactory. Of the total respondents to the FS Socio-Economic Survey in 2012, a little over one-fifth has completed secondary level of education; and nearly one-fifth, primary level. About 10 percent have obtained Bachelor's degree; while nearly 3 per cent attained Master's degree.

Table V-2:Educational Attainment of Survey Respondents

Level	Number	Percentage
Illiterate	79	9.92
Literate	95	11.93
Primary	144	18.09
Secondary	167	20.97
SLC	117	14.69
IA	89	11.18
BA	81	10.17
MA	21	2.63
Others	3	0.37
Total	796	100.00

Source: FS Socio-Economic Survey 2012

84. **Water Supply.** In Khalanga, there are two existing water systems constructed by DWSS in 1973-1976 and 1995-1997, respectively named as BhangeriKhola System and Chisapani Spring System. A piped water supply system, called the Kaliaiselu Stream System, is also in operation in Sitalpati, built by WSSDO, Salyan in 1995-1997. All three

systems are not well managed. The quantity of supplied water is insufficient to meet demand; while the quality does not fully meet the NDWQS. The WUSC-Sitalpati is managing the system with constraints, especially in dry season.

85. The existing water supply system of Salyan Town supplies water through 133 taps, of which 34 is dedicated to government offices and the rest for the public. Each day, water is supposed to be supplied or made available from the taps for 1.5 hrsn the morning and 1.5 hours in the evening, Mondays through Sundays. In the dry season (as observed during the site visit in late February 2014), water is supplied for only 1.5 hours each day. Long hours are spent by people in queuing for water, with some queuing their pails way ahead of expected operating hours. This indicates the meager access to water supply in Salyan Town and the hardship that people face each day to have water. Outside the taps' operating hours, people resort to the nearby river to fetch water.

86. **Sanitation Services.** Majority of the households have their own toilets in or outside the house. In the core, most of the buildings have been constructed with attached water sealed toilet or flush toilet with septic tanks. The latrine or toilet coverage in the subproject area is some 56 per cent. The rest of the households do not have any type of sanitation facility in their premises. This absence of latrines has forced the concerned households to resort to open defecation. Water-borne disease cases are on the rise, particularly during the dry season when access to water supply is scanty. The subproject area has only one public toilet, situated at the bus park; however it is wanting of replacement or rehabilitation. The effort towards the initiation to adopt proper sanitation system can still be found because children at school are being made to practice it, since every school and college has at least one toilet.

87. **Drainage.**Urban drains, in the form of open lined roadside drains, exist only in Sitalpati, specifically along the main road. These are approximately 500 m in total length. To a large extent, therefore, the subproject area drains naturally, particularly in the hilly areas. The conditions of the open drains in Sitalpati apparently require maintenance, clearing them of the accumulated debris and solid wastes. Some sections need rehabilitation or repair.

88. **Solid Waste Management.**There is no proper system of solid waste collection and disposal. Some house and shop keepers have arranged to manage their solid wastes and dispose of them at the landfill site in Ward 5 of Khalanga VDC, which is on the way to Luwaping place near the old Bus Park. Hospital wastes are sometimes openly dumped together with municipal refuse. Solid wastes from the bazaar area are collected regularly to avid the nuisance of odor. These are, however, disposed of at any vacant land, including river banks. The VDC has proposed new location for solid waste dumping site at Ward 5 of near Panikhola.

89. **Power Supply.**Almost all houses in Salyan are connected to the grid. However, power supply is intermittent, provided only during the daytime. Some households and businesses have acquired solar system to have lighting at night. Power supply poles are sometimes encroaching onto road carriageway.

90. **Telecommunication Services.**The subproject area has good access to telecommunication services. There are more than 500 telephone lines in the District and these are augmented by mobile telephones. Most of the organizations in the district have telephones and internet connections.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Positive Environmental Impacts and Benefits

91. There will be opportunities for local employment and increased earnings of local enterprises during construction. When completed, the Subproject will bring about the following environmental benefits, impacts and outcomes:

- Water supply
  - The benefit of having access to reliable and adequate supply of safe and potable water;
  - Promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and
  - Enhanced public health, improved quality of life and safe communities as outcomes.
- Sanitation
  - the benefit of public commuters having access to improved sanitation facility;
  - promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and
  - enhanced public environment (bus park environment), enhanced public health and safe communities as outcomes.

92. Overall, the Subproject will lead to enhanced public health and urban environment, significantly contributing to a qualitative improvement in the lives of Salyan Town residents.

93. To sustain the positive outcomes, effective operation and maintenance guided by an O&M Manual that contains Water Safety Guide, among others, is essential. Continuing hands-on training of WUSC in EMP implementation particularly water quality monitoring is necessary. This should be an integral component of Output 2.

B. Impacts/Issues/Concerns and Mitigation Measures Relative to Siting, Planning and Design

94. The Rapid Environmental Assessment (REA) Checklists for water supply and sewerage were used to identify potential impacts/issues/concerns of the Subproject. (Annexe A). The REAs identified the issues and concerns that should be considered during design, impacts that should be mitigated during construction and impacts that should be mitigated or enhanced during operation. Table III-1 presents the measures taken during project preparation and IEE to mitigate them.

95. Relative to design, the salient concerns would be the inadequate consideration/ incorporation in the respective designs of the REA-identified impacts/issues/concerns that should be considered during design (Table III-1) and the following:

(i) Yield of source, particularly in a scenario of climate change induced drought.
(ii) Existing users of the groundwater resource in the vicinity or upstream;
(iii) Social considerations of nearby population and service providers and their opinions;
(iv) Vulnerability to damage during earthquake;
(v) Existing utilities adjacent to or encroaching the footprints of horizontal works; and
(vi) Sustainable source/s for construction aggregate materials.

C. Impacts/Issues/Concerns and Mitigation Measures during Construction

1. Non-Compliance with Relevant Environmental Legislation

96. This issue/concern will arise when there is lack of awareness of Project and Subproject staff and management on environmental safeguard requirements, compliance with the requirements and/or conditions specified in IEE Report approvals and consent for use of the community forest are not maintained and monitored. Measures to mitigate this concern include: (i) capacity strengthening of the PMO Environmental Officer and his/her counterpart at the subproject level; and (ii) ensuring the necessary additional approval/permit/registration is obtained should subproject have major change.

2. Erosion Hazards

97. Albeit existing transmission mains and distributions pipes on sloping terrain in Khalanga VDC have remained stable and not exhibiting signs of erosion, potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution pipes.

98. Some mitigation measures include: (i) confining terrain disturbance according to a Staking Plan and Excavation Segmentation Plan and implement Erosion Control Plan that should all be part of the Contractor's EMP (C-EMP) and should have considered the surface drainage routes and patterns; (ii) keeping pipe laying works as close as possible to excavation works and vice versa; (iii) stabilizing disturbed slopes immediately after installation and backfill and use erosion control blankets or re-vegetate and use vegetation promotion blankets; and (iv) control water at the top of the site by diverting the flow far elsewhere.

99. Outside Subproject footprints, quarrying and borrowing activities to supply the aggregate demand of the Subproject would involve land disturbance that could cause erosion and/or landslide. Contractor must coordinate with MoSTE on restrictions in quarrying and the legitimacy of extraction operations of identified sources. He/she must secure permit to quarry/borrow if he/she proposes to extract aggregates and implement a quarry site restoration plan, which should be part of the C-EMP.

Table VI-1:REA-identified Impacts/Issues/Concerns and Mitigation Measures Taken during Project Preparation and IEE

REA identified Impacts/Issues/Concerns	Measures taken during FS and IEE to mitigate impacts/issues/concerns
Water Supply Issues & concerns that should be considered during design	
Unsatisfactory raw water quality	During FS stage, water samples from 3 sources were tested. Tests revealed quality of water samples to be within NDWQS and WHO Guideline values for the few parameters they were tested for.
Delivery of unsafe water to the distribution system	Design includes basic treatment using Ca(ClO)2 and proposes lab unit and kits. This IEE proposes "hands on" training by a licensed laboratory for the first few years of operation under Output 2, & continuing training thereafter.
Inadequate protection of intake structures	Intake well has adequate land for perimeter fencing.
Health hazards arising from inadequate design of facilities for receiving, storing and handling of Cl& other	Design has included a "housed" dosing unit. 100.

REA identified Impacts/Issues/Concerns	Measures taken during FS and IEE to mitigate impacts/issues/concerns
hazardous chemicals	
Delivery of water to distribution system, which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed a better quality GI, DI, and HDPE pipes.
Community safety risks due to both accidental and natural hazards	Design proposes perimeter walls for all point works.
Impacts that should be mitigated during construction Impairments associated with transmission lines and access roads	EMP incorporates mitigation measures.
Workers health and safety hazards	EMP incorporates mitigation measures.
Noise and dust	EMP incorporates mitigation measures.
Increased road traffic	EMP incorporates mitigation measures.
Social conflicts of workers from other regions/countries	EMP incorporates mitigation measures.
- Risks to community health and safety due to transport, storage and use and/or disposal of materials such as explosives, fuel and other chemicals	EMP incorporates mitigation measures.
- Community safety risks due to both accidental and natural hazards	EMP incorporates mitigation measures.
Impacts that should be mitigated/enhanced during operation Excessive algal growth	EMP incorporates mitigation measures.
Increase in production of raw sewage	EMP incorporates mitigation measures.
Inadequate disposal of sludge from water treatment	EMP incorporates mitigation measures.
Occupational health and safety hazards from handling &U management of Cl, other contaminants, and biological and physical hazards during project construction and operation	EMP incorporates mitigation measures.
Delivery of unsafe water due to poor O&M treatment processes	EMP incorporates mitigation measures.
Delivery of water to distribution system, which is corrosive due to inadequate attention of feeding of corrective chemicals	EMP incorporates mitigation measures.
Increased sewage flow due to increased water supply	EMP incorporates mitigation measures.
Increased sullage	EMP incorporates mitigation measures.
Risks to community health and safety due to transport, storage and use and/or disposal of materials such as explosives, fuel and other chemicals	EMP incorporates mitigation measures.
Sanitation Impacts that should be mitigated during construction Noise, vibration and dust	EMP incorporates mitigation measures.
Social conflicts between construction workers from other areas and community workers?	EMP incorporates mitigation measures.
Health & safety hazards to workers from toxic gases and hazardous materials	EMP incorporates mitigation measures.
Impacts that should be mitigated/enhanced during operation Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?	EMP incorporates mitigation measures.
Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water	EMP incorporates mitigation measures.
Contamination of surface and ground waters due to sludge disposal on land	EMP incorporates mitigation measures.

