Draft Initial Environmental Examination

June 2014

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

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

CURRENCY EQUIVALENT

(As of 15 June 2014)

Currency Unit	-	Nepalese Rupee (NPR)
USD 1.00	=	NPR 95.301
NPR 1.00	=	USD 0.010149

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
PMO	Project Management Office
REA	rapid environmental assessment
RPMOS	Regional Project Management Offices
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
ft	feet
ha	hectare/s
km	kilometer/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.

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EXECUTIVE SUMMARY

1. The Third Small Towns Water Supply and Sanitation Sector Project (3STWSSSP) 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. Charali town subproject is one of the subprojects proposed under the 3STWSSSP. Charali does not have any piped water supply system. About 85% of the households rely on private shallow tube wells for water. Remaining households take water from either open wells or from the tube wells of nearby households. Some clusters and wards suffer from unavailability of water. Water quality tests show that water from shallow tube wells has iron and coliform levels higher than the National Drinking Water Quality Standards (NDWQS). About 83% of the households have toilets. However, some of these households have unimproved sanitation facilities. Those without toilets resort to defecation in nearby forests, field and streams/rivers.

3. **Categorization.** Charali town subproject is classified as Environmental Category B as per the SPS as no significant impacts are envisioned. Accordingly this 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 the 3STWSSSP to improve water supply and sanitation service delivery in Charali. Investments under this subproject includes; (i) construction of a piped water supply system (tube wells, water treatment plant, transmission main, overhead tank, distribution main and household connections); (ii) construction of household latrines and one public toilet; and (iii) establishment of a 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. Implementation activities will be overseen by a separate Project Management Office (PMO) which will be established in DWSS head office in Kathmandu and two Regional Project Management Offices (RPMOs) in the eastern and western region. A team of technical, administrative and financial officials, including safeguards specialists, will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMOs will be staffed by qualified and experienced officers and will be responsible for the day-to-day activities of project implementation in the field, and will be under the direct administrative control of the PMO. Consultant teams are responsible for subproject planning and management and assuring technical quality of design and construction; and designing the infrastructure and supervising construction; and safeguards preparation.

6. **Description of the Environment.** Subproject components are located in Charali 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 forest (thar are not declared as protected areas). There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

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

8. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The concepts considered in design of the subproject are: (i) demand for new piped water supply; (ii) maximum population coverage with pipe layout mostly in residential areas and areas of high growth rate; (iii) avoidance of water-use conflicts; (iv) locating pipelines within ROWs to reduce acquisition of land; (v) locating pipelines at least 10 meters from latrines, septic tanks and any main drains to avoid contamination; (vi) locating 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; and (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 areas, and there are well developed methods for their mitigation. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed. Traffic management will be necessary during pipe-laying on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

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 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 the subproject. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB and DWSS websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

12. The citizens of Wards 1 to 6 of Dhaijan Village Development Committee (VDC) and Wards 4, 5 and 6 of Duwagardhi VDC in Charali will be the major beneficiaries of the project. The most noticeable net environmental 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 improved 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 the DSMC will submit monthly monitoring reports to the PMO. The PMO will consolidate the monthly reports and will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

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 the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009). The Government of Nepal EIA will incorporate the findings and recommendations of this IEE and prescribed environmental management in the EMP.

I. INTRODUCTION

A. Introduction to 3STWSSSP

1. The Third Small Towns Water Supply and Sanitation Sector Project (3STWSSSP) will support the government of Nepal (the Government) in providing water supply and sanitation facilities and services to around 26 small towns in Nepal. Out of the 265 small towns in Nepal, Asian Development Bank (ADB) has already supported the Government, through successful implementation of earlier two projects in 50 towns. Drawing experience from the past projects, the project will fund physical investments in water and sanitation infrastructure in selected small towns in Nepal and non-physical investments in institutionalizing sector reforms, capacity building, project management and service delivery improvement in these towns.

2. 3STWSSSP will be implemented over a five-year period (2015 to 2020) and will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Urban Development (MOUD) and the implementing agency is the Department of Water Supply and Sewerage (DWSS).

3. The outcome will be inclusive and sustainable water supply and sanitation service delivery in selected small towns in Nepal. The project will have 3 outputs; (i) Improved water supply and sanitation infrastructure in selected small towns; (ii) Strengthened sector policy, institutional framework, service delivery and project implementation; and (iii) Improved project implementation and financing platform. The IEE is based on an assessment of these components within the project area.

II. POLICY, LEGAL & FRAMEWORK

A. ADB Policy

4. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects undertaken as part of programs funded under ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. With respect to the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[1]

5. ADB's environmental safeguards policy principles are defined in SPS, 2009, Safeguard Requirements 1 and the IEE is intended to meet these requirements (Table 1)

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

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken (**Annex A)** , indicating that subproject is **NOT**: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and

[1] 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
	secondary influence areas. Significant adverse impacts during construction will be temporary and short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient. The IEE including specific description of the environment and corridor of impact will be updated as necessary based on the final design and alignments.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Section VI). Preliminary climate change screening as part of the REA was conducted.
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	Analysis of "with-subproject"or "without-subproject" is presented in Section III.
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts by means of environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Section IX
Carry out meaningful consultation with affected people & facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted (Annex D). A grievance redress mechanism for the resolution of valid project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft EIA (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	The draft IEE will be disclosed on ADB's website prior to project appraisal. Copies of both SPS-compliant IEE and Government of Nepal-approved EIA will be made available at the offices of the Project Management Office (PMO), Regional Project Management Offices

SPS 2009 - Safeguard Requirements	Remarks
	(RPMOs)and Water Users' and Sanitation Committee (WUSC) for public consultation. For the benefit of the community, the summary of the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring 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.
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	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.

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

B. Nepal's Environmental Policy and Legal Framework

6. 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:

(i) **Environmental Protection Act (EPA), 1997.** Requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA report approved by the concerned sector agency or Ministry of Science, Technology and Environment (MoSTE), respectively, prior to implementation. The EPA: (i) sets out the review and approval process of IEE and EIA reports, that involve informing and consulting stakeholders; (ii) stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards; (iii) specifies for the Ministry in charge of environment (currently the MoSTE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA report; (iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and (v) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

(ii) **Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007**. Defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and

2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007.

7. Other environmental and core labor policies, laws and rules that are relevant to the subproject are presented in Table 2.

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

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.	A Government of Nepal environmental assessment report will be prepared based on this IEE.
		Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	The source is groundwater to be drawn from the deep aquifer. Prevailing water source is the shallow aquifer and water drawn has Mn, Fe, Al and coliform levels exceeding National Drinking Water Quality Standards (NDWQS). Hence, people are eager to be connected to piped water supply system.
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Site for the intake well, treatment unit, overhead tank is government land (Dept. of Forest).
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	Environmental Management Plan prescribes the compliance with NDWQS and its Directives during operation.
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with	EMP provides measures to mitigate workers' helth and safety hazards.

Policy/Law/Guideline	Year*	Relevant Provisions	Remarks
		arrangements for the use of protective devices and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from liftig of heavy weights.	
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.	Subproject will not impact on any forest. EMP stipulates no illegal quarrying of natural aggregate materials.
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, most relevant to the Project are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	Subproject will not impact on physical cultural heritage & biodiversity. EMP provides measures to mitigate impacts.
National Water Supply and Sanitation Policy	1998	The Policy requires the: (i) monitoring of water quality supplied by completed WSS projects; and (ii) evaluation of their benefits in improving health (e.g., reducing water-borne diseases) and in relieving the sufferings of women and other disadvantaged groups in carrying out their responsibilities over water collection and maintenance of sanitation and hygiene.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Drinking Water Rules	1998	The Rules: (i) gives the procedure for the settlement of dispute on use of water sources; (ii) requires water supplier to maintain the quality of water as prescribed in the Water Resources Act; (iii) prohibits water supplier to construct structures and conduct activities that would pollute the water source and cause significant adverse effect on the environment.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties & powers to: (i) conserve & protect their local environment & natural resources; (ii) plan, implement &/or operate & maintain local WS projects; (iii) implement or arrange for implementation local sanitation/sewerage & drainage projects; (iv) protect cultural heritage & religious sites; &/or (v) monitor project activities within their respective jurisdictions.	Provides basis for Local Government to monitor the environmental performance of the subprojects. EMP provides the responsibilities of Local Governments (LGs)in EMP implementation.

Policy/Law/Guideline	Year*	Relevant Provisions	Remarks
National Urban Policy	2007	Policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.	Government of Nepal Government of Nepal environmental assessment report, based on this IEE, will be prepared to ensure environmental conservation and protection.
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.	Government of Nepal environmental assessment report will be prepared based on this IEE. This ADB IEE will be submitted to ADB for review and approval.
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector	2009	The Plan defines the population threshold of "small towns" to be in the range of 5,000 to 40,000. Reference to Schedules 1 and 2 of the EPR, as amended in 2007, places water supply projects in small towns under Schedule 1 or within the threshold of water supply projects requiring only an IEE. The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes environmental effects and performance monitoring.
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.

* last year amended

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

9. Nepal is party to the following international environmental agreements that have broad relevance to works and environmental assessment of works under the project: (i) World Heritage Convention, in 1978; (ii) Convention on Wetlands of International Importance

Especially as Waterfowl Habitat (Ramsar Convention), in 1987; (iii) Convention on Biodiversity, in 1992, (iv) Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London Amendment, in 1994, and (v) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, in 1996. 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 (MDG), the seventh goal of which is to "ensure environmental sustainability" targeting the reverse of loss of forest and environmental resources, reduction of biodiversity loss, and increase in the proportion of population with sustainable access to safe drinking water and basic sanitation.

III. ANALYSIS OF ALTERNATIVES

10. Charali is facing significant development challenges as it experiences medium growth rate. Meeting the water supply and sanitation needs of its constituents is deemed as a priority.

11. **'Without-subproject' or 'do-nothing' alternative.** Doing nothing about this challenge would be allowing Charali town to further develop as "under-serviced", the health of its residents and the general public at more risks, and its living environment, unsustainable. This would impede: (i) sustainable social and economic development of Charali town and in effect, of the Jhapa District as well; and (ii) Nepal's delivery of its commitment to MDG 7 to increase the proportion of population with sustainable access to safe drinking water and basic sanitation.

12. '**With subproject' alternative.** With the subproject, over 2,500 households will have convenient access to reliable and adequate safe and potable water supply. As a result, 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 Charali town. There will be indirect benefits to the VDCs surrounding Charali town. Improved water supply will create an enabling environment for local economic development and improved social services that communities within the sphere of influence of Charali Town will benefit from; thus, contributing to overall local economic development of the district.

13. The 'with subproject' alternative will contribute to the realization of the Updated 15-Year Development Plan for Small Towns Water Supply and Sanitation Sector and to the delivery of Nepal's commitment to MDG 7.

