Initial Environmental Examination

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NEP: Urban Water Supply and Sanitation (Sector) Project – Siddhanath Baijanath Water Supply and Sanitation Subproject

Package No. W-03

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

CURRENCY EQUIVALENTS

(as of 2 July 2018)

Currency unit	-	Nepalese rupee (NRe)
$1.00	=	NRs109.821
NRe1.00	=	$0.009

ABBREVIATIONS

ADB	-	Asian Development Bank
DSMC	-	design, supervision and management consultant
DRTAC	-	Design Review and Technical Audit Consultant
DWSS	-	Department of Water Supply and Sewerage
EARF	-	environmental assessment and review framework
EIA	-	environmental impact assessment
EMP	-	environmental management plan
EMR	-	environmental monitoring report
EPA	-	Environment Protection Act
EPR	-	Environment Protection Rules, 2054 (1997) (and amendments)
ESS	-	Environmental Safeguard Specialist
ESA	-	Environmental Safeguard Assistant
GRM	-	grievance redress mechanism
ICG	-	Implementation Core Group
IEE	-	initial environmental examination
MoWS	-	Ministry of Water Supply
NDWQS	-	National Drinking Water Quality Standard
PMO	-	Project Management Office
RPMO	-	Regional Project Management Office
ROW	-	right-of-way
SPS	-	Safeguard Policy Statement
UWSSP	-	Urban Water Supply and Sanitation (Sector) Project
WTP	-	water treatment plant
WHO	-	World Health Organization
WSS	-	water supply and sanitation
WUA	-	water users' association
WUSC	-	water users' and sanitation committee

WEIGHTS AND MEASURES

m^3	-	cubic meter
°C	-	degree Celsius
dBA	-	decibel audible
ha	-	hectare
kgf	-	kilogram-force
km	-	kilometer
kph	-	kilometer per hour
m	-	meter
mg/l	-	milligram per liter
mm	-	millimeter
%	-	percent

NOTE

In this report, "$" refers to United States dollars.

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EXECUTIVE SUMMARY

The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal in expanding access to community managed water supply and sanitation (WSS) in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by the Asian Development Bank (ADB). The project will finance climate-resilient and inclusive WSS infrastructure in project municipalities and strengthen institutional and community capacity, sustainable service delivery, and project development. The project will be implemented over a five-year period (indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach.

The project will have the following impact: quality of life for urban populations, including the poor and marginalized, improved through the provision of sustainable WSS services. The project will have the following outcome: inclusive and sustainable access to WSS services in project municipalities achieved. The project will have two outputs: (i) water supply and sanitation infrastructure in project municipalities improved, and (ii) institutional and community capacities strengthened.

The Ministry of Water Supply (MOWS) is the executing agency and Department of Water Supply and Sewerage (DWSS) the implementing agency. The project management office (PMO) will be responsible for the overall management, implementation and monitoring of the project. There will be regional PMOs (RPMOs) to manage day-to-day project implementation at the subproject/municipality level. After construction including a one-year operations and maintenance (O&M) period by the contractor, subprojects will be operated by the water users' and sanitation committee (WUSC) or municipality.

Siddhanath Baijanath (Kanchanpur) town project is one of the subprojects proposed under UWSSP. There is no existing water supply scheme in the project town. People are using tube wells, dug wells, shallow wells, and river for their daily water use.

Subproject Scope. The subproject is demand-driven by municipality and WUA, and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract. The subproject is formulated to improve water supply service delivery in wards 6, 8 and 10 of Bheemdutta Municipality. Investments under this subproject include: deep tube wells, reservoir, transmission mains with distribution lines, household connections and office building.

Environmental assessment has been conducted for the Siddhanath Baijanath water supply and sanitation subproject and selected based on (i) detailed engineering design, and (ii) most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklist (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the Siddhanath Baijanath water supply and sanitation subproject shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

Therefore, the Siddhanath Baijanath water supply and sanitation subproject is classified as Category B for environment per ADB Safeguard Policy Statement (SPS). This initial

environmental examination (IEE) report has been prepared based on detailed design and following requirements of ADB SPS and Government of Nepal Environment Protection Rules where the subproject is listed under Schedule-1 requiring an IEE.