3. Impacts on Air Quality

101. **Dust.** 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, borrowing. The significance of dust impact will be high in the bazaar areas where more population reside and work and where urban socio-economic activities concentrate.

102. Some mitigation measures include: (i) confining earthworks according to a Staking Plan and Excavation Segmentation Plan that should be part of the 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; and (vii) limiting speed of construction vehicles in access roads and work sites to maximum of 30 kph.

103. **Odor and gas emissions.** This will be a salient impact during demolition of existing public toilet and septic tank at the bus park. To mitigate odor and gas emissions, prior to demolition: (i) clean and disinfect the existing public toilet well; (ii) pump septic tank empty of liquids and solids and dispose of the pumped out materials properly; (iii) Open break the bottom of the emptied septic tank and fill with granular material and leave it that way permanently (if to abandon it in place); (iv) If to remove the septic tank and soak pit, remove also the surrounding soil and haul and dispose of it accordingly.

4. Noise

104. Noise-emitting construction activities include earthworks, rock crushing, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be high in areas where noise-sensitive institutions such as health care and educational facilities are situated.

105. Some mitigation measures include: (i) using equipment that emit least noise, well-maintained and with efficient mufflers; (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; and (v) minimizing drop heights when loading and unloading coarse aggregates.

5. Impacts on Water Resources

106. **Impacts on Surface Water Quality.**Some sections of the distribution pipeline will cross water bodies, exposing these resources to risks of pollution caused by: (i) poorly managed construction sediments, wastes and hazardous substances; and (ii) poor sanitation practices of construction workers. Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.

107.

108. Some mitigation measures include: (i) disposing of spoils or excess soils as free filling materials as soon as possible; (ii) locating temporary storage areas on flat grounds and away from main surface drainage routes; (iii) shielding temporary storage areas with sandbags &/or silt fence; (iv) implementing an eco-friendly solid and hazardous waste

management, disposing them promptly; and (v) providing adequate water supply and sanitation facilities at work sites.

109. **Impacts on River Morphology and Hydrology.**Quarrying from riverbeds could cause the alteration of a river's morphology and hydrology. WUSC has suggested the Sharda River as source for natural aggregates sand and gravel. Currently people are manually quarrying sand and gravel from Sharda River, the magnitude of which is much less than would be expected from quarrying to meet Subproject's needs.

110. Suggested mitigation measure is to coordinate with MoSTE and local authorities regarding restrictions in quarrying from Sharda River. As much as possible, alternative source should be identified. An Aggregates Management Plan should be part of the C-EMP. Contractor's should be required to obtain aggregates only from sources with environmental clearance and license to operate and that still have a high ratio of extraction capacity over loss of natural state.

111. **Impacts on the Quality of Groundwater Resource:** There are no private and public groundwater wells that will be affected by the Subproject. Potential groundwater contamination at the dug well site will be caused by the use of dirty or contaminated drilling equipment. To mitigate: (i) ensure drilling equipment is cleaned well and will be free of contaminants such as grease, sewage and chemicals, prior to drilling; and (ii) dispose of spoils and wastes at the end of each day's work.

112. **Impacts on stored water in adjacent ground reservoir tanks (RVTs).**Construction of new ground reservoir tanks will potentially exposed the water stored in adjacent existing RVTs. Aside from applicable measures to mitigate impacts on surface water quality (mentioned above), adequately hoarding the existing RVTs and providing sandbags in their perimeters would mitigate sedimentation and/or contamination of stored water in adjacent RVTs.

6. Impacts on Flora and Fauna

113. Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling, and Illegal harvesting of community forest resources as fuel for cooking by workers will result in unnecessary loss of vegetation beyond Subproject footprints. No tree along the transmission main alignment through the community forest will be cut

114. Some mitigation measures include: (i) physically and clearly marking limits of subproject footprints and work easements; (ii) installing clear signage and markers to direct traffic movement in sites; (iii) designating stockpiling areas; (iv) replanting at least 5 trees in the vicinity for every tree cut and taking care of the newly planted seedling during the construction period; (v) re-vegetating disturbed slopes and grounds, as applicable.; and providing alternative fuel to workers for cooking.

115. No terrestrial fauna and bird species in the community forest will be affected. Mitigating impacts on aquatic species in crossed water bodies is discussed under impacts on water quality. Hunting and poaching by workers will be strictly prohibited.

7. Impacts on Physical Cultural Resources

116. Subproject will not encroach into, or be in close proximity to, physical cultural resources. In case of chance find, work should be stopped at once; relevant work site

hoarded securely; and VDC informed immediately for proper action. No chance find has ever been reported or heard of, according to the WUSC.

8. Impacts on the Socio-Economic Environment and Resources

117. **Slow mobility in the core areas, blocked accesses to properties and work sites, local flooding, utility service disruptions.** These will result from excavation works, stockpiling, movement and parking of construction vehicles and equipment, and/or accidental damage of existing utilities (e.g., power supply poles, open drains and water taps or hoses). Nuisance and safety hazards are the indirect impacts.

118. Some mitigation measures include: (i) preparing a traffic management scheme jointly with local authorities; (ii) posting of traffic flagmen during the entire working hours; (iii) providing safe success to affected properties; (iv) managing stockpiling; (v) leading pumped water from excavations to drains or storing in drums for use in watering dry surfaces; (vi) coordinating the relocation of affected power supply poles, embedded private water hoses prior to excavation; and (vii) in case of accidental damage to existing utilities, advise concerned authority at once.

119. **Community health and safety hazards.**Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; local flooding; service disruptions; and potential fire and explosion, among others. Communicable and transmittable diseases may potentially be brought into the community by construction workers.

120. Mitigation measures include: (i) Contractor's implementation of the ADB-cleared C-EMP; (ii) adequate lighting, temporary fence, reflectorized barriers and signage at active work sites; (iii) Contractor's preparedness in emergency response; and (iv) adequate dissemination of the GRM and Contractor's observance/implementation of the GRM.

121. **Workers' Health and Safety Hazards.**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 non-observance 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.

122. In addition to 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 water supply and sanitation facilities at caps and work sites; (iv) arrange with nearest health center and hospital for health care and emergency care of workers.

123. **Impacts on the Sustainability of Works.** During construction, seismic event may occur, causing damage or movement to unsettled/unfinished/uncured and/or completed structures and affecting their structural integrity. After every seismic event, Contractor must conduct engineering investigation of built structures and implement the necessary corrective actions without delay.

D. Impacts/Issues/Concerns and Mitigation Measures during Operation

1. Non-compliance with relevant environmental legislation

124. This issue/concern will arise when there is lack of awareness of Project staff and management of completed works on environmental safeguard requirements, compliance with the requirements and/or conditions specified in IEE Report approvals and registration for use of water resource. Measures to mitigate this concern include: (i) capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and (ii) ensuring compliance with NDWQS, applicable conditions in IEE approvals and registration for use of water resources.

2. Delivery of Unsafe Water

125. Unsafe water delivered due to any one or combinations of the following will impact on public health: (i) accidental human error in chlorine dosing; (ii) accidental spill of hazardous substances; (iii) leaks in the system; (iv) lack of environmental quality monitoring; (v) inadequate maintenance and housekeeping; and (vi) deteriorating quality of groundwater resource without parallel upgrade of water treatment.

126. Some mitigation measures include: (i) ensuring competent/cautious handling and storage of Calcium Hypochlorite and qualified persons to implement/oversee disinfection; (ii) providing safe storage for chemicals; (iii) ensure capacity to implement quick response to hazardous substance/waste spills; (iv) implement SPS-compliant EMP; (v) monitor raw water quality.

3. Non-sustainability of Services or Completed Works

127. This issue will arise with Operator's disregard of the impacts of the following on operation: (i) climate change-induced drought; (ii) increased uncontrolled private extraction of groundwater; and (iii) seismic events. To mitigate, WUSC to monitor yield closely especially in the dry season and during a climate-change induced drought. After every seismic event, WUSC should conduct engineering investigations of completed works and implement the necessary corrective actions without delay.

4. Occupational Health and Safety Hazards

128. Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards. Mitigation measures include: (i) installation of clear, visible signage in premises on observance of safety measures; and (ii) setting up of mechanism for quick response to chemical and hazardous substance spills.

5. Odor and Health Hazard

129. The inadequate maintenance and upkeep of the new public toilet at the bus park will cause odor, invite pests to the facility, creating public nuisance and health hazard. Lack of maintenance of the septic tank will lead to non-sustainability of the effectiveness of the septic tank in primary treatment of sewage. Some mitigation measures include (i) maintaining the cleanliness of the public toilet and its immediate vicinity; and (ii) desludging of the septic tank promptly, ensuring pumped out materials are disposed of properly.

130. **Traffic Management Plan (TMP):** TMP shall be developed and followed during the construction period of the project. Outline of sample TMP is attached in annex E of this document

131. **Spoil Management Plan (SMP):** Spoil will be managed properly during the construction period of the project. The sample SMP is enclosed in annex F of this document.

E. Indirect, Induced and Cumulative Impacts

1. During Construction

132. **Indirect and Induced Impacts.**The volume of vehicle movements that will be generated from the simultaneous construction at eight subproject component sites will create choke points at the narrow access roads and slow down mobility of people, good and services, particularly in the bazaar areas. A greater number of people will be exposed to safety hazards from constricted road space. Coupled with disruption of economic activities and social services from extended interrupted power supply due to relocation of power poles and/or likely accidental damages, production outputs will suffer some slowdown. Severe dust falling on rice plants and other crops in the vicinity of subproject footprints would have some effect on the crops' yields. Apart from the applicable mitigation measures from among those mentioned for direct impacts, proper coordination with the relevant ward authorities, social service institutions and businesses should enable further mitigation of indirect and induced the impacts. Social preparation of communities potentially affected by indirect and induced impacts during construction.

133. **Cumulative Impacts.**There are no known ongoing or proposed developments in Salyan Town as well as planned extension of the subproject as yet. Hence, cumulative impacts will arise mainly from the construction of main Subproject components and associated facilities. For purposes of common understanding in subsequent paragraphs: (i) Subproject's "main area of influence", as defined in Section IV-D, covers component sites, i.e., footprints and areas within 200 m from their edges, considering the potential reach of noise, dust and socio-economic impacts. (ii) "Point works" refer to such main components as pumps, RVTs, dug wells/treatment unit/ancillaries, public market. (iii) "Horizontal works" refer to transmission main and distribution pipes. (iv) "Construction period" (excluding O&M) for horizontal works is estimated to be 1 year, for Pump and RVT is 6 months, for dug well/treatment unit/ancillaries is 6 months.