IV. DESCRIPTION OF SUBPROJECT

A. The Study Area

14. Charali is an emerging town in Jhapa District in the Eastern Development Region of Nepal. The town area is 13.74 sq.km and its total population in 2012 was 11,728. The location map is shown as **Figure 1**.

15. Charali is experiencing medium growth rate, as it continues to attract migrants from the hilly areas due to its available physical facilities like access road, marketing facilities, residual area, campus, electrification, telecommunication and importantly, fertile land. Moreover, it is strategically located at the cross road of East West Highway and Mechi Highway.

16. Subproject components will be located in the Charali town area or in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at these sites. The subproject sites will be located in government-owned land and pipes will be laid along existing right of way (RoWs). There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Charali town.

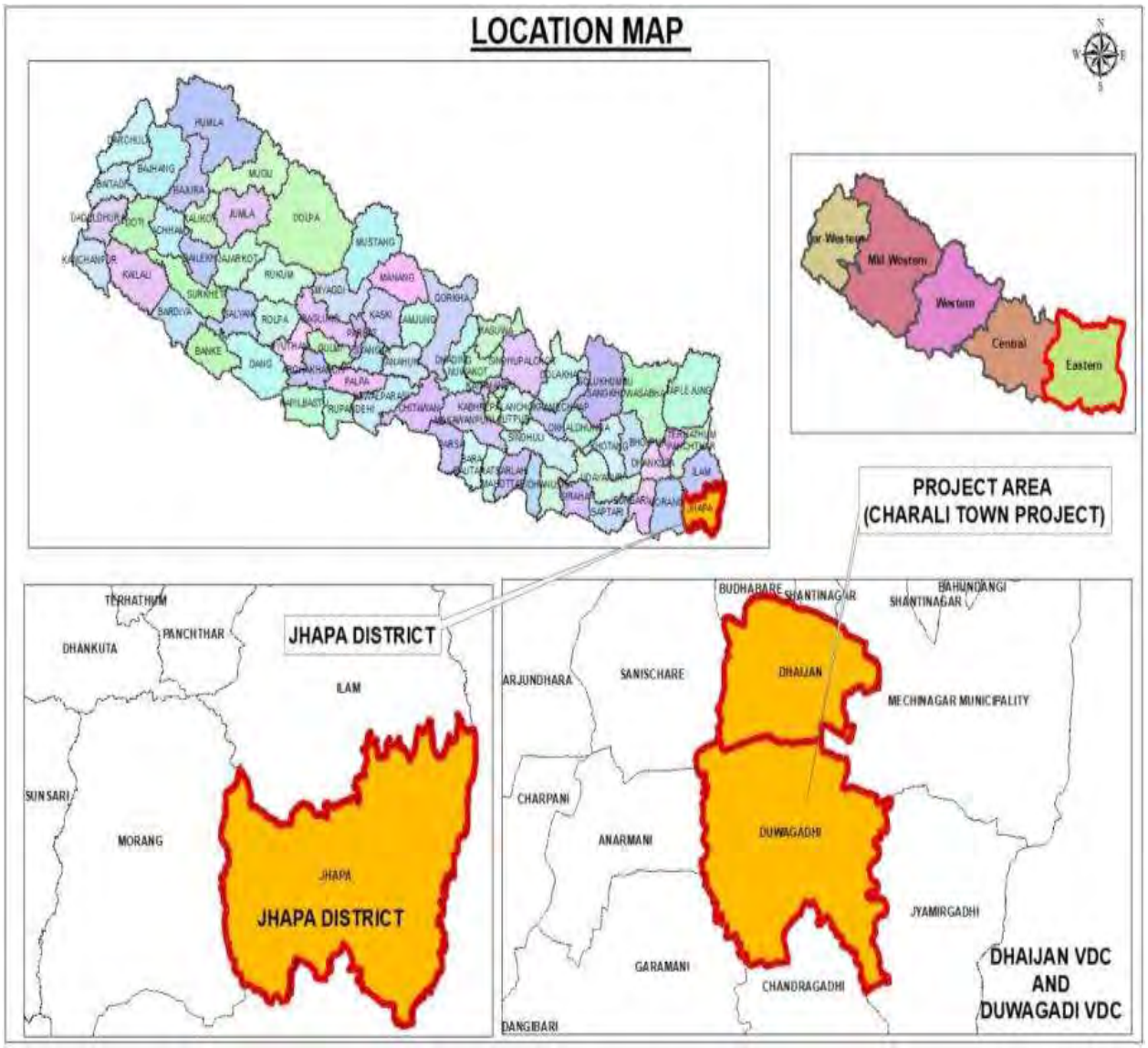


Figure 1: Location Map of Charali Town

B. Existing Condition and Need for the Subproject

17. The subproject area does not have any piped water supply system. About 85% of the households in the subproject area rely on private shallow tube wells for water. The rest of the households take water from either open wells or from the tube wells of nearby households. Some clusters and wards as No. 4 of Duwagadhi and No. 6 of Dhaijan VDC mainly suffer from unavailability of water. Tests have shown that water from shallow tube wells have high iron

content and coliform levels. Water-borne disease cases, associated with poor quality of water, unsanitary conditions and lack of personal hygiene, are on the rise. Diarrhea, dysentery, skin disease (scabies), worms (roundworm, whipworm, tapeworm and guinea worm), fever (typhoid), malaria and jaundice are most common in the area. There were 273 cases of community people suffering from water borne diseases last year.

18. About 83% of the households have toilets. Some of these households have unimproved sanitation facilities. This include pit latrines with bamboo, shrubs cover, with walls of pits not properly protected. Those without toilets resort to defecation in nearby forests, field and streams/rivers.

19. Charali is developing to be a market center as well as the center for transportation. There is only one public toilet in Charali Town. This is situated in the market area managed by Market Management Committee (Bazaar Byawastha Samittee) and needs connection to a reliable water supply. The Sunday Hatt Bazaar does not have a public toilet.

C. Proposed Components

20. From consultations with the subproject stakeholders, it was apparent that all were eagerly waiting for the subproject, believing that access to safe and potable water will significantly contribute to the improvement of quality of life in Charali and the local economy.

21. The subproject will (i) develop a piped water supply system for Wards 1 to 6 of Dhaijan Village Development Committee (VDC) and Wards 4, 5 and 6 of Duwagardhi VDC; (ii) provide water connection to existing public toilet near the highway; (iii) construct household latrines and a new public toilet at the market; and (iv) establishment of septage management site as a pilot. The location of the subproject investments is provided in Figure 2.

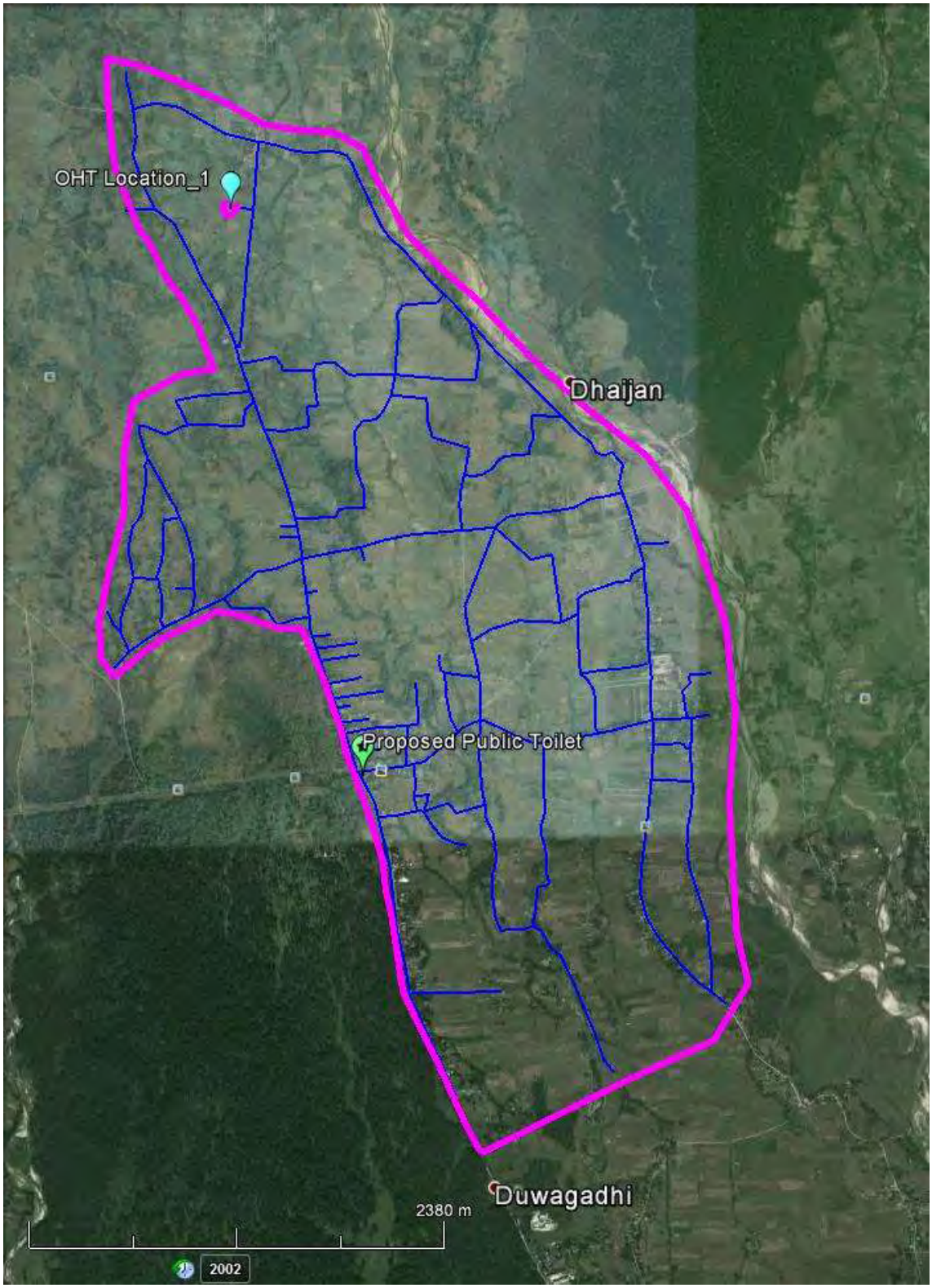


Figure 2: Location of Water Supply and Public Toilet Components in Charali

1. Water Supply System

22. The water supply system will tap the groundwater at Ward 6 of Dhaijan VDC through two deep tube wells, each designed to have a safe yield of 16.5 liters per second (lps). The works will comprise structures, pipelines and a set of operations and maintenance (O&M) tools and equipment. The subproject will serve a total of 2,565 household connections. The major structures include:

(i) 2 tube wells of approximately 150m deep with one submersible pump each;
(ii) treatment unit, 33 lps capacity, consisting of two units of lime dosing tanks, aeration towers and pressure filters;
(iii) one overhead tank (OHT), 450 m^3;
(iv) ductile iron (DI) transmission mains, 450 meters (m); and
(x) distribution pipelines, total length of 57.412 kilometers (km), consisting of 53.646 km of HDPE pipe and 3.766 km of DI pipe

23. The layout plan of the site for one deep well, water treatment plant, OHT and buildings, is provided in Figure 3**.** The specific description of sites and surroundings of the main components are presented in Table 3.