Description of the Environment. The project components are in Bheemdutta Municipality, bordering Kailali district in the east, Dadeldhura in the north and India in the south and west. The project components will be in municipality-owned sites and right-of-way (ROW) of public roads. There are no protected areas, forests, wetlands, mangroves, or estuaries in or near the subproject locations.

Potential Environmental Impacts and Mitigation Measures. The subproject is unlikely to cause significant adverse impacts that are irreversible, diverse or unprecedented because: (i) the components will involve straightforward construction and operation, so impacts will be mainly localized; (ii) there are no significant sensitive environmental features in the subproject sites although careful attention needs to be paid to minimizing disruption to the community; and (iii) predicted impacts are site-specific and likely to be associated with the construction process and are produced because the process is invasive, involving excavation and earth movements.

Some impacts and their significance have been reduced by amending the designs and locations. The concepts in the design of the project are: (i) demand for new piped water supply; (ii) maximum population coverage mostly in residential areas and areas of high growth rate; (iii) avoidance of water-use conflicts; (iv) locating pipelines within ROWs to reduce acquisition of land; (v) locating pipelines at least 10 meters (m) away from latrines, septic tanks and any main drains to avoid contaminations; (vi) locating the intake at least 30 m upstream from sanitation facilities; and (vii) ensuring that all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultations.

During construction, impacts will likely arise from the need to dispose of moderate quantities of soil; and the disturbance to residents, businesses, and traffic. These temporary impacts are common for construction activities in urban areas, and there exist well-developed methods for their effective mitigation. Traffic management will be necessary during pipe laying on busy roads. Earthworks will be conducted during the dry season to avoid difficult working conditions that prevail during the monsoon. The location of stockyards will be identified at least 300 m away from watercourses. Fuel and lubricant storage areas will be located away from drainage. Precautions will be taken to minimize construction wastes. Measures will be provided to prevent wastewater entering into streams, watercourses, or irrigation channels. Open burning of solid wastes generated from the workers camp will be strictly prohibited. Better solid waste management practices will be adopted such as collection, segregation, reuse and recycling activities within the construction site and workers camp.

An O&M Manual including a standard operating procedures for operation and maintenance will be developed, imparting necessary training; safety and personal protection equipment for workers, measures to maintain the water supply system efficiency. During operation, the delivery of unsafe water will be mitigated with prompt action on leaks, and frequent monitoring. The WUSC, as operator, requires the development of its capacity in water quality monitoring. Monitoring kits and laboratory rooms will be provided to WUSC, and the enhanced capacity development will be met through a “learning-by-doing.” An expert in the first year and periodic capacity strengthening after that will be undertaken the successful operation.

Environment Management. This IEE included an environmental management plan (EMP) which describe and address the potential impacts and risks identified by the environmental assessment.

The EMPs included proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. The IEEs and EMPs will be included in bidding and contract documents with specific provisions requiring contractors to (i) comply with all other conditions required by ADB; (ii) to submit a site-specific environmental management plan (SEMP), including proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (iii) specific mitigation measures following the approved EMP; (iv) monitoring program as per SEMP; and (v) budget for SEMP implementation. A copy of the EMP/approved SEMP will be kept on site during the construction period at all times.

The budget for EMP implementation and its monitoring is NRs3,250,000 that include air quality, noise level monitoring, capacity building, workforce, administrative and other costs, e.g., public consultation and information disclosure, grievance redress mechanism (GRM) implementation and any unanticipated impacts. The implementation costs of mitigation measures are covered separately under civil work contract. The contractor will be responsible for implementing the mitigation measures given in EMP. PMO, RPMO, and design, supervision and management consultants (DSMCs) are responsible for monitoring the EMP implementation.

Consultation, Disclosure, and Grievance Redress Mechanism. The stakeholders were involved during the IEE through discussions on site and public consultations. The views expressed by stakeholders were incorporated in the IEE and project design. IEE will be made available to the public through the ADB and UWSSP websites. The consultation process will continue during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within IEE to ensure that public grievances are addressed quickly.