134. The Subproject has eight main Subproject components, i.e. seven for water supply and one for sanitation. Table VI-1 shows the horizontal works for transmission mains and distribution pipeline will be commonly in the same area of influence of point works. Such associated facilities as stockpiles and some sections of access roads are assumed to be within the respective main area/s of influence of Subproject components. Other associated facilities as workers' camp and Contractor's work area, waste dump sites, areas for reuse of excess soils/spoils and quarries/borrow pits are outside the respective main areas of influence of Subproject components..

135. Assuming all components are started simultaneously or almost simultaneously, without mitigation, cumulative impacts will be "significant" in magnitude during the peak construction period (about first four months of construction period). After which magnitude of cumulative impacts will lessen to "moderate" magnitude. The sensitiveness of the resources, natural and artificial, within the main areas of influence are taken into account, together with types of works involved and their intensities. Considering all these:

136. Site 1 (dug well, treatment unit & ancillaries) jointly with Site 6 (public toilet at bus park) tops the site with most cumulative impacts. The two sites' main areas of influence overlap with that of distribution pipe in the vicinity. And, these are in Sitalpati Bazaar. It is followed consecutively by Site 5 (Pump KRVT-2 in the compound of the District Office),Site 4 (Pump 3 and KRVT-1) in the vicinity of the playground which will accessed through narrow

roads and populated areas. The horizontal works if randomly started will have extended main areas of influence.

137. The potential moderate and high cumulative impacts would be dust, noise, road space limitation leading to slow mobility, access blocking, disruption of social services and economic activities, community and workers' health and safety hazards, generation of solid wastes and spoils.

138. To bring cumulative impacts down to acceptable levels:

- Civil works must be well planned, strategized and completed promptly.
- Contractor should implement the ADB-cleared C-EMP fully; key institutions to act their roles in EMP implementation effectively.
- There must be adequate consultations with stakeholders, including bus operators, and local authorities and coordination, particularly regarding expected cumulative impacts. Bus operations to temporarily adjust to the circumstances to relieve some road space limitations and for public safety and convenience.
- The grievance redress mechanism should be disclosed (through public meetings, display at strategic places and media) to the communities affected by the cumulative impacts.

2. During Operation

139. The indirect and induced impact of a reliable and sufficient water supply would be increased generation of wastewater and sullage. If inadequately managed, this situation would lead to contamination of supplied water through leaks or broken pipes in the distribution system. Mitigation measures would be: (i) prompt action on broken pipes/leaks; and (ii) monitoring incidence of water-borne disease in the dry and in the wet seasons.

140. With reliable and sufficient access to safe and potable water, the indirect positive impacts will be improved public hygiene and sanitation, leading to overall improvement in public health and quality of life. Enhancement measures include ensuring the quality of supplied water meets NDWQS through implementation of quality monitoring as prescribed in the EMP. Induced impacts of improved water supply system include rural–urban migration, more land conversion from rural to urban uses. Adequate projections of these induced changes must be incorporated in the design for sustainability of works. The cumulative impact would be the rapid urban growth driven earlier by the existing water supply system and the future urban growth that will be driven by the proposed improved water supply. Measures to mitigate the adverse impact of rapid urban growth would be rational land use planning of the VDC and District, incorporating environmental management for sustainable growth.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

141. Stakeholder consultation and participation was an essential process in project preparation and this 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. Table VII-1 lists down the persons consulted during the IEE. Annex C present the notes of some of the consultations.

Table VII-1:Lists of People and Institutions Consulted

	Name	Organization/Address	Contact No
		Key Informants Interviewed	
06/02/14	*Mr.Tiresh Prasad Khatri*	*Deputy Project Director STWSSSP PMO, DWSS*	
23/02/14	*Mr.Kedar Man Prajapati*	*Environment Section, MUD*	
14/03/14	*Mr.Tiresh Prasad Khatri*	*Deputy Project Director STWSSSP PMO, DWSS*	
		Persons Randomly Consulted in Salyan 25 February 2014 Sitalpati and Khalanga, Salyan District	
1	Mr.Purna Chandra Rai	Chairman, Khalanga-Sitalpati Water supply and Sanitation Users Group	9844980449
2	Mr. Shankar Bdr. Gharti	Chairman, Patneri Community Forest, Khalanga-3, Salyan	9844976061
3	Mr. Himalaya Shrestha	Teacher, Tribhuvan Higher Secondary School, Salyan	98478440679
4	Mr.BijayaMalla	Teacher, Tribhuvan Higher Secondary School, Salyan	9447844661
5	Mr.DhrubaDev Prasad Khumal	Senior divisional engineer, water supply and sanitation district office	9845234327
6	Mr.KeshavBudhathoki	Vice chairman Khalanga-Sitalalpati Water supply and Sanitation Users Group	9847843228
7	Mr.Suraj Kumar Maharjan	Social worker, Khalanga-7	9847844699
8	Mr.Yagra Raj Bohara	Chief District Officer, Salyan	
9	Mr. Mani Kumar Gyawali	Local Development Officer, Salyan	9857822272
10	Mr. Mohan Lal Nepali	Treasurer, WSUC	9857821168
11	Mr. Daman Bhatta	Businessman, Khalanga-8	
12	Mr.BirBahadurGharti	Businessman, Sagarmatha guest house	9809558961
13	Mr. Him Raj Budhathoki	Businessman, Royal Guest House	
14	Mr.Pran Kumar Rai	Member, WUSC, and Businessman	9847844343
15	Mr. Narayan K.C	Owner, KC Sweet Shop, Khalanga	088-400016
16	Mr.Birendra P Bhandari	Local resident, Sitalpati	
17	Ms.ManjuRokka	Local resident, Khalanga	
18	Mr.SumanBohara	Local resident, Khalanga	
19	Mr.Tiram K Rokka	Businessman, Hotel Green Palace	9847979957
20	Mr. Ram Krishna Regmi	Owner, Kantipur Community Hospital, Sitalpati	9847822522
21	Ms.PushpaChaudhary	Khalanga	
22	Ms. Kamala Kumari	Local resident, Sitalpati	
23	Ms.Lilawati Sharma	Local resident, Sitalpati	

142. During the conduct of the GoN IEE, consultations were undertaken in compliance with GoN's EPR.

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

- During detailed design, if there would be a major change in design/alignment/location, warranting an update of the IEE, the PMO and PISU will hold at least one public consultation meeting early on in the IEE update to

solicit perceived impacts, issues, concerns and recommendations from affected communities.

- Prior to construction, the PMO and PISU will conduct an intensive information, education and communication (IEC) campaign to ensure sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and PISU, 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-ES, PISU-ESA and Contractors will have been set up at strategic locations within the subprojects' main areas of influence. The grievance redress procedure and details will have been posted at the offices of the PMO, PISU, WUSC and VDC.
- During construction, regular random interviews will be conducted by the PISU-ESA every month to monitor environmental concerns of subproject communities.
- During operation, periodic random interviews will be conducted by the PMO and PISU and WUSC to monitor the environmental concerns of subproject communities.
- The public consultations and information disclosure will be continuous throughout the project cycle. PMO and PISU will be responsible for designing and implementing such aspects on the ground.

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

VIII. GRIEVANCE REDRESS MECHANISM

A. Purpose of the Grievance Redress Mechanism

145. The Project-specific grievance redress mechanism (GRM) is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the subprojects under the 3STWSSP. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Subproject are protected; and (ii) their concerns are effectively and timely addressed.

B. Proposed Set-Up

146. The MUD, as the Project executing agency, will establish the GRM and its support system, including setting up the Grievance Redress Committee (GRC) at the subproject level. The GRC will comprise of the: (i) Chief of the WSSDO; (ii) members of the WUSC; (iii) two representatives of affected persons, a male and a female; (iv) a member of IP community, preferably female; (v) a representative of a non-government organization or community-based organization actively involved in IP development/other backward communities in the area, if any; (vi) local government representatives, i.e., VDC and DDC; (vii) DSC social safeguard expert; and (viii) DSC environmental safeguard expert (ESE). The environmental safeguard assistant (ESA) of the PISU will oversee the implementation/observance of the mechanism for environmental complaints at the subproject level. He/she will be technically advised, supported and trained by PMC's environmental specialist and the DSC ESE. PMO's Environmental Officer will oversee the implementation/observance of the GRM in all subprojects. Representatives of affected

persons (APs), civil society and eminent citizens will be invited as observers during GRC meetings. Contractors and WUSCs (as Operators) will be required to designate their respective counterpart GRM staff.

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

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

C. Access to the Mechanism

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

- The public, especially the residents and regular passers-by, in the main areas of influence of the subprojects, are aware of their rights to access, and will have access to, the GRM free of administrative and legal charges; and
- The GRM is fully disclosed prior to Notice to Proceed for construction is given: (a) in public consultations and IECs or social/community preparations, (b) through posters displayed in the offices of the PMO, PISU, VDCs, DDC and at strategic places within the main areas of influence of subprojects (posters to include names and contact details of the EO of the PMO and the head and ESA of the PISU).

D. GRM Steps and Timeframe

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

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

FirstLevel: The access point will be the PISU. The steps are detailed below. (Figure VIII-2)

Step 1 Lodging a Complaint (Day 1)
AP lodges complaint with the PISU, verbally or in writing. PISU documents/registers lodged complaint, makes sure these are duly referenced and provides AP with a copy of referenced complaint.

Step 2 Screening of Complaint (Day1)
ESA screens the complaint if it is Project-related and valid and informs the AP immediately of the screening results. An AP with complaint screened as non-Project-related and/or invalid will be advised that he/she may raise complaint to the second level of the GRM, and PISU will forward the complaint to the GRC.

Step 3 Investigation, Discussion and Agreement (Day 1)
PISU, together with the Contractor/Operator and AP, will investigate and discuss the complaint at the site. Agreement on actions and measures and time involved will be made with the AP. Agreement will be properly documented and filed; PISU, AP, Contractor/Operator will have copies.

Step4 Implementing the Agreed Action

- If required action is minor, i.e., not requiring further investigation and would be quick and easy to implement, the Contractor/Operator will immediately implement the agreed action. (Day 2/Day 3)
- If required action is major, i.e., requiring further investigation and/or procurement of supplies/parts, the Contractor/Operator will: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact (Day 2/Day 3); and (ii) start work on the major action within 5 days from discussion (or not later than Day 8 since receipt of complaint).
- AP will be advised by the PISU that his/her complaint may be raised to the second level of the GRM, if he/she so prefers when: (i) minor action is not implemented within 2 days from discussion; (ii) interim measure prior to major action is not implemented within 2 days from discussion; or (iii) major action is not started within 5 days from discussion.