Table 3: Water Supply System Main Component Sites and Surroundings

Component	Description
Deep tube well 1, treatment unit and overhead tank	One deep tube well will located at the north tip of Ward 6, Dhaijan VDC, together with the treatment unit, overhead tank and other ancillary facilities such as office building,. The site lies about 300 m west of Mechi Highway. Site has been donated to, and is registered in the name of, the WUSC. Presently, it is being cultivated (with 2 crops) by the land donor/ex-owner until construction starts. Access road will be constructed.
Deep tube well 2	Deep tube well 2 will be sited at about 300 m from the DTW 1. Site has been identified and is currently being transferred to the WUSC. Site is used for cultivation. Transmission main will run from this site to the treatment unit at the deep tube well 1 site.
Distribution pipes	Distribution main lines follows side of highway. People are walking on the shoulders of the Highway. Paved carriageway is one lane each way.

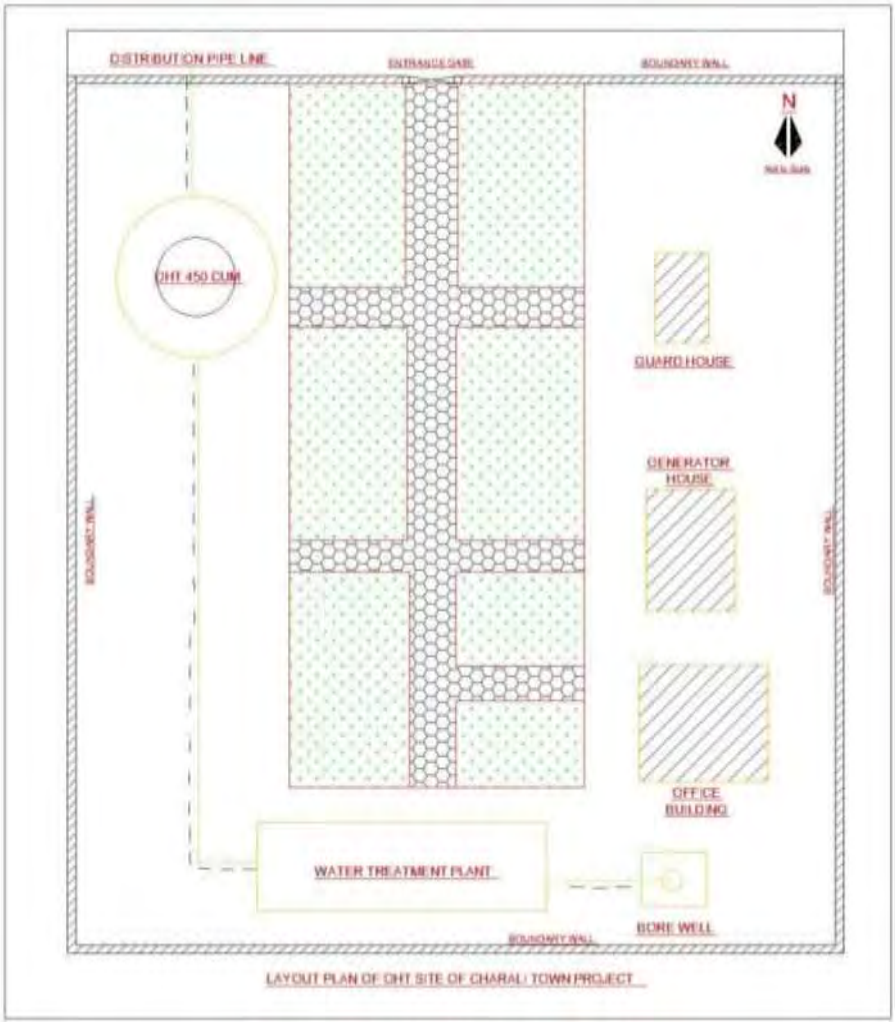


Figure 3: Layout of the Water Treatment Plant, OHT and Buildings in Charali

2. Household and Public Toilets

24. To promote open defecation free (ODF) in the town, it is proposed that household level toilets will be constructed for those who are lacking improved sanitation facilities. An output based aid (OBA) mechanism will be used especially amongst the low income households. A public toilet at the Hatt Bazaar will be constructed to provide market vendors and goers with sufficient facilities to discourage open defecation.

3. Septage Management

25. To improve the current situation of uncontrolled disposal of septage collected from septic tanks, in local waterways and drains, a septage disposal site will be established in Hate Malo community forest. An area of approximately 200 m^2 will be required to establish the septage disposal burial pit. Septage from household and public septic tanks will be collected by existing private contractors and disposed at this site.

D. Implementation Schedule

26. Detailed designs for the water supply system and household and public toilets are completed and procurement for works will be tendered out by end May 2014. It is estimated that time for construction of the water supply system will be 24 months. An extended defects period of 2 years including one year for operation and maintenance will be included in the contract. Construction of household toilets through an OBA mechanism and the public toilet will be also be procured under the same contract and constructed within the contract period. Septage disposal site will be established under the grant component of the loan on a pilot basis.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical and Chemical Environment and Resources

27. **Landforms, Topography, Geology and Soils.** Charali lies in the Terai belt in the Eastern Development Region on the southern portion of the Churia Hill Region of Nepal. The elevation of the subproject area is 122-134 m above mean sea level. The land is almost plain and has gentle slope towards south. The area comprises of gravel sand and clay.

28. **Climate.** Charali lies in a sub-tropical climatic region, where summer is very hot and winter is cool. Average minimum temperature is 8°C; average maximum temperature is 34°C. Rainy season starts from June and ends in September. Meteorological records of 2004 show that Jhapa District had a total annual rainfall of about 2,450 mm.

Table 4. Meteorological Records 2004

Month	Temperature		Rainfall
	Maximum	Minimum	
January	23.0	8.8	20.4
February	27.5	11.3	0.00
March	31.7	17.6	10.2
April	31.4	20.5	93.2
May	32.8	22.7	245.3
June	33.3	23.7	308.7
July	31.6	24.1	903.0
August	34.2	24.9	327.1
September	33.2	23.3	412.7
October	31.9	18.7	130.7
November	30.6	13.0	0.00
December	27.4	11.3	0.00
		Total	2451.3

Source: DDC, Jhapa, 2013

29. **Water Quality.** The proposed subproject area is situated in between two Rivers these are known as Hadia Khola and Birin Khola. These kholas are dried up in summer.

30. Groundwater is available in the area. Dug wells and shallow tube wells are present within the surrounds of the area as sources of at least 85% of the total households. No deep tube well exists in Charali. Water obtained from Budhbare bore well was tested for quality during design. The test revealed Fe, Mn and Al contents as exceeding NDWQS limits. Arsenic, which is a big threat to groundwater resources in the Terai was not detected. Coliform was detected. These findings provide basis for the form of treatment that will be proposed for the subproject.

Table 5. Groundwater Quality Data of Charali

Parameter	Unit	Deep Tube Well *	Sallow Tube Well **	NDWQS	WHO
Temperature	^{o}C	29.0	28.7	-	-
pH	-	7.4	7.7	6.5-8.5	None
Electrical Conductivity	µc/cm	167	172	1500	-
Color	TCU	<5	<5	5	None
Total Dissolved Solids	mg/l	80	110	1000	-
NH_3-N	mg/l	0.63	0.84	1.5	None established
NO_3-N	mg/l	0.09	0.11	50	50
Chloride	mg/l	<1	<1	250	None established
Total Hardness	mg/l	76	93	500	-
Calcium	mg/l	56	62	200	-
Total Alkalinity	mg/l	70	76	-	-
Iron	mg/l	0.92	2.42	0.3 (3)*	-
Manganese	mg/l	ND	0.1	0.2	-
Arsenic	mg/l	ND	ND	0.05	0.01
Zinc	mg/l	ND	ND	3	None established
Copper	mg/l	ND	0.02	1	2
Lead	mg/l	ND	ND	0.01	0.01
Chromium	mg/l	ND	ND	0.05	0.05
Cadmium	mg/l	ND	ND	0.003	0.003
Aluminum	mg/l	0.12	0.18	0.2	None established
Total coliforms	cfu/100 ml	928	1,260	0	Must not be detectable in any 100 ml sample
Fecal coliforms	cfu/100 ml	0	752	0	

Source: Detailed Engineering Design Report of the Charali Town Project, July 2013.

* Water sample obtained from Budhbare well, about 2.5 km north from the proposed bore site for the subproject..

** Community shallow tube well in Charali

Exceeds both NDWQS and WHO guideline values

Exceeds NDWQS limit

31. **Air Quality.** The main source of air pollution is dust due to movement of vehicles and construction activities. Interior roads are generally earth or gravel roads. Particulate matters easily suspend in the air with the passage of vehicles, particularly during the dry season. The anthropogenic non-point air pollution sources in the subproject area are household cooking and burning of domestic solid wastes and agricultural/farm wastes. Point sources of air emissions include the few small scale industries in the subproject area and its vicinity. However, the contribution from these sources is scattered and not sufficient to cause air quality parameters to exceed national standard limits. Based on observation, the ambient air quality in the subproject area is within the limits prescribed by the National Ambient Air Quality Standards of Nepal.

32. **Acoustic Environment.** The sources of noise in Charali Town are the construction activities, vehicle movement and some small scale industries/businesses. At daytime, noise is expected to be higher in the Town center along the East-West Highway. From field observation, noise level in Charali is within the national and international permissible standards at daytime and nighttime.

B. Ecological Environment and Resources

33. **Flora**. Deforestation has decreased the flora of the project area but since the concept of community forests has been introduced, there has been an improvement in the forest cover. A mixed forest area is on the southwest and northeast portion of the subproject area. It predominantly consists of Sisso (Dalbergia Sisso), Mango (Magnifera Indica), Coconut (Cocos nucifera), Betelnut (Areca catechu), Bamboo (Bambusa vulgaris), Kadam (Anthrocephalus chinensis), Sakhuwa (Shorea Robusta), Masala (Eucalyptus camaaldulensis) and Siris (Albizia procera).

34. **Fauna** Most of the subproject is now agricultural lands. Wild life is not found in the subproject area. Wildlife outside the subproject area includes Mongoose (Herpetes edwardsii) and Jackal (Canis aureus), Bird species found in area includes; Crow (Corvus splendens), Sparrow (Passer domesticus), Pigeon (Columba livia), Dhukur, Bakula, jungle fowl, and vultures.

35. **Protected Area**. In the periphery of the subproject area, there is no declared protected area. The Hate Malo community forest, 391 ha, borders the southern segment of Mechi Highway on the west. The Kalika community forest lies to the northeast of the service area, east of the Daijan Road. Distribution main will be installed along Daijan Road. The closest edge of the forest to Daijan Road is about 450 m away. Both forests are not declared as protected areas.