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

Conclusions and Recommendations. Siddhanath Baijanath water supply and sanitation subproject will bring a series of benefits to the local people. Based on the IEE findings, there are no significant impacts, and the classification of the subproject as Category B per ADB SPS is confirmed. To conform to government regulations, permits and clearances will be obtained prior to award of works contract. This draft IEE will be submitted to ADB for concurrence and disclosure. However, this draft IEE will be updated based on final detailed design and submitted to ADB for final review and disclosure.

I. INTRODUCTION

1. The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal in expanding access to community-managed water supply and sanitation (WSS) in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by the Asian Development Bank (ADB).[1] The project will finance climate-resilient and inclusive WSS infrastructure in project municipalities and strengthen institutional and community capacity, sustainable service delivery, and project development. Subprojects will be demand driven by water users' associations (WUAs) and project municipalities and selected based on transparent criteria[2] including population growth, poverty index, existing WSS infrastructure, community willingness for cost sharing, and long-term operation and maintenance (O&M) contract.[3]

2. The project will build upon the ongoing efforts of the Government of Nepal in providing WSS services in urban areas of Nepal. It will help the country to meet Sustainable Development Goal (SDG)-6 to ensure availability and sustainable management of water and sanitation for all by 2030 and it is aligned with sector objectives laid out by the government's Fourteenth Plan, National Urban Development Strategy, and updated 15-year Development Plan for WSS in Small Towns, which is to improve water supply and sanitation service delivery in urban areas across Nepal.

3. The project will have the following impact: quality of life for urban populations, including the poor and marginalized, improved through the provision of sustainable WSS services.[4] The project will have the following outcome: inclusive and sustainable access to WSS services in project municipalities achieved. The project will have two outputs: (i) water supply and sanitation infrastructure in project municipalities improved and (ii) institutional and community capacities strengthened.

4. The Ministry of Water Supply (MOWS) is responsible for planning, implementation, regulation, and monitoring of WSS. The Department of Water Supply and Sewerage (DWSS) under the MOWS supports the provision of WSS facilities in municipalities where large utilities do not exist, and these are operated by Water Users' and Sanitation Committees (WUSCs)[5] or municipalities.[6] Shortage of investment funds, skilled personnel, and inadequate O&M budgets, hinders municipalities from providing adequate, cost-effective services. The Local Governance Operation Act, 2017, established municipalities as autonomous government institution with responsibility for WSS services. While municipalities' capacity is being built, the government and residents have been receptive to the decentralized, participatory, and cost-sharing service provision model by WUAs. Development support for municipal WSS has been channeled through a combination of (i) government grants through DWSS, (ii) loans by the Town Development Fund

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[1] ADB. Nepal: Small Towns Water Supply and Sanitation Sector Project Nepal: Second Small Towns Water Supply and Sanitation Sector Project; and Nepal: Third Small Towns Water Supply and Sanitation Sector Project.

[2] Subproject selection criteria are detailed in the Project Administration (PAM). Selection of future investments to be designed under the project will follow same criteria, with preference for investments located in Kathmandu Valley, provincial headquarters, and strategic border municipalities.

[3] Procurement can only commence after DWSS and municipality sign management agreement with WUSC for 20 years O&M service. The municipality will own the system and the WUSC will be the operator.

[4] Government of Nepal. 2009. *Urban Water Supply and Sanitation Policy*. Kathmandu.

[5] The WUSCs, formed under the Nepal Water Resource Act, 1992, are the elected executive bodies of the WUA.

[6] The DWSS assists in preparation of investment plans, project design, and establishing sustainable service delivery.

(TDF),[7] and (iii) contributions from municipalities and beneficiaries.[8] The TDF also supports WUAs in institutional and financial management including the introduction of tariffs.