Step 5 Confirmation of Completed Action
Contractor/Operator will secure a written confirmation of completed action from the AP and furnish the PISU a copy.

Step 6 Confirmation of Satisfaction (1 week after confirmation of completed action)
The PISU will monitor the effectiveness of the resolution for at least a week after receipt of confirmation of completed action from the Contractor/Operator. After which, PISU will secure a written confirmation of satisfaction from the AP.

Second Level: TheAPwillbenotifiedbythe PISU when complaint isforwarded tothe GRC. TheGRCwill call for a hearing,if necessary,where AP can presenthis/herconcern/issues.TheGRCwillsuggestcorrective action/measureatthefield level and assign clear responsibilities for implementing its decision within 7 days of receipt of complaint by GRC. If GRC decision is not acceptable to the AP, if the suggested corrective action/measure is not started within 7 days, the matter/AP will be referred to the third level.

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

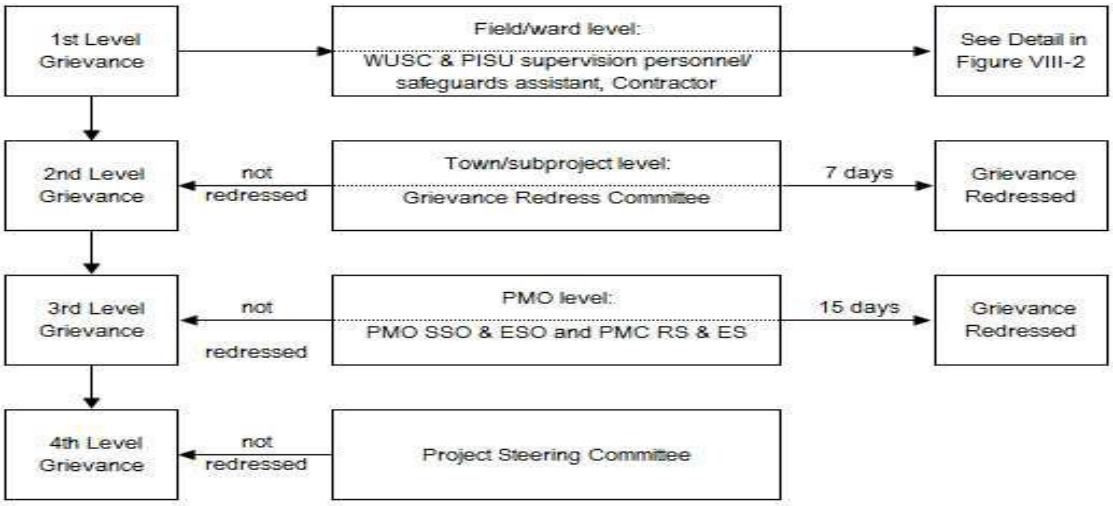
Fourth Level: For extremely major issues that will go beyond the third level, these will be referred to the project steering committee (PSC), to be resolved within 30 days. Environmental complaints (other than those that will involve the legal system) are expected to be mainly resolved at the second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

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

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

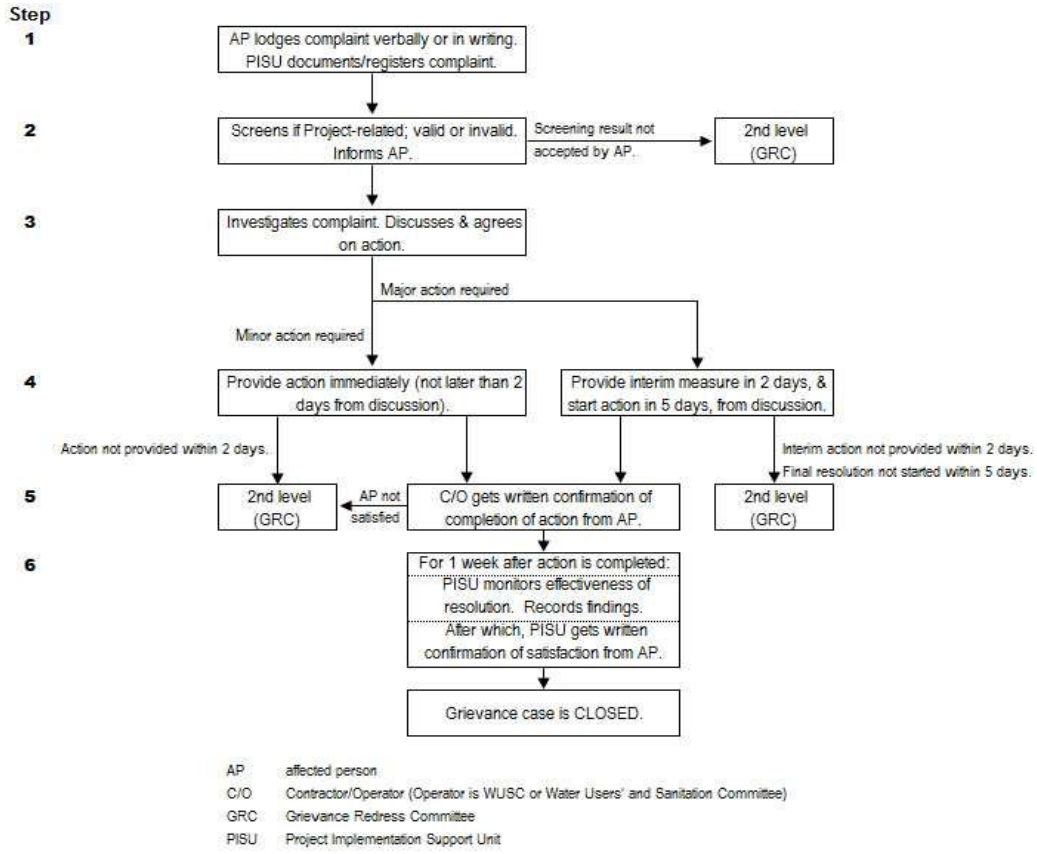
154. **Periodic review and documentation of lessons learned**.The PMO EO will do periodic review of the effectiveness of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address complaints.

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



ES Environmental Specialist
ESO Environmental Safeguards Officer
PISU Project Implementation Support Unit
PMC Project Management Consultant
PMO Project Management Office
RS Resettlement Specialist
SSO Social Safeguards Officer
WUSC Water Users' and Sanitation Committee

Figure VIII-2. GRM First Level



IX. ENVIRONMENTAL MANAGEMENT PLAN

155. 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 assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

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

A. Institutional Arrangement

157. **Executing and implementing agencies.**The Ministry of Urban Development (MUD) will be the executing agency with responsibility of subproject execution agency with responsibility of subproject execution delegated to the Department of Water Supply and Sewerage (DWSS). The Water Supply and Sanitation Division/Sub-division Office

(WSSDOs) are the subproject implementing agencies. Water User's and Sanitation Committees of participating towns are the implementing agencies.

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

Prior to construction

- The MUD will deputize 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 Environmental Division of the MUD will be responsible for reviewing the EIA Report prior to submission to the Ministry of Science, Technology and Environment (MoSTE) for reviewing and approval.
- The DWSS will review the IEE/EIA Report prepared by the Design and Supervision Consultant's 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 engage 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.

B. Safeguard Implementation Arrangement

159. **Project Management Office (PMO).**The safeguard officers (environmental safeguard officer and social safeguard officer) of the PMO will receive support from safeguards experts (environmental and social) of the 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 recommended necessary corrective actions to be taken as necessary;
(viii) Consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
(ix) Ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public; and
(x) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

160. **Regional Project Management Offices (Eastern and Western RPMOs).**The regional DWSS engineers and social development officers of the RPMOs will receive

support from; (i) the PMO safeguards officers (environmental and social); and (ii) the safeguards specialists (environmental and social), the social mobilizers and environmental management plan (EMP) monitors of the design, supervision and management consultant (DSMC) teams as specified below:

(i) Prepare new IEEs/EMPs in accordance with the EARF and government rules;
(ii) Include EMPs in bidding documents and civil works contracts;
(iii) Comply with all government rules and regulations;
(iv) Take necessary action for obtaining rights of way;
(v) Oversee implementation of EMPs including environmental monitoring by contractors;
(vi) Take corrective actions when necessary to ensure no environmental impacts;
(vii) Submit monthly environmental monitoring reports to PMO, and;
(viii) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

161. **Civil Works Contracts and Contractors.**EMPs are to be included in bidding and contract documents and verified by the PMO and RPMOSs. The contractor will be required to designate an environment supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The government will ensure that bidding and contract documents include specific provision requiring contractors to comply with all; (i) applicable labor laws and core labor standards on (a) prohibition of child labor as define in national legislation for construction and maintenance activities, 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 site. Contractors will only starts the civil works activities in communities surrounding the project site. 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.

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

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

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/EIA/

- 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/EIA Reports.
- Facilitate public consultations, as necessary.