C. Physical Cultural Resources

36. There are no physical cultural resources within or adjacent to the subproject's component sites.

D. Socio-Economic Environment and Resources

37. **Land Use Pattern, Sectors of the Economy and Accessibility.** Charali is experiencing medium growth rate. The major factors that attract migration to Charali are its available physical facilities like access road, marketing facilities, residual area, campus, electrification, telecommunication and importantly, fertile land. It is located at the cross road of East West Highway and Mechi Highway. From the highways, settlements are accessed through earth or gravel interior roads.

38. No specific area has been designated for industries. A few small scale industries exist in Charali, such as rice mills and shops. Charali is still highly agricultural in terms of land use and occupation of its population. The main product is paddy rice, maize and wheat. Horticulture and livestock raising including poultry are engaged in but not in commercial scale. The people of Charali VDC have been also attracted towards land development, and small businesses (retail shops of various types). The subproject VDCs have some small industries like bamboo industry, agro, poultry, and dairy.

39. **Population.** The subproject area has 2,565 households and a total population of 11,928 people. The average household size is 4.57. Sixty% of the households reside in the six wards of Dhaijan VDC. Subproject area population is projected to reach 12,700 by 2015 and nearly 19,000 by 2030.

Table 6. Total Households and Population by Ward

VDC/Ward	Cluster Settlements	HHs	Population
Dhaijan VDC			
Ward 1	Dhaijan Chowk, Makhan Tole, Karki Tol Labarbote	281	1,346
Ward 2	School Tole, Mill Tole, Aapgachi	104	514
Ward 3	Mechi Gaon, Fighter Tole, Dhaijan Chowk	174	817
Ward 4	Saimarg	49	224
Ward 5	Dhimal Gaon	108	489
Ward 6	Kalijhoda, Bsrjhsng Tol, Shere Dangi , Naya Basti, Godhuli Chowk	837	4,089
	Sub-Total (Dhaijan VDC)	1,553	7,479
Duwagardhi			
Ward 4	Charali Chowk, Santi Tol, Mandir Tol, Aitabare Tol	514	2,138
Ward 5	Fulbasa, Katthe Gaon, Teli Gaon, Bange Bazar, Sansthan Line	264	1,190
Ward 6	Dhaijan Chowk, Ram Nagar Tole, Balmari Tol	234	1,121
	Sub-Total (Duwagardhi VDC)	1,012	4,449
	TOTAL (Subproject Area)	2,565	11,928

Soure: SSTWSSSP (Charali Town Project) Final Detailed Engineering design Report, July 2013.

40. **Caste and Ethnicity.** Like other towns of Nepal, Charali is also characterized by heterogenic caste composition. Considering the both of Duwagardhi and Dhaijan VDCs collectively, Brahman and Chhetri constitute 27%; Rai, 12%; Tharu/Rajbansi, 6.5%; Kami/Damai, 6%; Gurung/Magar, 4.47%; Newar, 4.4%; and others, 38%.

41. **Occupation/Employment and Income.** According to the Socio-Economic Survey, of the households surveyed, a high 41% were engaged in agriculture. Those engaged in business constituted 20%. Some 16% were in service sector; nearly 12% were laborers; while 8% depended on remittance from abroad. Less than 2% was in the industry sector and other form of occupation.

42. The same survey revealed the average household monthly income of those surveyed to be NPR 23,650.00. Some 58% were in income level of more than NPR 15,000; 19% had incomes between NPR 10,001 and 15,000; another 19% were earning between NPR 4001 and 10,000; while about 4% were in the income category of below NPR 4,000.00.

43. The urban poor groups below poverty line with a monthly household income of less than NPR 8,000 are estimated to constitute 4.7 % of total households, i.e., 98 households. These households vary from Brahmin to Rai, other indigenous, marginalized and scheduled castes who have been working in their own professions of tailoring, shoe making, iron smiths and farmers. They have close ties with the other effluent societies and are making contributions in the development

44. **Access to Basic Services. Health.** The subproject area is served by one health center. Water-borne disease cases, associated with poor quality of water, unsanitary conditions and lack of personal hygiene, are on the rise. Diarrhea, dysentery, skin disease (scabies), worms (roundworm, whipworm, tapeworm and guinea worm), fever (typhoid), malaria and jaundice are most common in the area. There were 273 cases of community people suffering from water borne diseases last year.

45. **Education.** According to the Socio-Economic Survey, 15% of the respondents were illiterate; while 15% were just literate. Seventeen% attained primary; 21%, secondary; 14%, SLC; and 11%, IA, levels of education. About 5% have bachelor's degree and a little over 1%, master's degree.

46. **Water Supply.** The subproject area does not have any piped water supply system and the community completely relies on shallow tube well/hand-pumps. As indicated in the preliminary survey, there are 1,775 private tube wells in the subproject area, serving 85% of the total households. The rest of the households take water from either open wells or from the tube wells of nearby households. Some clusters and wards as # 4 of Duwagadhi and # 6 of Dhaijan VDC mainly suffer from unavailability of water.

47. **Sanitation.** About 83% of the households have toilets. The remaining households resort to defecation in nearby forests, field and streams/rivers. There is one public toilet in the subproject area, run by Bazar Samiti in Ward 4.

48. **Drainage**. Linear stormwater drainage of about 2 km exists in the market area. Outside the market area, the VDC and users have been constructing drains, especially along the East-West Highway, inner core areas and newly developed areas.

49. **Solid Waste Management.** Some openly dumped solid wastes can be seen in the market area. In other parts of Charali, people manage their solid wastes in their backyard.

50. **Power Supply.** The subproject area is connected to the national grid. However, power supply is intermittent to observe load shedding hours.

51. **Telecommunications**. Most of the institutions and some private owners have telephone connections.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Positive Environmental Impacts and Benefits

52. 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 the public having access to public sanitation facilities;
  - the benefit of having household sanitation facilities to reduce the likelihood of open defecation;
  - promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and

- enhanced public environment, enhanced public health and safe communities as outcomes.
- Controlled disposal of septage to reduce the likelihood of irregular disposal (in nearby waterways and land) and improve public and environmental health.

53. Overall, the subproject will lead to enhanced public health and urban environment, significantly contributing to a qualitative improvement in the lives of Charali Town residents.

54. To sustain the positive outcomes, effective operation and maintenance guided by an O&M Manual that contains Water Safety Plan , among others, is essential. Continuing hands-on training of WUSC in EMP implementation particularly during the operation and maintenance of water and sanitation facilities.

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

55. The Rapid Environmental Assessment (REA) Checklists for water supply and sanitation were used to identify potential impacts/issues/concerns of the subproject as per preliminary design (**Annex 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 7 presents the measures taken during project preparation and IEE to mitigate them.

56. Relating to design, the salient concerns would be the inadequate consideration/ incorporation of the REA-identified impacts/issues/concerns that should be considered during design as listed in Table VI-1 and the following:

- yield of source, particularly in a scenario of climate change induced drought.
- existing users of the groundwater resource in the vicinity or upstream;
- social considerations of nearby population and service providers and their opinions;
- vulnerability to damage during earthquake;
- existing utilities adjacent to or encroaching the footprints of horizontal works; and
- sustainable source/s for construction aggregate materials.

Table 7. REA-identified Impacts/Issues/Concerns and Mitigation Measures Taken during Project Preparation and IEE

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED and IEE to mitigate impacts/issues/concerns
<u>Issues & concerns that should be considered during design</u> - Unsatisfactory raw water quality	During the detailed engineering design stage, water samples from deep tube well & shallow well were tested. Tests revealed iron content and coliform as beyond standard limits. This information has guided design of water treatment and depth of well. However verification on the yield through borehole tests need to be carried out and confirmed before award of contract.
- Delivery of unsafe water to the distribution system	Design proposes basic treatment using lime dosing, pressure filter and disinfection using Ca(ClO)2 and

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED and IEE to mitigate impacts/issues/concerns
	provisions for lab unit and kits. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first few years of operation under the Water Safety Plan included in the subproject design, & continuing training thereafter.
- Inadequate protection of intake structures	Intake well has adequate land for perimeter fencing to keep animals away from grazing nearby. Appropriate casing of tube wells including the installation of screens. Intake well to be located at least 30m upstream from sanitation facilities. Where this cannot be maintained; (i) septic tanks will need to be sealed (water tight) and emptied as per the design requirements; (ii) tube wells to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once every quarter). Disinfection of the tube well should be conducted prior to commissioning and after repairs.
- Health hazards arising from inadequate design of facilities for receiving, storing and handling of Cl & other hazardous chemicals	Design has included a "housed" dosing unit.
Delivery of water to distribution system, which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed DI, and HDPE pipes.
Contamination of drinking water source and other environmental receptors from household and public toilets	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source.
Risk to public and environmental health due to inappropriate siting and design of septage disposal pit.	The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e.g. US EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown.
Impact of climate change resulting in; (i) insufficient water in aquifers to sustain demand; (ii) damage to physical infrastructure due to flooding; and (iii) impact to water quality.	The project design incorporates the following (i) groundwater source for water supply will be from deeper aquifers where yields are sustainable and not affected by changes in precipitation that can influence the rate of aquifer recharge; (ii) pipes will be constructed below ground to avoid damage during floods; (iii) water safety plans will be developed and implemented in all project towns; (iv) no infrastructure will be constructed in the floodplains; (vi) source protection will be carried out; and (vii) water conservation and demand management measures will be promoted and adopted by the WUAs/LBs.

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED and IEE to mitigate impacts/issues/concerns
	To further reduce the impact of climate change on physical investments and build resilience of project towns, the design guidelines of DWSS for small towns will incorporate a separate section on climate change with explicit assessment and adaptation procedures for subprojects.
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 of water supply system Excessive algal growth in reservoirs	EMP incorporates mitigation measures.
Occupational health and safety hazards from handling and 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	Water safety plans are part of the design of the water supply system.
Impacts that should be mitigated/enhanced during operation of toilets and septage disposal	
Contamination to land or waterways 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 waterways (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.

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

57. **Non-compliance with relevant environmental legislation.** 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 license to use the water resource 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.

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

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

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

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

62. **Impacts on Topography and Landform and/or River Morphology and Hydrology.** Quarry operations may cause localized changes in topography and landform (if done on land) and river morphology and hydrology (if done on riverbeds). Impact is expected to be site-specific, affecting a relatively small area and reversible by mitigation measures, 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. Coordination must be made with MoSTE and local authorities regarding restrictions in quarrying from rivers.

63. **Impacts on water quality**. Some dug wells and water bodies will be in close proximity to pipeline or other component works. During construction, there will be risk of pollution of these

water resources from poorly managed construction sediments, wastes and hazardous substances; and poor sanitation practices of construction workers. To mitigate: (i) prepare and implement management plans for spoils, stockpiles, wastes and hazardous substances (ii) provide adequate sanitation facilities and water supply at construction and camp sites; and strictly enforce upon workers to practice proper sanitation.