During operation

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

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

Environmental Management Plan (EMP)

Table IX-1: Environmental Management Plan: Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Impacts/Issues/ Concerns and Mitigation Measures during Construction						
Legal complications	Non-Compliance with Relevant Environmental Legislation	• capacity strengthening of the PMO Environmental Officer and his/her counterpart at the subproject level; and • (ii)ensuring the necessary additional approval/permit/registration is obtained should subproject have major change.	• PMO,RPMOS,& DSC	• Compliance with existing legal provisions	• Once during construction	• NA
Erosion Hazards	Potential erosion may occur when moderately to highly sloping terrains are disturbed for the installation of transmission mains and distribution pipes.	(i) confining terrain disturbance according to a Staking Plan and Excavation Segmentation Plan and implement Erosion Control Plan that should all be part of the Contractor's EMP (C-EMP) and should have considered the surface drainage routes and patterns; (ii) keeping pipe laying works as close as possible to excavation works and vice versa; (iii) stabilizing disturbed slopes immediately after installation and backfill and use erosion control blankets or re-vegetate and use vegetation promotion blankets; and	• O,RPMOS,& DSC	• Status of debris and quarries, no of trenches, date of trenching and backfilling,	• Once prior to trenching and once after backfilling.	Included in Civil works contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		(iv) control water at the top of the site by diverting the flow far elsewhere.				
Air Quality	**Dust due to:** (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, borrowing	(i) confining earthworks according to a Staking Plan and Excavation Segmentation Plan that should be part of the 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; and (vii) limiting speed of construction vehicles in access roads and work sites to maximum of 30 kph.	O,RPMOS,& DSC	Air Quality: PM10,	Once during construction period	Included in civil works contract
	Odor and gas emissions during demolition of existing public toilet and septic tank at the bus park	(i) clean and disinfect the existing public toilet well; (ii) pump septic tank empty of liquids and solids and dispose of the pumped out materials properly; (iii) Open break the bottom of the emptied septic tank and fill with granular material and leave it that way permanently (if to abandon it in place); (iv) If to remove the septic tank and soak pit, remove also the surrounding soil and haul and dispose of it accordingly.	O,RPMOS,& DSC	Public response	Once during the demolition of public toilets.	Civil works contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Noise	Noise due to earthworks, rock crushing, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates	(i) using equipment that emit least noise, well-maintained and with efficient mufflers; (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; and (v) minimizing drop heights when loading and unloading coarse aggregates.	O,RPMOS,& DSC	Noise Quality, Equivalent Sound Pressure Level.	Once during construction period	Included in Civil works contract
Impacts on Water Resources	**Impacts on Surface Water Quality.**Some sections of the distribution pipeline will cross water bodies, exposing these resources to risks of pollution caused by: (i) poorly managed construction sediments, wastes and hazardous substances; and (ii) poor sanitation practices of construction workers. Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.	(i) disposing of spoils or excess soils as free filling materials as soon as possible; (ii) locating temporary storage areas on flat grounds and away from main surface drainage routes; (iii) shielding temporary storage areas with sandbags &/or silt fence; (iv) implementing an eco-friendly solid and hazardous waste management, disposing them promptly; and (v) providing adequate water supply and sanitation facilities at work sites.	O,RPMOS,& DSC	Water Quality Test (National Drinking Water Quality Standard Parameters)	Once during construction period	Included in civil works contact

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	Impacts on River Morphology and Hydrology	Coordinate with MoSTE and local authorities regarding restrictions in quarrying from Sharda River An Aggregates Management Plan should be part of the C-EMP . Contractor's should be required to obtain aggregates only from sources with environmental clearance and license to operate and that still have a high ratio of extraction capacity over loss of natural state.	O,RPMOS,& DSC	Source and management of aggregates	Once during construction period	Included in civil works contract
	Impacts on the Quality of Groundwater Resource. caused by the use of dirty or contaminated drilling equipment. To mitigate: (i) ensure drilling equipment is cleaned well and will be free of contaminants such as grease, sewage and chemicals, prior to drilling; and (ii) dispose of spoils and wastes at the end of each day's work.	(i) ensure drilling equipment is cleaned well and will be free of contaminants such as grease, sewage and chemicals, prior to drilling; and (ii) dispose of spoils and wastes at the end of each day's work.	PMO,RPMOS,& DSC	Cases of mixing of contaminated water/ public reporting	Every month during construction period.	Included in civil works contract
	Impacts on stored water in adjacent ground reservoir tanks (RVTs).	Construction of new ground reservoir tanks will potentially exposed the water stored in adjacent existing RVTs	PMO,RPMOS,& DSC	Cases of mixing of contaminated water/ public reporting	Every month during construction period.	Civil contractor's responsibility

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Impacts on Flora and Fauna	Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling, and Illegal harvesting of community forest resources as fuel for cooking by workers will result in unnecessary loss of vegetation beyond Subproject footprints.	: (i) physically and clearly marking limits of subproject footprints and work easements; (ii) installing clear signage and markers to direct traffic movement in sites; (iii) designating stockpiling areas; (iv) replanting at least 5 trees in the vicinity for every tree cut and taking care of the newly planted seedling during the construction period; (v) re-vegetating disturbed slopes and grounds, as applicable.; and providing alternative fuel to workers for cooking.	PMO,RPMOS,& DSC	No. of trees felling, no of forest encroachments recorded.	Once a month	Included in civil works contract
Impacts on the Socio-Economic Environment and Resources	Slow mobility in the core areas, blocked accesses to properties and work sites, local flooding, utility service disruptions.	(i) preparing a traffic management scheme jointly with local authorities; (ii) posting of traffic flagmen during the entire working hours; (iii) providing safe success to affected properties; (iv) managing stockpiling; (v) leading pumped water from excavations to drains or storing in drums for use in watering dry surfaces; (vi) coordinating the relocation of affected power supply poles, embedded private water hoses prior to excavation; and (vii) in case of accidental damage to existing utilities, advise concerned authority at once	PMO,RPMOS,& DSC	Compliance with proposed mitigation measures.	Every month during the construction.	Included in civil works contract,, contractor's responsibility
	Community health and safety hazards	(i) Contractor's implementation of the ADB-cleared C-EMP; (ii) adequate lighting, temporary fence, reflectorized barriers and signage at active work sites; (iii) Contractor's preparedness in emergency response; and (iv) adequate dissemination of the GRM and Contractor's observance/implementation of the GRM	PMO,RPMOS,& DSC	Compliance with proposed mitigation measures.	Every month during the construction.	Included in civil works contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Workers Health & safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures	Comply with requirements of Labor Act of GoN and standards on workers' health and safety (H&S). Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (vests/cloths with reflectors, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training4 for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. Provide medical insurance coverage	Contractor	Site –Specific H&S plan Equipped first-aid stations Medical insurance coverage for workers Number of accidents Records of supply of uncontaminated water Condition of eating areas of workers Record of H&S orientation trainings Use of personal protective equipment % of moving equipment outfitted with audible back-up alarms Permanent sign boards for hazardous areas Signage for storage and disposal areas Condition of sanitation facilities for workers	Visual inspection by RPMOS (monthly) and DSMC-ESS on weekly basis. Frequency and sampling sites to be finalized during detailed design stage and final location of sub project components	Included in civil works contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		for workers; Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection , and preventing injuring to fellow workers; Provide visitor orientation if visitors to the site can gain access to areas where hazardous condition or substances may be present. Ensure also that visitor's do not enter hazard areas unescorted; Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; Ensure moving equipment is outfitted with audible back-up alarms; Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors and the general public as appropriate; and Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively				
Environmental legislation compliance	Lack of awareness amongst project managers and WUSC in operating systems as	Capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and ensuring compliance with NDWQS,	PMO, RPMOs, DSC and WUSC	Monitoring reports and checking operations against O&M manuals and	After commissioning of systems and semi annually	N/A

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	per required legislation and IEE requirements	applicable conditions in IEE approvals and license for use of water resource.		permits/clearances		
Impacts/Issues/Concerns and Mitigation Measures during Operation						
Drinking water supply system	Delivery of unsafe Water	The operations and maintenance plan and training for staff will cover; (i) competent/cautions handling and storage of calcium Hypochlorite and qualified persons to implement/oversee disinfection and treatment; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-complaint EMP and a water safety plan; and (v) monitor water quality.	PMO, RPMOs, DSC and WUSC	Water Quality reports WTP records in the log book	During O&M of the system Quarterly monitoring	Responsibility of WUSC
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	Appointment of environment supervisor to ensure EMP implementation Timely submission of monitoring reports including pictures.	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by RPMOS to PMO PMO to submit semi-annual monitoring report to ADB	N/A
3. Post Construction Activities	Damage due to debris, spoils, excess construction materials	Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (All excavated roads shall be reinstated to original condition. All disrupted utilities restored All affected structures rehabilitated /compensated The area that previously housed the construction camp is to be checked	Contractor	RPMOS/PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M	Prior to turn-over of completed works to WUSC	responsibility of contractor

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		for spills of substances such as oil, paint, etc. and these shall be cleaned up. All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area hall be top soiled and regressed using the guidelines set out in the revegetation specification that forms part of this document. The contractor must arrange the cancellation of all temporary services. Request PMO/PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.		are removed; and (iv) worksite clean-up is satisfactory.		
Sanitation facilities (toilets and septage disposal site)	Contamination to land or water ways due to overflow of septic tanks and/or uncontrolled dumping of septage	The subproject incorporates a pilot for controlled disposal of septage. This is to reduce the likelihood of uncontrolled septage disposal to land and local water ways (nallas) which is currently practiced.Further septic tanks will be designed to ensure maximum retention is achieved and will be emptied at the required frequency (min every 3 years).Households will be educated on the above to further reduce the likelihood of septic tank overflows and uncontrolled dumping of septage .	WUSC, DSC, RPMOs and PMO for education campaign	Sanitary inspection reports. Water quality re[orts from test pits near tube well sites	During O&M of the system.	WUSC

C. Environmental Monitoring Program

165. Environmental monitoring will be done during construction on three levels:

(i) Monitoring development of project performance indicators by the PMO-ESS;
(ii) Monitoring implementation of mitigation measures by the Contractor; and
(iii) Overall regulatory monitoring of environmental issues by the PMO.

166. In addition to regular monitoring onsite (at town level) by the PISU and DSC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table IX-5 presents the indicative environmental monitoring plan for the subproject which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

Table IX-1:Environmental Monitoring Program

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
1.	Air quality	• Prior to construction to establish baseline • Construction phase	SPM PM2.5 PM10 SO2 NOx CO	• PTWs location • OHT location • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• 24-hour monitoring once in a season (except monsoons) for the construction period	• National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	• Prior to construction to establish baseline • Construction phase	Equivalent day and night time noise levels	• PTWs location • OHT location • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• Once in a season (except monsoons) for the construction period	• National Noise Standard Guidelines, 2012	Contractor
3.	Water quality	• Prior to construction to establish baseline • Construction phase	TDS, TSS, pH, hardness, BOD, fecal coliform, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons, mineral oils, phenols, cyanide, temperature	• Along khals adjacent to construction sites (to be identified by the and (provide if PMC or DSC))	• Twice a year (pre-monsoon and post-monsoon) for the entire period of construction	• National Drinking Water Quality Standards, 2006	Contractor
4.	Survival rate of	• O&M	Survival rate	• In the areas	• Twice a	• None	WUSC

Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
landscaping, tree plantation	phase		where re-plantation/ landscaping proposed	year for 2 years		

D. Institutional Capacity Development Program

167. 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.

168. 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.

169. The PMO-ESS 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. The proposed training project along with the frequency of sessions is presented in Table 15.

Table IX-2: Training Program for Environmental Management

Items	**Pre-construction/prior to construction**	**Construction**	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staffs	Experiences and best practices sharing
Purpose	To aware the participants of the environmental safeguard requirements of ADB and GOB and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GOB	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation**	• Roles and responsibilities of	Experiences on EMP

Items	Pre-construction/prior to construction	Construction	
	• ADB Safeguards Policy Statement • Government of Bangladesh Environmental Laws and Regulations **Module 2: Environmental Assessment Process** • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	officials/contractors/consultants towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, PIUs, and (provide if PMC or DSC)
Participants	Executing and implementing agencies, PMO, and PMO staffs (technical and environmental) involved in the project implementation	PMO PIUs Contractors	PMO PIUs Contractors

E. Staffing Requirement and Budget

170. 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.

171. 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-ESS assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO-ESS.

172. 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.

173. 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.

174. The indicative costs of EMP implementation are shown in Tables IX-7 and IX-8 (by source of funds).

Table IX-3: Indicative Cost of EMP Implementation

	Particulars	Stages	Unit	Total No.	Rate (NPR)	Cost (NPR)	Cost covered by
A.	Mitigation Measures						
1.	Compensatory plantation measures	Construction	Per tree				Civil works contract
B.	Monitoring Measures						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	3	150000.00	450,000.00	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	3	30000.00	90,000.00	Civil works contract
C	Capacity Building						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the (provide if PMC or DSC) environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to start of Phase 2 and upon completion of the project	lump sum	1 8	Module 1 – 300000.00 Module 2 – 100000.00 Module 3 – 200000.00	300,000.00 800,000.00 200,000.00	Covered under PMC or DSC contract
D.	Manpower Costs						
1	PMO Environment Safeguards Officer	Construction phase	1	20	65000.00	1,300,000.00	Budget covered through PMC
2	PISU Environment Safeguard Assistants	Construction phase	2	20	25000.00	1,000,000.00	Budget covered through DSC
3	PMO Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at PMO level	person months (spread over entire project implementation period)	24 person months	350000.00 per person month	8,400,000.0	Remuneration and budget for travel covered in the PMC contract

	Particulars	Stages	Unit	Total No.	Rate (NPR)	Cost (NPR)	Cost covered by
4	DSC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at PIU level	person months (spread over entire project implementation period)	20 person months	300000.00 per person-month	6,000,000.0	Remuneration and budget for travel covered in the DSC contract
E.	Administrative Costs						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum		XXX	XXX	These consents are to be obtained by contractor at his own expense.
		Environmental assessment and environmental clearances as per EPA 1996 and EPR, IEE presentation at review committee related expenses	Lump sum	1	50000.00	50000.00	50000.00
F.	Other Costs						
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lump sum		350000.00	Covered under DSC contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		200,000.00	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance defect liability period
TOTAL						19,140,000.00	

F. Implementation Schedule

175. Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table IX-7 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.

Table IX-5: Environmental Management Implementation Schedule

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

X. CHAPTER – 10: MONITORING AND REPORTING

176. RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the EIAs/IEEs for the projects. In addition to recording information on the work and deviation of work components from original scope PMO, PIUs, and (provide if PMC or DSC) will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome.

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

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

179. ADB will review project performance against the MUDs commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

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

XI. CONCLUSION AND RECOMMENDATION

180. 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. Except during windy days and heavy rainfall, fugitive dust, fine aggregates, sediments and/or wastes would not be the 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.

181. 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 EIA will incorporate the findings and recommendations of this IEE and prescribed environmental management in the EMP.

Table XI-1: Proposed Topics for Capacity Building/Training

		Topic	Target Participants	Timing
1.	**By Environmental Specialists**			
	1.1	Legal Framework	DWSS, PMO,	Early stage
		▪ Relevant national laws, regulations & standards on environmental assessment & management	WSSDO, PISU, RMSO, WUSC	of Output 2
		▪ ADB SPS 2009	(15-18)	
		▪ Environmental assessment & review procedure under the Project		
	1.2	Environmental Assessment		
		▪ Rapid environmental assessment		
		▪ Initial environmental examination		
	1.3	Some Aspects of EA Process & Environmental Management		
		▪ Meaningful consultation & info disclosure		
		▪ Grievance redress mechanism		
		▪ Environmentally responsible procurement		
		▪ Occupational & community health and safety		
	1.4	EMP Implementation, part 1	DWSS, PMO,	Early stage
		▪ Institution arrangements & responsibilities	WSSDO, PISU,	of Output 2
		▪ Environmental quality monitoring	RMSO, WUSC,	
		▪ Emergency response	(15-18)	
	1.5	EMP Implementation, part 2		
		▪ Performance monitoring & indicators		
		▪ Environmental monitoring report		
2.	**By External Experts**			
	2.1	Other relevant topics, such as:	MUD, DWSS,	During
		A Good engineering and construction practices as mitigation measures	PMO, PISU,	Project's
		B Climate change adaptation (applicable to	WSSDO, RMSO,	Capacity Devt.

	eligible activities/works under the Project)	DSC	
	B.1 Climate change impacts on infrastructure	(30)	Program
	B.2 Climate-proofing of infrastructures		
C	Strategic environmental assessment of WSS sector policy, development plans and programs		
D	Other relevant topics that may be suggested by MUD, DWSS, PMO, PISU & WSSDO		

Table XI-2: Performance Indicators

Indicator				Data Source
Output & Impact	Baseline Level Scenario	Target Outcome	Performance	
During Construction 1 Air emissions Ambient concentrations of dust/ particulates (PM_{10}, $PM_{2.5}$); SO_2, NO_2	- Pre-construction ambient level does not exceed the national standard limits	- Level should not exceed the pre-construction ambient level	- No. of parameters that exceeded, & % of excess/es of each over, the pre-construction ambient level/s	- Results of air quality monitoring during construction - Results of pre-construction air quality monitoring
	- No complaint	- No complaint lodged regarding health impact or nuisance	- % of total HHs in main area of influence that lodged complaint on health impact &/or nuisance.	- Grievance Redress Mechanism records/ report
2 Noise	- Pre-construction ambient level does not exceed the more stringent limit between national standard & WHO Guidelines	- Level should be equal or less than the more stringent limit between national standard & WHO Guidelines	- % of excess over the more stringent limit between national standard & WHO Guidelines	- Results of noise monitoring during construction - Results of pre-construction noise monitoring
	- Pre-construction ambient level does not exceed the less stringent limit between national standard & WHO Guidelines.	- Level should be equal or less than the less stringent limit between national standard & WHO Guidelines.	- % of excess over the less stringent limit between national standard & WHO Guidelines.	
	- Pre-construction ambient level exceeds the less stringent limit between national standard & WHO Guidelines	- Level should not exceed the pre-construction ambient level.	- % of excess over pre-construction ambient level.	
	- No complaint.	- No complaint lodged regarding health impact or nuisance from noise.	- % of total HHs in main area of influence that lodged complaint on health impact &/or nuisance due to severe noise	- Grievance Redress Mechanism records/ report
3 Generation of construction-related traffic, especially of big trucks - Public safety hazard/risks	- None.	- None or 0% of construction days with road accidents involving construction vehicles	- % of total construction days with road accidents involving construction vehicles	- Contractor's & PMO's EMRs - Contractor's Safety Team's records - Grievance Redress Mechanism records
		- No accident should result in long-term or permanent injury or fatality.	- % of total construction days with accident with serious injuries/fatalities.	- Records/reports of district/municipality police/traffic authorities
During Operation 4 Poor quality drinking water supplied Public health hazard/risk	- Quality at start of commissioning meets NDWQS limits.	- Quality meets NDWQS limits.	- No. of parameters that exceeded, & % of excess/es of each over, the national standard.	- Results of succeeding drinking water quality monitoring - Results of drinking water quality test at start of commissioning
	- No complaint	- No complaint lodged on supplied water supplied	- % of total HHs in service area that lodged complaint on supplied	- Grievance Redress Mechanism records/ report
5 Noise of pump/generator	- Pre-operation ambient level does not exceed the more stringent limit between national standard & WHO Guidelines	- Level should be equal or less than the more stringent limit between national standard & WHO Guidelines	- % of excess over the more stringent limit between national standard & WHO Guidelines	- Results of noise monitoring during construction - Results of pre-operation noise monitoring

Indicator				Data Source
Output & Impact	Baseline Level Scenario	Target Outcome	Performance	
	- Pre-operation ambient level does not exceed the less stringent limit between national standard & WHO Guidelines.	- Level should be equal or less than the less stringent limit between national standard & WHO Guidelines.	- % of excess over the less stringent limit between national standard & WHO Guidelines.	
	- Pre-operation ambient level exceeds the less stringent limit between national standard & WHO Guidelines.	- Level should not exceed the pre-operation ambient level.	- % of excess over pre-operation ambient level.	
	- No complaint.	- No complaint lodged regarding health impact or nuisance from noise.	- % of total HHs in the service area that lodged complaint on health impact &/or nuisance due to noise.	- Grievance Redress Mechanism records/ report
6 Odor in/cleanliness of public toilet and its immediate vicinity	- Well kept, no odor emanating from the, & no litters &/or poorly managed solid wastes in the, immediate premises/vicinity of the public toilet at the start of commissioning.	- No odor associated with lack of maintenance at any one time during operation. - No litter, poorly managed solid wastes in the premises/vicinity of the public toilet during operation.	- No complaint received from any user. - No bad feedback from quarterly survey. - No odor and litter/poorly managed solid wastes seen during random check by random inspection by PISU or WSSDO.	- Informally & formally received complaint during operation. - Report of quarterly random survey - Report of quarterly random inspection by PISU/WSSDO. - Daily cleaning records of WUSC.
7 Damage during earthquake or extreme weather event	- No damage	- No damage during earthquake or extreme weather event	- No. of days of disruption in services due to damage.	- Operator's field investigation report - Field spot checks & random interviews by PMO/PISU.