64. **Impacts on Aesthetics.** Construction works will potentially involve cutting of a few trees of common species in along the boundaries of community forests. Construction works will temporarily mar the landscape with excavated soils, residual soils/spoils, stockpiles of aggregates and construction materials (such as pipes), solid wastes, and haphazard parking of construction equipment. To mitigate: (i) apply for tree-cutting permit and implement and tree-replanting plan coordinated with the Community Forest Users' Group; (ii) implement a spoils, waste, debris disposal plan; (iii) keep works premises clean and orderly; and (iv) in areas where visual environment is important or where there are privacy concerns, provide screens or hoarding/temporary fence of suitable materials.

65. **Impacts on Biodiversity**. There are no protected areas in and around the subproject sites. Haphazard site clearing, parking and movement of construction vehicles and equipment, stockpiling in this area could result in unnecessary loss of vegetation beyond subproject footprint. Illegal harvesting and poaching by workers from community forest surrounding or nearby workers camp for use as fuel for cooking and/or eating can cause some loss of forest resource.

66. 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) providing alternative fuel to workers for cooking; and (v) strictly prohibit harvesting and poaching of forest resources by workers.

67. **Impacts on Physical Cultural Resources.** 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.

68. **Impacts on the Socio-Economic Environment and Resources. Slow mobility in the core areas, blocked accesses to properties and work sites, localized 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). Nuisance and safety hazards are the indirect impacts.

69. 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.

70. **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.

71. 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 and prohibit unauthorized entry; (iii) Contractor's preparedness in emergency response; and (iv) adequate dissemination of the GRM and Contractor's observance/implementation of the GRM.

72. **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.

73. 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 housing at the workers' camp with adequate basic services and provide adequate water supply and sanitation facilities at work sites; (iv) arrange with nearest health center and hospital for health care and emergency care of workers. Overall, the contractor should comply with IFS EHS Guidelines on Occupational Health and Safety (this can be downloaded from http://www1.ifc.org/wps/wcm/connect/9aef2880488559a983acd36a6515bb18/2%2BOccupational%2BHealth%2Band%2BSafety.pdf?MOD=AJPERES)

74. **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

75. **Non-compliance with relevant environmental legislation.** 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 license for use of water resource.

76. **Delivery of Unsafe Water.** 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.

77. 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 and a water safety plan; and (v) monitor water quality.

78. **Non-sustainability of Services or Completed Works.** 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.

79. **Occupational Health and Safety Hazards.** 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.

E. Indirect, Induced and Cumulative Impacts

1. During Construction

80. **Indirect and Induced Impacts.** The volume of vehicle movements that will be generated from the simultaneous construction of component sites will create choke points at the narrow access roads and slow down mobility of people, good and services, particularly in the bazaar area. 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.

81. **Cumulative Impacts.** There are no known ongoing or proposed developments in Charali 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.

82. 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 significant 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.

83. 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 and local authorities

and proper coordination, particularly regarding expected cumulative impacts.

- 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

84. 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.

85. 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 increment in urban growth that will be driven by the availability of a reliable water supply system. 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

86. 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 8 lists down the persons consulted during the IEE. Table 9 presents the issues raised and how the IEE has addressed them **Annex D** presents the notes of some of the consultations.

Table 8. Lists of People and Institutions Consulted

Date/No.	Name	Organization/Occupation	Address
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 Charali 03 March 2014			
1	Mr. Hem Prasad Poudel	Farmer	Dhaijan-5
2	Mr. Lal Bahadur Thebe	Chaiman, WUSC	Charali-4
3	Mr. Chandra K. Sherpa	Neighbor of OHT /intake site	Dhaijan-6
4	Ms. Sonu Nembang	Housewife	Dhaijan- 6
5	Ms. Gita Sherpa	Farmer	Dhaijan- 6
6	Ms. Sunita Sherpa	House wife	Dhaijan- 6
7	Mr. Bishnu Prasai	Treasure, Charali WUSC	Duhagadi 6
8	Mr. Rajan Adhikari	Businessman, Binita medical	Duhagadi 6

9	Mr. Mahendra Poudel	Businessman , Mahalaxmi store	Charali-4
10	Ms. Kalpana Rijal	Local resident	Charali-4
11	Mr. Bhanu Marasini	Local resident	Charali-4
12	Mr. Chetan Poudel	Local resident	Charali-4
13	Mr. Shamuhang Limbu	Businessman, Mandro restaurant	Duhagadi 6

Table 9 Issues Raised by Interviewed Stakeholders

Issues	How Issue Addressed
WUSC needs training in water quality monitoring not just once, but should be continuing	IEE recommends a licensed and accredited laboratory to conduct the water quality monitoring in the first few years of operation (2-3 years), with the active participation of the WUSC, as form of training.
People in Charali are not much aware about proper health and sanitation practices, requiring awareness raising program.	IEE recommends social preparation of communities prior to actual commencement of the subproject. (Project Output 2 includes "Improving Public Awareness for Sanitation".)
Safety concern for a house adjacent to the intake/water treatment/OHT site during construction .	IEE recommends hoarding/temporary fencing of work sites adjacent or close to populated/settlement areas and to strictly enforce "no unauthorized entry" to work sites.
Concern on the price of water they have to pay after being connected to the system.	IEE recommends social preparation of communities prior to actual commencement of the subproject.
Have heard about the poor performance of contractors in STWSSP subproject elsewhere.	In terms of environmental performance, the IEE recommends preparation of Contractor's EMP (C-EMP) addressing as minimum the requirements of the SPS-compliant EMP, monitoring of environmental performance of contractor; approval by ADB of the C-EMP; and stipulating some tie-up of progress payment and collection of performance bond with the performance in the C-EMP. A grievance redress mechanism will be established to accommodate complaints.
Incidence of water-borne diseases in increasing trend.	IEE proposes water quality monitoring as prescribed in the Nationakl Drinking Water Quality Standards and its Directives. IEE recommends social preparation of communities prior to actual commencement of the subproject. (Project Output 2 includes "Improving Public Awareness for Sanitation".)

87. During the conduct of the Feasibility Study, consultations were undertaken by the Design and Supervision Consultants. 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 RPMOs will maintain good communication and collaboration with the WUSC and VDC. The PMO, RPMOS, 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:

- Prior to construction, the PMO and RPMOs 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 RPMOs, 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, RPMOs 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, RPMOS, WUSC and VDC.

- During construction, regular random interviews will be conducted by the RPMOS-ESA every month to monitor environmental concerns of subproject communities.
- During operation, periodic random interviews will be conducted by the PMO and RPMOS and WUSC to monitor the environmental concerns of subproject communities.

88. For the benefit of the community, the summary of the IEE Report will be translated in the local language and made available at the (i) offices of MUD and DWSS/PMO, (ii) RPMO offices, (iii) DSMC offices; (iv) contractor's campsites; and (v) WUSC offices. It will be ensured that: (i) hard copies of the IEE (in English and Nepalese) are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness; and (ii) an electronic version of the IEE will be placed in the website of the ADB after approval and will be placed in the official website of the MUD and DWSS.Copies may be made available upon formal request. Environmental monitoring reports will be disclosed on the ADB,, MUD and DWSS websites.

VIII. GRIEVANCE REDRESS MECHANISM

A. Purpose of the Grievance Redress Mechanism

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

90. A common GRM will be in place for social, environmental, or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Appendix 7 has the sample grievance registration form. Every grievance shall be registered and careful documentation of process with regard to each grievance undertaken, as explained below. The environmental and social safeguards officer (ESO/SSO) at project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Development Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at VDC/Municipality level.

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

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

93. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUSC; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC. The grievance redress mechanism and procedure is depicted in Figure 4.

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

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

(ii) **Second Level of GRM** (VDC/Municipality level): The complainant will be notified by the WUSC that the grievance is forwarded to the VDC/Municipality -level GRM. The Grievance Redress Committee (GRC) will be called for a meeting. The GRC meeting will be called and chaired by the District chief of WSS. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUSC. If the grievance remains unresolved within 10 days of receipt of complaint by WUSC, the matter will be referred to the third level. The RPMO SDO will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued and the decisions carried out.

[2] If the complaints are related with IP/dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities should be involved.

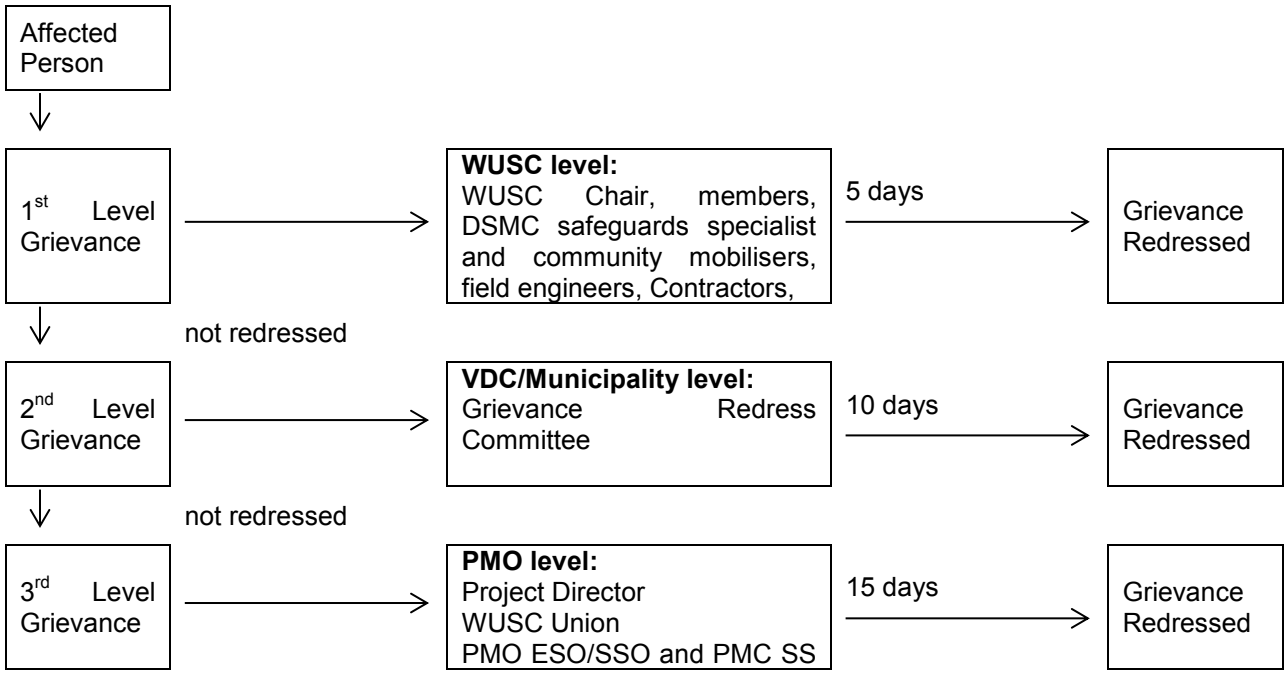
(iii) **Third Level of GRM** (PMO Level)**:** Any unresolved or major issues at Municipality/VDC level will be referred to the PMO for final solution. The PMO's Project Director and WUSC Union representative will have special meeting to find solution. Decision has to be made within 15 days of receipt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

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

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

97. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

Figure 4: Grievance Redress Process



	expert	

DSMC=design, supervision and management consultant; ESO = environmental and social safeguards officer; GRC = grievance redress committee; PD = project director; PMC = project management consultant; PMO = project management office; WUSC = water user and sanitation committee.