REFERENCES

Environmental Protection Act, 1996

Environment Protection Regulations, 1997

Environmental Protection Rules, 1997, and as amended in 1999 and 2007

Final Feasibility Study of Salyan Town Water Supply and Sanitation Project

Final Detailed Engineering Study of Salyan Town Water Supply and Sanitation Project

Initial Environmental Examination on Salyan Town Water Supply and Sanitation Project

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

Annex A.Rapid Environmental Assessment (REA) Checklist for Salyan Town Sub projects and Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

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

Country/Project Title: **NEP: Third Small Towns Water Supply and Sanitation Sector Project**

Subproject: **Salyan Town Water Supply and Sanitation Subproject**

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA			
▪ DENSELY POPULATED?		√	The distribution pipeline will partially go through the bazaars in SitalpatiKhalanga, with low moderate population density.
▪ HEAVY WITH DEVELOPMENT ACTIVITIES?		√	The distribution pipeline will partially go through the bazaars in Sitalpati&Khalanga. Development activities are of low moderate intensity.
▪ ADJACENT TO OR WITHIN ANY ENVIRONMENTALLY SENSITIVE AREAS?			
• CULTURAL HERITAGE SITE		√	
• PROTECTED AREA		√	
• WETLAND		√	

Screening Questions	Yes	No	Remarks
• MANGROVE		√	
• ESTUARINE		√	
• BUFFER ZONE OF PROTECTED AREA		√	
• SPECIAL AREA FOR PROTECTING BIODIVERSITY		√	
• BAY		√	
B. POTENTIAL ENVIRONMENTAL IMPACTS Will the Project cause…			
▪ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
▪ hazard of land subsidence caused by excessive ground water pumping?		√	High cost involved in pumping will constrain over pumping. EMP recommends the monitoring of pumping & maintaining of records to control pumping to design limit.
▪ social conflicts arising from displacement of communities ?		√	
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Basic water treatment is proposed under the Subproject. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
▪ delivery of unsafe water to distribution system?	√		Design proposes monitoring kits, a lab room. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives.
▪ inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design proposes housing for intake wells, as well as perimeter fencing of the entire land area of the intake wells & associated facilities.

Screening Questions	Yes	No	Remarks
▪ over pumping of ground water, leading to salinization and ground subsidence?		√	High cost involved in pumping will constrain overpumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit.
▪ excessive algal growth in storage reservoir?	√		EMP provides mitigation measures.
▪ increase in production of sewage beyond capabilities of community facilities?	√		Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
▪ inadequate disposal of sludge from water treatment plants?	√		Minimal sludge expected. EMP provides mitigation measures.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
▪ impairments associated with transmission lines and access roads?	√		No water transmission or distribution lines exist. Power transmission lines crossing the proposed water transmission & distribution lines will not be affected. EMP provides measures to mitigate impacts on power supply poles in the bazaar that are immediately adjacent to, or onto, road carriageways. Associated access roads in bazaars are narrow but paved; elsewhere these are unpaved. Outside bazaars, associated access roads are unpaved, in poor conditions. Impaired access roads will be repaired, as appropriate.
▪ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		$Ca(ClO)_2$, commonly used in basic water treatment, will be used. EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.
▪ health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	√		$Ca(ClO)_2$, commonly used in basic water treatment, will be used. EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.

Screening Questions	Yes	No	Remarks
▪ dislocation or involuntary resettlement of people?		√	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
▪ noise and dust from construction activities?	√		EMP provides mitigation measures.
▪ increased road traffic due to interference of construction activities?	√		EMP provides mitigation measures.
▪ continuing soil erosion/silt runoff from construction operations?		√	
▪ delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.
▪ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	√		Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.
▪ accidental leakage of chlorine gas?		√	
▪ excessive abstraction of water affecting downstream water users?		√	Water irrigation in the vicinity comes from existing wells near the river.
▪ competing uses of water?		√	
▪ increased sewage flow due to increased water supply	√		Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
▪ increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		Sullage is currently led to drains or to the backyard to percolate/seep through the ground. There is no wastewater collection & treatment system. EMP provides mitigation measures.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
▪ social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
▪ Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.

Screening Questions	Yes	No	Remarks
▪ Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		EMP provides mitigation measures.

Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

Screening Questions		Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides	0	Investments in the sample sub project towns will not likely be affected by climate change and extreme weather events due to the siting of project. For example all pipes will be constructed below ground no investments will be sited in flood plains etc.
	Would the project design (e.g the clearance for bridges) need to consider any hydro-meteorological parameters (e.g sea-level, peak river flow, reliable water level, peak wind speed etc)	0	Note likely. Ground water sourced from deep tube wells will be the source of water for the sample subproject towns. Further source water protection will be carried out.
Materials and maintenance	Would weather, current and likely future climate conditions (e.g prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro metrological parameters) affect the selection of project inputs over the life of project outputs (i.e construction materials)	0	
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?	0	Climate conditions will unlikely affect water quantity and quality of water supply system. Ground water for the water supply system will be sourced from the deep aquifers where yield is demonstrated to be sufficient to meet the demand. The water supply schemes will be designed to meet the current and future demand. Further

	water supply system will be operated and maintained efficiently to reduce system losses. Water safety plans will be implemented to ensure water supplied is safe and potable at all times.

Options for answers and corresponding scores are given below.

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

Annex B. Relevant Environmental Quality Standards

B.1 Ambient Air Quality Standards

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

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

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

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

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

B.2 Noise Level Standards

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

* Guidelines for Community Noise, WHO, 1999.

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

B.3 National Drinking Water Quality Standards, 2006

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

* Health-based guideline values

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

^ These standards indicate the maximum and minimum limits.

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

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

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

Annex C. Notes of Consultations

C.1 Consultations with Relevant Government Institutions at the National Level

Date	Institution	Person/s Met	Key Notes
06 Feb 2014	STWSSP PMO DWSS	Mr.Tiresh Prasad Khatri Deputy Project Director STWSSSP	▪ The STWSSSP PMO was set up for the 1st STWSSSP, carried over in the 2nd STWSSSP, and will continue to be the PMO for the 3rd STWSSSP. ▪ PMO does not have a staff that focuses on the environmental management requirements of the Project. ▪ In the 2nd STWSSSP, WSSDOs did not have staffs focusing on the environmental management requirements of subprojects. ▪ In the 2nd STWSSSP, the roles/responsibilities in EARF and EMP implementation were carried by the following key institutions as follows: EARF implementation: Screening for categorization for ADB – by DSC Preparation of ADB IEE – by DSC Preparation of the GoN IEE – DSC EMP implementation Update of ADB IEE during detailed design – by PMO with PMC support Conduct of environmental quality monitoring based on the EMP during construction – by WSSDO Conduct of environmental quality based on the EMP during operation – by independent monitoring group EMP implementation monitoring – by PMO Preparation of EMR – by PMO GRM implementation and reporting – by WSSDO ▪ Based on lessons learned from the previous STWSSSPs, he agreed that the following suggested environmental management aspects be focused on the key institutions as follows: PMO Such aspects as meaningful consultations, grievance redress mechanism, environmental responsible procurement, Institutional roles and responsibilities in environmental management, emergency response, performance monitoring. WSSDO Such aspects as grievance redress mechanism, occupational and community health and safety WUSC Occupational and community health and safety. Other topics Climate change and adaptation (applicable to WSS sector) – particularly for the PMO and WSSDO Good engineering and construction practices as mitigation measures – particularly for the WSSDO Strategic environmental assessment of WSS sector policy, plans and programs – particularly for the MUD and DWSS ▪ He suggested the following forms of capacity strengthening: Exposure visit for PMO,WSSDO and WUSC

Date	Institution	Person/s Met	Key Notes
			In-house training on environmental and social safeguard Basic environmental and social safeguard training to all staff of DWSS Special training to staff of PMO and WSSDO Orientation training for WUSC Deputation of PMO and DWSS Environment and Social Section to PPTA Team for knowledge transfer and capacity strengthening
			▪ Remarks made: On having an environment specialist on board the PMO: "Create a position of environmental officer at DWSS/PMO in a permanent basis (for this MUD should have policy level decision." On the suggested topic of legal framework for environmental management of the Project: *"MUD should deal in such topic and should take the responsibilities."* On resolving grievances by WSSDO during the 2nd STWSSSP: *"Reporting is poor."* On environment responsible procurement: *"Role of MUD in decision making"* On Performance monitoring: "Third party monitoring or external monitoring" ▪ During the 2nd STWSSSP, constraints were encountered in resolving ROW clearance and land-related issues. ▪ At the central level, a Project Coordination Committee (PCC) will be set up with the secretary of the MUD as the chair and the joint secretary of the MUD as the alternate chair. The PCC will comprise of the DWSS Director General, TDF Executive Director and senior representatives from the Ministry of Finance, Ministry of Local Development, Ministry of Health and Population, Ministry of Law and Justice and the National Planning Commission. The PMO Director will serve as member-secretary. The PCC will meet at least twice a year to review the overall progress and discuss key issues to be addressed at the central level. ▪ In each town, a Town Project Coordination Committee (TPCC) will be established. If a subproject is implemented in a municipality, the TPCC will be chaired by the Mayor[1] of the municipality, and represented by the Executive Officer of the municipality, WSSDO and WUSC. If it is located in a VDC, the TPCC will be chaired by the head of the WSSDO, and represented by the WUSC and the VDC, until political leadership[2] is in place in the VDC, after which time the VDC chair will co-chair the TPCC. Representatives of the education and health units of local governments will also be members of the TPCC, to ensure the sustained efforts for health and hygiene education beyond the construction period. Representatives from the DDC, PMO, RMSO, TDF, Contractor, DSC and local NGO will also be invited when needed. TPCCs will meet quarterly, or as often as necessary, to oversee the subproject progress and effectiveness of all relevant activities and discuss any issues to ensure smooth implementation and operation. [1] Until the Mayor is elected, the Chief Executive Officer deputized from the MLD, acting as Mayor, will chair the TPCC. [2] Political leadership refers to either the elected chair or the chair selected via consensus among political parties.
23 Feb 2014	Environment Section, MUD	Mr.Kedar Man Prajapati	▪ The Water Supply and Environment Division (i) reviews IEE and EIA reports for water supply and sanitation sector projects; and (ii) approves IEE Reports. ▪ The MUD is just 2 years old. It used to be that the Min. of Physical Planning and Works reviews & approves IEE reports and reviews EIA reports for water supply and sanitation projects. The Water Supply and Environment Division of MUD is an absorbed division from the MPPW.