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

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

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

IX. ENVIRONMENTAL MANAGEMENT PLAN

101. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with. (Tables 10).

102. 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

103. **Executing and implementing agencies.** The Ministry of Urban Development (MUD) will be the executing agency with responsibility of subproject execution delegated to the Department

of Water Supply and Sewerage (DWSS). The Water Supply and Sanitation Division/Sub-division Office (WSSDOs) are the subproject implementing agencies. Water Users' and Sanitation Committees of participating towns are the implementing agencies.

104. 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 Environment 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 review and approval.
- The DWSS will review the IEE/ EIA Report prepared by the Design and Supervision Consultants' Team's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MUD.
- The DWSS will prepare the ToRs for the Environmental Safeguard Specialist that will be engaged to support the PMO and for the Environmental Safeguard Specialists of the two Design and Supervision Consultants that will be appointed to prepare the subprojects.

During construction and operation

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

B. Safeguard Implementation Arrangement

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

(i) confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and government rules;
(ii) confirm whether EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by regional project management offices (Eastern RPMO and Western RPMO) and contractors;
(iv) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
(v) facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
(vi) supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
(vii) review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;

(viii) consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
(ix) ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public; and
(x) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

106. **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.

107. **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 provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. Contractors will only starts the civil works activities in the section/subproject sites that has IR/IPP impacts upon the completion of RP/IPP implementation and after receiving clearance from the WUSC and endorsed by RPMO's SDO.

108. **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 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.

109. **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

110. **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.

Table 10 Environmental Management Plan

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

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
				sample)		
Drinking water supply	Extraction of unsatisfactory raw water quality Delivery of unsafe water to the distribution system Inadequate protection of intake well	During the detailed engineering design stage, water samples from deep tube well & shallow well were tested. Tests revealed iron content and coliform as beyond standard limits. This information has guided design of water treatment and depth of well. However verification on the yield through borehole tests need to be carried out and confirmed before award of contract. Design proposes basic treatment using lime dosing, pressure filter and disinfection using Ca(ClO)2 and provisions for lab unit and kits. This IEE proposes “hands on” training by a licensed & accredited laboratory for the first few years of operation under the Water Safety Plan included in the subproject design, & continuing training thereafter. Intake well has adequate land for perimeter fencing to keep animals away from grazing nearby. Appropriate casing of tube wells including the installation of screens. Intake well to be located at least 30m upstream from sanitation facilities. Where this cannot be maintained; (i) septic tanks will	PMO, RPMOS, & DSMC	Incorporated in final design and communicated to contractors.	Prior to award of contract	N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	Health hazards arising from inadequate design of facilities for receiving, storing and handling of Cl & other hazardous chemicals	need to be sealed (water tight) and emptied as per the design requirements; (ii) tube wells to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once every quarter). Disinfection of the tube well should be conducted prior to commissioning and after repairs. Design has included a "housed" dosing unit with appropriate ventilation, bunding and training for staff in handling as per material, safety data sheets (MSDS).				
Sanitation (Toilets and septage disposal)	Contamination of drinking water source and other environmental receptors from household and public toilets Risk to public and environmental health due to inappropriate	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source. The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e.g. US	PMO, RPMOS, & DSMC	Incorporated in final design and communicated to contractors.	Prior to award of contract	N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	siting and design of septage disposal pit.	EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown.				
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	• Determine locations prior to award of construction contracts.	DSMC, RPMOS	• List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. • Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	• During detailed design phase	• N/A
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage	• Prepare list of approved quarry sites and sources of materials	DSMC, RPMOS	• List of approved quarry sites and sources of materials; • (ii) Bid document to include requirement for verification of	• During detailed design phase, as necessary with discussion with detailed design engineers and PIUs	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	patterns, ponding and water logging, and water pollution.			suitability of sources and permit for additional quarry sites if necessary.		
EMP Implementation Training	Irreversible impact to the environment, workers, and community	• Project manager and all key workers will be required to undergo EMP implementation including spoils management, standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws, etc	PMO, RPMOs and DSMC. Contractor's Environmental Supervisor	• Proof of completion (Safeguards Compliance Orientation) • Posting of proof of completion at worksites • Posting of EMP at worksites	• During detailed design phase prior to mobilization of workers to site	• Training cost is the responsibility of the PMO & RPMOS.
2. During Construction Activities						
A. Physical Characteristics						
Topography, landforms, geology and soils and/or river morphology and hydrology	Significant amount of sand, gravel or crushed stone will be required for this subproject. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and	• Contractor's should be required to first utilize readily available sources with environmental clearance and license to operate and that still have a high ratio of extraction capacity over loss of natural state. • Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply to environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.	Contractor	• Records of sources of materials	• Monthly by RPMOS	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	hydrology (if on river). The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Coordinate with MoSTE and local authorities regarding restrictions in quarrying from rivers. As much as possible, alternative source should be identified.				
Water quality	Trenching and excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation	• Prepare and implement a spoils management plan (see Appendix 3 for outline). • Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with district development committee on designated disposal areas. • All earthworks must to be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. • Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. • Take all precautions to minimize the wastage of water in	Contractor	• Areas for stockpiles, storage of fuels and lubricants and waste materials; • Number of silt traps installed along trenches leading to water bodies; • Records of surface water quality inspection; • Effectiveness of water management measures; • - No visible degradation to nearby drainage, water bodies due to construction activities	• Visual inspection by RPMOS and DSMC-ESS on weekly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost is $1,500

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	measures.	the construction activities. • Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. • While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. • Monitor water quality according to the environmental management plan.				
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon	• Confine earthworks according to a staking plan and excavation segmentation plan that should be part of the working document • Water dry exposed surfaces and stockpiles of aggregates at least twice daily , or as necessary • If re-surfacing of disturbed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces	Construction Contractor	• Location of stockpiles; • Number of complaints from sensitive receptors; • Heavy equipment and machinery with air pollution control devices; • Certification	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of	Cost is $1,000

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Hoarding active work sites in populated areas • Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2' freeboard • Limit speed of construction vehicles in access roads and work sites to maximum of 30 kph. • Arrangements to control dust through provision of winDSMCreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). • Monitor air quality.		that vehicles are compliant with air quality standards.	subproject components	
Acoustic environment	Construction activities will be on settlements, along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of	• Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with local administration (Chief district office), local police/traffic office so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise	Contractor	• Number of complaints from sensitive receptors; • Use of silencers in noise-producing equipment and sound barriers; • Equivalent day and night time noise levels	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	• Cost is $1,500

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	equipment, materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	generating equipment. • Limit engine idling to maximum 5 minutes. • Minimize drop heights when loading and unloading coarse aggregates. • Spread out schedule of materials, spoil & waste transport • Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). • Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.				
Aesthetics	Construction works will potentially involve cutting of a few trees of common species at the northern edge of the Hatemalo community forest. Construction works will temporarily mar the lanDSMCape with excavated soils, residual soils/spoils, stockpiles of aggregates and construction materials (such as pipes), solid wastes, and haphazard parking of construction equipment. . The impacts are negative but	• Prepare a debris disposal plan. • Remove all construction and demolition wastes on a daily basis. • Coordinate with district development office for beneficial uses of excess excavated soils or immediately dispose to designated areas. Avoid stockpiling of any excess spoils. • All vehicles delivering fine materials to the site and carrying debris for disposal shall be covered to avoid spillage. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. • In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other	Contractor	• Number of complaints from sensitive receptors; • Worksite clear of hazardous wastes such as oil/fuel • Worksite clear of any wastes, collected materials from drainages, unutilized materials and debris • Transport route and worksite cleared of any dust/mud	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost estimated @ $2,000

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	short-term, site-specific within a relatively small area and reversible by mitigation measures.	suitable materials prior to the beginning of construction. • The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas.				
• B. Biological Characteristics						
Biodiversity	Activities being located in WUSC acquired area. There are no protected areas in or around subproject sites. A very small portion of the northern edge of the Hatemalo community forest is within the subproject area. The installation of a distribution main will potentiall cut down a few trees of common species.	• Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior clearance of the DSMC who will coordinate closely with community forest users' group. • All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. • Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. • If unavoidable to cut a few trees in the Hatemalo community forest, apply for a tree-cutting permit. • Prohibit workers from harvesting, cutting trees for firewood and poaching from forests and fishing from rivers and from	Contractor	• PIU and PMO to report in writing the number of trees cut and planted if tree-cutting will be required (to be determined during detailed design stage) • Number of complaints from sensitive receptors on disturbance of vegetation, poaching, fishing, etc.	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• In coordination with the community forest users' group, implement compensatory plantation for trees lost at an agreed rate in compliance with Forest Act. Maintain the saplings for the duration of contract.				
C. Socioeconomic Characteristics						
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a traffic management plan (see Appendix 4 for sample) • Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Maintain safe passage for vehicles and pedestrians throughout the construction period. • Schedule truck deliveries of construction materials during periods of low traffic volume. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil.	Construction Contractor	• Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see Appendix 4 for sample); • Number of complaints from sensitive receptors; • Number of signages placed at project location • Number of walkways, signages, and metal sheets placed at project location	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Socio-economic status	Manpower will be required during the construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.	• Priority hiring of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from local market.	Construction Contractor	• Employment records; • Records of sources of materials • Records of compliance to Nepal Labor Act, district wages	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of town where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located alongside the roads. The impacts are	• Obtain details from nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; • Integrate construction of the various infrastructure subprojects to be conducted in town (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. • Consult with local community /district development committee /local administration to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. • Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users.	Construction Contractor	• Utilities Contingency Plan • Number of complaints from sensitive receptors	• Visual inspection by RPMOS & DSMC-ESS on monthly basis • • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Contractor's activities and movement of staff will be restricted to designated construction areas. • Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction. • Consult with district development committee on the designated areas for stockpiling of, soils, gravel, and other construction materials. • If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission in writing from the landowner and approval from the DSMC. • Use small mechanical excavator to attain faster	Contractor	• Number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see Appendix 4 for sample); • Number of complaints from sensitive receptors; • Number of walkways, signages, and metal sheets placed at project location • Agreement between landowner and contractors in case of using	• Visual inspection by RPMOS (monthly basis) and DSMC-ESS by weekly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		trenching progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.3 • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved		private lands as work camps, storage areas, etc. •		