Date	Institution	Person/s Met	Key Notes
			▪ IEE report for GoN processing will have to use the IEE format in Schedule 3 of the EPR. ▪ The Division does not monitor the compliance of projects to the terms of conditions of IEE approval due to shortage of manpower. The WSSDOs are responsible for monitoring. ▪ For IEE approval, where applicable: Tree-cutting permit is a pre-requisite document. Water withdrawal permit is not a pre-requisite document. Permit to encroach RAMSAR wetlands or conservation area is not a pre-requisite document, because when a project encroaches into such site, an EIA is required. Permit to encroach a preserved monument area is not a pre-requisite document, because when a project encroaches into such site, an EIA is required. Permit to encroach into community forest is not a pre-requisite document. Zoning clearance is not a pre-requisite document.
			▪ From experience, 45 days of IEE review, revisions/additions and re-review is already short. Sometimes, it could take much longer. ▪ The preparation of a GoN IEE Report based on an ADB IEE Report is estimated to take 1.5 months.
05 Mar 2014	STWSSP PMO DWSS	Mr.Tiresh Prasad Khatri Deputy Project Director STWSSSP	▪ On STWSSSP institutional set up, PMO is supported by the PMC, a team of local specialists. PISUs, under the WSSDOs, are supported by the DSC. ▪ The DSC prepares 1 subproject IEE using a harmonized ADB &GoN outline. PMC reviews the IEE on behalf of the PMO prior to submission to ADB and MUD for review and approval. ▪ Many DWSS technical staffs have educational background in environmental engineering. If PMO needs to have one to focus on the environmental management requirements of the Project, a qualified staff may be deputized to the PMO. At the subproject level, WSSDO staff may be deputized to the PISU for the same purpose. ▪ For water quality monitoring during operation, the Project will include provisions for: (i) testing kits for parameters required under the NDWQS Directives to be tested/analyzed daily; and (ii) a lab room. In addition, there are five regional labs already established, although some are partially functional due to lack of manpower. ▪ The regional labs for the four towns from the 2nd STWSSSP are as follows: For Salyan, the regional lab is in Nepalgunj, some 6 hrs away by land. For Chandrauta,, the regional lab is in Pokhara; however, Nepalgunj is also accessible in 4-5 hrs by land. For Charali and Mahendranagar, the regional lab is in Ithori. ▪ WUSC needs training, not just once but should be continuing training. ▪ Under the 2nd STWSSSP, there are two sewerage subprojects that are about to be sent to ADB for review. ▪ All subprojects under the 2nd STWSSSP are still in construction stage or for ADB review.

C.2 Consultations at the Town/Subproject Level

Date	Institution	Person/s Met	Key Notes
25 Feb 2014	Khalanga-Sitalpati WUSC	Mr.Purna Chandra Rai Chairman Mr.KeshavBudhathoki Vice-Chairman Mr. Mohan Lal Nepali Treasurer Mr.Pran Kumar Rai Member and Businessman	▪ WUSC has already fulfilled the recipient town's requirements as stipulated by the STWSSSP. The chairman further added that they are ready for the implementation of project from every aspect. He has mentioned that the land required for intake site is already in WUSC's name and other land required for pumping stations falls in community forest and government land. WUSC has already obtained permission from the Community Forest Users' Group, and government for using their land by WUSC. They are desperately waiting for the initiation of the project. They will avoid stress and disturbances to public structures while constructing projects. ▪ WUSC does not have the capacity to monitor for compliance with the NDWQS.
	Patneri Community Forest Users' Group	Mr. Shankar BahadurGharti Chairman	▪ The RVT of the existing water supply scheme also lies in their community forest. Since the project is very important and the only available option, they have decided to provide the required land for the construction of pump house, and RVT required for this project within their boundary. The pipe alignment from their boundary to school also doesn't impact on community forest. According to him, tress cutting could be avoided and minimum ground coverage clearance should be sufficient for the type of project. ThePatneri Community Forest Users' Group is willing to support the project.
	Tribhuvan Higher Secondary School, Tuhaping, Khalanga, Salyan	Mr. Himalaya Shrestha, Teacher Mr.BijayaMalla Teacher	▪ The project is very important to address the acute shortage water in Khalanga-Sitalpati area. So, all the local residents will be supportive for the project. One of the pump and reservoir lies adjacent to the school. According to him, school has decided to allocate the required land for pump and reservoir shall be provided to WUSC. There won't be any disturbances to the operation of school if managed properly.
	WSSDO	Mr.DhrubaDevPrashadKumhal Chief	▪ Highlighted the importance and need for this project for Khalanga. All the government offices are in Khalanga including the police, jail, military, and other government offices. Due to non-availability of water the service providers and local people are suffering and even affecting their productivity. So, to address the existing situation and future growth this project is very important. The project should be initiated at the earliest. Since the high elevation pumping with several intermediate pumping stations is proposed, the O & M part will be challenging. So, he has advised to involve technicians and train them he from the construction phase of the project to make the project sustainable.
	Salyan District Office	Mr.Yagya Raj Bohara Chief District Officer	▪ The project is top most priority project the district. The government land required for this project shall be made available. Besides, the local government is willing to provide any kind of support to this project for unhindered construction and operation.
	Local Development Office, Salyan	Mr. Mani Kumar Gyawali, Local Development Officer	▪ Highlighted the need for this project for fulfilling the present basic requirements and future growth of the district. He has further added the district development committee has also decided to support this project. The district development committee through its 19th district council meeting held on 2013 has decided to provide NPR 1.5 million every month for 20 years for the operation and maintenance of the project. ▪ Raised the issue of underground storage (aquifer capacity) and its yield at the intake site. He has suggested conducting the detail testing to ensure the proposed yield.

Royal Guest House Businessman	Mr. Hem Raj Budhathoki, Owner	▪ Mentioned that most businesses in Sitalpati area dependent on water sourced from the Sharda River. They are bringing in the water with the help of pumps. His business requirement is average 6,000 liters/day. They are spending huge amount of money for bringing the River water to their house (e.g., costs associated with investment on generator, motor, pipes, electricity etc). They feel that the existing practice is costly and not sustainable. So a more reliable, less costly and sustainable solution is required for running a successful business in the area. This will also help to increase the health and sanitation condition in district.
Kantipur Community Hospital	Dr. Ram Krishna Regmi, Owner	▪ The community hospital has a bed capacity of 15 beds. ▪ Due to non-availability of water (both in quantity and quality), there is a rise in water borne diseases in the district. So improvement in water supply sector is important for Salyan. This is more prevalent during the dry season.

Annex D.Sample Grievance Redress Form

(To be available in Nepalese and English)

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

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

FOR OFFICIAL USE ONLY

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

Annex E. Sample Traffic Management Plan

SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

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

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

B. Operating Policies for TMP

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

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

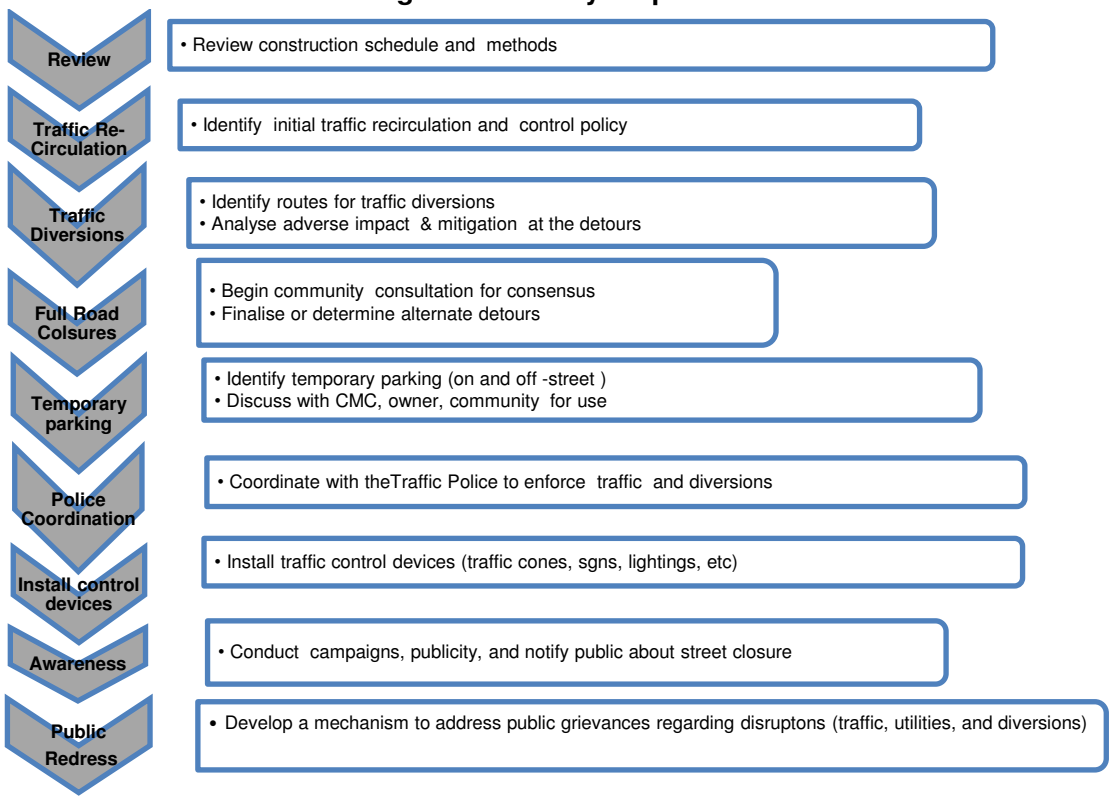
C. Analyze the impact due to street closure

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

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

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

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

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

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

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

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

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

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

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

E. Vehicle Maintenance and Safety

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

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

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

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

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

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

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

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

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

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

Annex F. Spoil Management Plan

Spoil Management Plan (SMP)

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

Objectives of SMP: The objectives of SMP are:

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

Structure of SMP:

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

Aspects and Potential Impacts

The key aspects of potential impacts in relation to SMP are listed in table below

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

Spoil volumes, Characteristics and Minimization

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

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

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

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

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

Storage and stock piling

Transportation and haulage route

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

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

Appendixes

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

Annex G. Sample Semi-Annual Environmental Monitoring Report Template

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

INTRODUCTION

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

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

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

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

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be Reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
    - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
    - If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
    - adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;

- Are their designated areas for concrete works, and refueling;
- Are their spill kits on site and if there are site procedure for handling emergencies;
- Is there any chemical stored on site and what is the storage condition?
- Is there any dewatering activities if yes, where is the water being discharged;
- How are the stockpiles being managed;
- How is solid and liquid waste being handled on site;
- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

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

Overall Compliance with CEMP/EMP

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

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

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

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

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

Air Quality Results

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

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

Water Quality Results

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

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

Noise Quality Results

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

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

Annex H.SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

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

WEATHER CONDITION:
_____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory_____ Incident_____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident:
_____

Intervention Steps:
_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

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

Site Restored to Original Condition	Yes		No	

Signature
_____

Sign off

_____ _____

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

Annex I. Pictorial Highlights of Public Interactions during IEE study at Salyan Town Sub project