[3]These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the environment management specialist's attention immediately; and (iv) taking remedial action as per environment management specialist's instruction. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the PIU within 48 hours of receipt of such complaint/grievance.				
Workers health and safety	There is invariably a safety risk when construction works such as	• Comply with requirements of Labor Act of GoN and standards on workers' health and safety (H&S). • Ensure that all site personnel	Contractor	• Site-specific H&S Plan • Equipped first-aid stations • Medical	• Visual inspection by RPMOS (monthly) and DSMC-ESS on	• N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	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.	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 (reflectorized vests, 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		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 • Signages for storage and	weekly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	

[4] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• 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 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 conditions 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		disposal areas • Condition of sanitation facilities for workers		

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		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 a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
• D. Historical, Cultural, and Archaeological Characteristics						
Physical and cultural heritage	There are no scheduled or unscheduled archaeological, paleontological, or architectural sites of heritage significance listed by local and/or national authority and/or internationally (UNESCO) within or adjacent to subproject sites..	• Stop work immediately to allow further investigation if any finds are suspected.	Contractor	• Records of chance finds	• Visual inspection by RPMOS and DSMC-ESS on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• N/A
• E. Others						

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Submission of EMP implementation report	Unsatisfactory compliance to EMP	• Appointment of environmental 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**						
Post-construction clean-up	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 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 shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document.	Contractor	• RPMOS/PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and (iv) worksite clean-up is satisfactory.	• Prior to turn-over of completed works to WUSC	• Cost for implementation of mitigation measures responsibility of Contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• 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.				
4. Operation and Maintenance Activities						
Environmental legislation compliance	Lack of awareness amongst project managers and WUSC in operating systems as per required legislation and IEE requirements	capacity strengthening of the WUSC and continuing capacity strengthening of Project staff; and ensuring compliance with NDWQS, applicable conditions in IEE approvals and license for use of water resource.	PMO, RPMOs, DSMC and WUSC	Monitoring reports and checking operations against O&M manuals and permits/ clearances	After commissioning of systems and semi annually	N/A
Drinking water supply system	Delivery of Unsafe Water.	The operations and maintenance plan and training for staff will cover; (i) competent/cautious handling and storage of Calcium Hypochlorite and qualified persons to implement/oversee disinfection and treatmet; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-compliant EMP and a water safety plan; and (v) monitor water quality.	PMO, RPMOs, DSMC and WUSC	Water quality reports WTP records in the log book.	During O&M of the system. Quarterly monitoring	N/A

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	Excessive algal growth in reservoirs	The water tanks are designed to be closed. In addition; (i) maintenance of chlorine residual in the system at all times including the cleaning of reservoirs as per the O&M schedule.	WUSC	Water quality results.	During O&M of the system. Daily maintenance of chlorine residual. Cleaning	N/A
Sanitation facilities (toilets and septage disposal site)	Contamination to land or waterways 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 waterways (nallas) which is currently practiced. Further, septic tanks will be designed to ensure maximum retention is achieved and will be emptied at the required frequency (min every 3 years). Households will be educated on the above to further reduce the likelihood of septic tank overflows and uncontrolled dumping of septage.	WUSC. DSMC, RPMOs and PMO for education campaign	Sanitary inspection reports. Water quality reports from test pits near tube well sites.	During O&M of the system.	N/A

C. Environmental Monitoring Program

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

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

111. In addition to regular monitoring onsite (at town level) by the RPMOS and DSMC on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table 11 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 11: 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 DSMC))	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 landscaping, tree	O&M phase	Survival rate	In the areas where re-plantation proposed	Twice a year for 2 years	None	WUSC

	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
	plantation						

D. Institutional Capacity Development Program

112. 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.

113. 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.

114. The PMO will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 12.

Table 12: 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

Items	Pre-construction/prior to construction	Construction	
Contents	**Module 1: Orientation** • 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	• Roles and responsibilities of officials/contractors/consultants towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP 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 DSMC)
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

115. 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.

116. The infrastructure involved in each scheme is generally straightforward to build. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMO assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO.

117. 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.

118. 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.

119. The indicative costs of EMP implementation are shown in Tables 13.

Table 13: Indicative Cost of EMP Implementation

	Particulars	Stages	Unit	Total Number	Rate (USD)	Cost (USD)	Cost covered by
A.	**Mitigation Measures**						
1.	Compensatory plantation measures (average estimate)	Construction				2,000	Civil works contract
B.	**Monitoring Measures**						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	2	500.00	1,000	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	3	500.00	1,500	Civil works contract
3.	Water Quality	- Pre-construction - Construction	Per location	3	500.00	1,500	
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	Module 1 – immediately upon engagement of the (provide if PMC or DSMC) environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to start of Phase 2 and upon completion of the project	lump sum				Covered under PMC or DSMC contract

	Particulars	Stages	Unit	Total Number	Rate (USD)	Cost (USD)	Cost covered by
	implementation; and (iii) lessons learned information sharing						
D.	**Manpower Costs**						
1	PMO Environment Safeguards Officer	Construction phase	1				Budget covered through PMC
2	RPMOS Environment Safeguard Assistants	Construction phase	2				Budget covered through DSMC
3	PMO Environmental Safeguard Expert	Responsible for environmental safeguards of the project at PMO level	person months (spread over entire project implementation period)				Remuneration and budget for travel covered in the PMC contract
4	DSMC Environmental Safeguard Specialist	Responsible for environmental safeguards of the project at PIU level	person months (spread over entire project implementation period)				Remuneration and budget for travel covered in the DSMC contract
E.	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum				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			PMO cost
F.	**Other Costs**						
1.	Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction	As per requirement	Lump sum			Covered under DSMC contract

	Particulars	Stages	Unit	Total Number	Rate (USD)	Cost (USD)	Cost covered by
		phase, including public awareness campaign through media					
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum			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						**6,000**	

F. Implementation Schedule

120. Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table 14 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.

Table 14. 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

	Activity	Indicative Time Frame
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	5th day 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. MONITORING AND REPORTING

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

122. RPMOs 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 H**. 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.

123. 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, with support from the PMC.

124. 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

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

- The proposed subproject, its components, are not within or adjacent to environmentally sensitive areas.

- The extent of adverse impacts is expected to be local, confined within the subprojects' main areas of influence, quarry or borrowing sites, waste disposal sites, and the routes to and from these sites. Fine aggregates, sediments and/or wastes would not be 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.

126. 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.

ANNEX A. RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR CHANDRAUTA TOWN SUBPROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE SUBPROJECT TOWNS

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area…			
▪ Densely populated?		√	Distribution pipeline will go through the small town center, with low population density (approximately 9 persons per hectare). No negative impacts are envisaged as infrastructure will be established on government land and pipes will be constructed on ROW. Minimal road disruption is likely. Measures like best activity scheduling, traffic management etc will be employed to minimize the impact to acceptable levels.
▪ Heavy with development activities?		√	The area is predominantly residential.
▪ Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		√	The subproject components are not within locations in or near sensitive and vulnerable ecosystems and protected areas.
• Protected Area		√	
• Wetland		√	
• Mangrove		√	
• Estuarine		√	
• Buffer zone of protected area		√	
• Special area for protecting biodiversity		√	
• Bay		√	
B. Potential Environmental Impacts Will the Project cause…			
▪ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	Groundwater sourced from deep tube wells will be the source for the water supply system. Further, the project has a prescribed design criteria that no sanitation facility (toilets, septic tanks and septage disposal/ management pits) will be located within a 30m buffer upstream of groundwater extraction sites.
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	

Screening Questions	Yes	No	Remarks
▪ hazard of land subsidence caused by excessive ground water pumping?		√	High cost involved in pumping will constrain overpumping. EMP recommends the monitoring of pumping & maintaining of records to control pumping to design limit.
▪ social conflicts arising from displacement of communities ?		√	Not anticipated. The proposed sites of the deep tube well and new overhead tank will not require acquisition of private land. There are no encroachers/squatters or residential/commercial structures at the proposed sites where infrastucture is to be established.
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	Not anticipated. Water quantity is sufficient.
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		√	Basic water treatment is proposed under the subproject for iron removal and disinfection. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
▪ delivery of unsafe water to distribution system?		√	The project will provide treated water through a new piped distribution system to individual households. The design proposes monitoring kits, a lab room at the WTP to enable regular water quality testing and monitoring. EMP recommends continuing training of water users and sanitation committee (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.
▪ over pumping of ground water, leading to salinization and ground subsidence?		√	High cost involved in pumping will constrain over pumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit.
▪ excessive algal growth in storage reservoir?		√	Not anticipated. Storage reservoirs will be fully enclosed and EMP provides mitigation measures for the O&M phase.
▪ increase in production of sewage beyond capabilities of community facilities?		√	All toilets will be connected to septic tanks designed for maximum retention and to cater for required sewage quantities.
▪ 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?		√	Groundwater pumps are submersible and all other pump equipment in the water treatment plan will be housed in a pump shed.

Screening Questions	Yes	No	Remarks
▪ impairments associated with transmission lines and access roads?	√		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP includes measures to mitigate impacts.
▪ 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. Separate storage areas for the chemicals have been included in the design of the water treatment plant.
▪ 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?	√		Personal protective equipment will be provided to workers. Regular training will also be conducted to ensure that workers are aware of construction hazards and risks of chemicals during O&M.
▪ dislocation or involuntary resettlement of people?		√	Not anticipated.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	Not anticipated.
▪ noise and dust from construction activities?	√		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP includes measures to mitigate impacts.
▪ increased road traffic due to interference of construction activities?	√		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate impacts. Construction contractors will be required to coordinate with local traffic police.
▪ continuing soil erosion/silt runoff from construction operations?	√		The EMP includes measures to mitigate impacts. Construction contractors will be required to include silt traps or channelization where required.
▪ 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 prescribes monitoring of distributed water according to the Directives of 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?		√	Not applicable. Chlorine gas will not be used for disinfection.
▪ excessive abstraction of water affecting downstream water users?		√	Not applicable.
▪ competing uses of water?		√	Not applicable.
▪ increased sewage flow due to increased water supply	√		The project design includes sanitation improvement. Toilets will be connected septic tanks designed to accommodate maximum retention with septage management.

Screening Questions	Yes	No	Remarks
▪ increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		The project will undertake sanitation improvement including educational campaigns on water, sanitation and hygiene promotion. The project does not include the construction of a sewerage network or wastewater treatment plant as the current and estimated population density does not warrant for one.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	Improved water supply management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
▪ social conflicts if workers from other regions or countries are hired?		√	Priority in employment will be given to local residents.
▪ 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?		√	Not applicable. Construction will not involve use of explosives and chemicals. Trenching will be done manually. Use of chemicals during O&M will be limited at water treatment sites.
▪ 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?		√	Operational area will be clearly demarcated and access will be controlled. Only worker and project concerned members will be allowed to visit the operational sites.
Sanitation			
C. Potential Environmental Impacts Will the Project cause…			
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	No such areas near the subproject sites.
▪ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		√	Septage disposal site will be located in a community forest in the outskirts of the town and will be designed to cater for required septage loads. Further septage from septic tanks will be stable emitting minimum odor.
▪ dislocation or involuntary resettlement of people?		√	Not anticipated.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	Not anticipated.
▪ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		√	Toilets will be connected to septic tanks that will be designed to achieve maximum retention. Septage will be removed regularly for controlled disposal.
▪ overflows and flooding of neighboring properties with raw sewage?		√	Not anticipated. Septic tanks will be designed to cater for required sewage loads.
▪ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		√	Not anticipated. Controlled septage disposal site will be established to avoid illegal dumping of septage in local waterways and land. No heavy industries in the subproject town.

Screening Questions	Yes	No	Remarks
▪ noise and vibration due to blasting and other civil works?	√		Anticipated during construction phase. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?		√	Not anticipated.
▪ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		√	Not anticipated. No sewer network system to be established in subproject town.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		√	Not anticipated. No sewer network or wastewater treatment plant will be constructed in the subproject town.
▪ road blocking and temporary flooding due to land excavation during the rainy season?	√		Road closure not anticipated. Excavations may result to temporary ponding of water during construction phase. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
▪ noise and dust from construction activities?	√		Anticipated during construction phase. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
▪ traffic disturbances due to construction material transport and wastes?	√		Minimum likelihood of occurrence as sanitation facilities are largely at household level and only one public toilet will be constructed at the Bazar. The septage management site is in the outskirts of the town. The impacts if any are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
▪ temporary silt runoff due to construction?	√		Excavations may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
▪ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		√	Not anticipated. No sewerage network is to be established in the subproject town. Toilets will be connected to sealed septic tanks designed to cater for required loads.
▪ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		√	Not anticipated. Toilets will be connected to septic systems and appropriate septage management will be employed.
▪ contamination of surface and ground waters due to sludge disposal on land?		√	Not anticipated. Project design has allowed for the establishment of a controlled septage disposal site that will employ low cost, easy maintenance method to manage septage that could potentially be used as compost in later years.

Screening Questions	Yes	No	Remarks
▪ health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		√	Not anticipated. Collection, transfer and treatment of septage to be in a controlled environment. Workers to be trained and inoculated. Further, septage from septic tank will be highly stable as it would have undergone maximum retention.
▪ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		√	Not anticipated.
▪ social conflicts between construction workers from other areas and community workers?		√	Priority in employment will be given to local residents.
▪ 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 construction and operation?		√	Not anticipated.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		√	Not anticipated.

PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE SUBPROJECT TOWNS

Screening Questions		Score	Remarks[5]
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 subproject 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	Not likely. Groundwater sourced from deep tube wells will be the source of water for the sample subproject towns. Further source water protection will be carried out.[6]
Materials and	Would weather, current and likely future climate	0	

[5] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

[6] A few subproject towns in the hill region under the sector loan will likely extract water from surface sources. To ensure water availability, source protection will be carried out

Screening Questions		Score	Remarks[5]
Maintenance	conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance of project outputs	Would weather/climate conditions and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Climate conditions will unlikely affect water quantity and quality of the water supply systems. Groundwater for the water supply system will be sourced from deep aquifers where yield is demonstrated to be sufficient to meet the demand. All water supply systems will be designed to include sufficient storage to meet the current and future demand. Further the 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 score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a 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: <u>EARF implementation</u>: Screening for categorization for ADB – by DSMC Preparation of ADB IEE – by DSMC Preparation of the Government of Nepal IEE – DSMC <u>EMP implementation</u> 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: <u>PMO</u> Such aspects as meaningful consultations, grievance redress mechanism, environmental responsible procurement, institutional roles and responsibilities in environmental management, emergency response, performance monitoring. <u>WSSDO</u> Such aspects as grievance redress mechanism, occupational and community health and safety <u>WUSC</u> Occupational and community health and safety.

Date	Institution	Person/s Met	Key Notes
			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 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,

Date	Institution	Person/s Met	Key Notes
			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, DSMC 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. ▪ IEE report for Government of Nepal 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 Government of Nepal IEE Report based on an ADB IEE Report is estimated to take 1.5 months.

Date	Institution	Person/s Met	Key Notes
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. RPMOSs, under the WSSDOs, are supported by the DSMC. ▪ The DSMC prepares 1 subproject IEE using a harmonized ADB & Government of Nepal 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 RPMOS 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
03 Mar 2014	Charali Small Town WSSP	Mr. Lal Bahadur Thebe Chairman	▪ They have collected approximately 7 million (70 Lakh) NPR for cash contribution to the subproject. The land ownership for DTW and OHT has been transferred to WUSC's name. People in the service area have been very helpful and are eager to have access to the proposed water supply system. He believes the water supply system will improve the sanitation condition in the area and reduces the cases of water borne diseases. He also mentioned that population of the town is increasing; settlements are becoming dense and congested. He further added that due to population pressure in the town and flow of people in weekly market, there is an urgent need for public toilet. The WUSC is ready to provide any kind of assistance and support to the subproject.
		Mr. Hem Prasad	▪ The Town needs the subproject for access to good quality water. According to him

Date	Institution	Person/s Met	Key Notes
		Poudel, Farmer Dhaijan-5	people in Charali are not much aware about proper health and sanitation practices. So, awareness raising program is required. He has high hope that the proposed system will improve the water quality and sanitation situation in and around areas.
		Mr. Chandra K. Sherpa Dhaijan-6 Neighbor of proposed intake site	▪ He raised safety concern for his house (which is adjacent to the proposed intake site and under construction) during and after construction of WTP, OHT. He signified interest to work in the subproject during construction and operation.
		Ms. Sunita Sherpa Housewife Dhaijan-6	▪ She is eager to get the supplied water, as the water they are relying now is very turbid and smells bad. However, she has shown concern about the price of water they have to pay after being connected to the system.
		Mr. Gita Sherpa Farmer Dhaijan-6	▪ The quality of water they are getting from the shallow tube well within their property is very poor. Due to high iron content and turbidity, they are facing problem for its usage. So, people in her locality are happy about the proposed system. She has shown the concern regarding the timely completion of the subproject.
		Mr. Bishnu Prasai Treasure WUSC	▪ He raised concern on the commencement of the project and performance of the contractor and challenges in contract management. They have heard lots of problem regarding the poor performance of the contractor in STWSSP elsewhere. So, they would like to request the DWSS for effective contract management, monitoring and supervision. He has further mentioned that there are no issues related to land acquisition and collection of payment from the users.
		Mr. Rajan Adhikari Duwagadhi-6 Binita Medical	▪ Water borne diseases, skin diseases are in increasing trend, which could be due to poor quality of water in the area. This, coupled with sub-standard sanitation, is one of the main reasons for increasing trend of diseases.
		Mr. Mahendra Poudel Businessman Mahalaxmi Store Charali-4	▪ According to him, the people are willing to contribute for the subproject and they are eager to get the supplied water. They will fully cooperate with WUSC for the effective and smooth construction and operation of the system. He believes that with the new water supply system in town, business will flourish and eventually help improve the economic condition and well being of the people.
		Mr. Chetan Poudel Resident Charali-4	▪ Good quality and sufficient quantity of water is a basic human need and right of the people. He thanked the government for bringing this subproject to the town. According to him, there is no conflict of any type for this subproject. There won't be any physical, environmental and social impact during construction. The subproject will add economic value to the town.

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 enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information to 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 included 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: (Name 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 Outline of Spoil Management Plan (SMP)

1.0 Purpose and application:

SMP is to describe how STWWSP 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.

2.0 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

3.0 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

4.0 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

5.0 Spoil volumes, characteristics and minimization

5.1 Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.
5.2 Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials
5.3 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

5.4 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.
5.5 Storage and stock piling
5.6 Transportation and haulage route

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

ANNEX F: SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

1. 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

2. 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

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

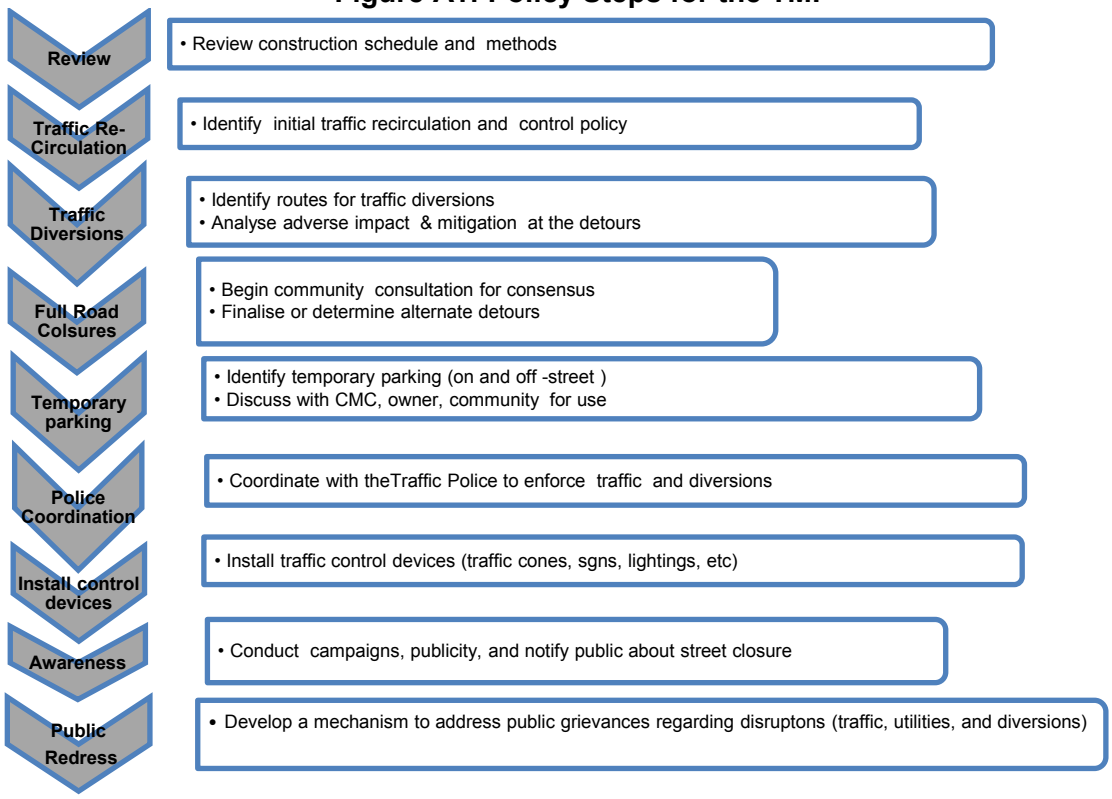
(i) approval from the PISU, local administration to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
(iii) determining of the 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.

4. 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

5. 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.

6. 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.

7. 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.

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

9. 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

10. 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

10. 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

11. 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”).

12. 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.

13. 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.

14 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.

15. 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 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.

I. 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		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

II. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

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

III. COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

IV. 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

V. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

VI. 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

VII. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

VIII. APPENDIXES

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

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