5. The project will be implemented over a five-year period (indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach. The MOWS is the executing agency and DWSS the implementing agency. The project management office (PMO) established under ongoing Third Small Towns Water Supply and Sanitation Sector Project (footnote 1) will be responsible for the overall management, implementation and monitoring of the project. There will be regional PMOs (RPMOs) to manage day-to-day project implementation at the subproject/municipality level. After construction including a one-year O&M period by the contractor, subprojects will be operated. by the WUSC or municipality.

6. Siddhanath Baijanath town project is one of the projects proposed under UWSSP. There is no existing water supply scheme in the project town. People are using tube wells, dug wells, swallow wells and river for their daily water use.

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

1. Name of Proponent

Project Management Office
Third Small Towns Water Supply and Sanitation Sector Project
Ministry of Water Supply
Government of Nepal

2. Address of the Proponent

Panipokhari, Kathmandu
Tel: 977 1 442388, 977 1 4412348
Fax: 977 1 4413280
E-mail: info@stwsssp.gov.np
Website: www.sstwsssp.gov.np

3. Consultant, Preparing the Report

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

Building Design Authority (P.) Ltd.
Architectural, Engineering & Planning Consultants
GPO Box 2882, Kamaladi, Kathmandu, Nepal.
Tel: 4227393, 4248200, 4247939
Fax: 977-01-4223536, E-mail: bda@info.com.npwww.bda.co.np

Plush Engineers & Architects

[7] The TDF is a government-owned entity established under the Town Development Fund Act, 1997. Loans from the government to WUAs or municipalities are generally on-lent by TDF under a subproject financing agreement.

[8] WUAs contribute 30% of project costs for water supply subprojects (25% from TDF loan and 5% from users' upfront cash contribution) and 15% for sanitation subprojects (subsidy from municipalities).

Engineering & Architectural Design, Project Planning & Evaluation, Socio Economic Survey, etc Consultants
PO Box 2882, Kamaladi, Kathmandu, Nepal.
Tel: 4227393, 4247939, 4248200
Fax: 977-01-4223536, E-mail: bda@info.com.np

B. Purpose of the Initial Environmental Examination

8. All projects funded by ADB must comply with its Safeguard Policy Statement (SPS) to ensure that projects are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. Environmental assessment has been conducted for the Siddhanath Baijanath water supply and sanitation subproject[9] based on detailed engineering design, and most likely environmentally sensitive components. The environmental assessment used ADB's rapid environmental assessment (REA) checklists for water supply and sanitation (Appendix 1) and a "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2). The environmental assessment of the Siddhanath Baijanath water supply and sanitation subproject shows it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors.

9. Therefore, the Siddhanath Baijanath water supply and sanitation subproject is classified as Category B for environment per ADB SPS. This initial environmental examination (IEE) report has been prepared based on detailed design and following requirements of ADB SPS and Government of Nepal Environment Protection Act (EPA) and Environment Protection Rules (EPR) where the subproject is listed under Schedule-1 requiring an IEE.

10. This IEE report primarily:
- (i) provides information on the project and its environmental requirements;
- (ii) provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the project's area of influence;
- (iii) identifies and assesses potential environmental impacts arising from the implementation of the project;
- (iv) recommends measures to avoid, mitigate, and compensate the adverse impacts;
- (v) presents information on stakeholder consultations and participation during project preparation;
- (vi) recommends a mechanism to address grievances; and
- (vii) includes an environmental management plan.

11. The IEE study team conducted a preliminary exercise to solicit information from planners, policy makers, project components, concerned authorities, the user community and affected population. The team reviewed the relevant documents on water supply and sanitation in the country the feasibility report. Similarly, the team also reviewed the reports on hydrology, meteorology, geology, and others related to the environment.

12. The study team visited the site to identify the potential impacts, both positive and negative,

[9] All the water supply subprojects will include output-based aid (OBA) for sanitation (toilets), hence they are called water supply and sanitation.

of the project. During the visit, the team met local people and conducted meetings, brainstorming sessions, field examinations, and data gathering. The team also made walkthrough surveys of the project area to assess the baseline environment and potential environmental impacts of the project during the construction and operation phases.

II. DESCRIPTION OF THE SUBPROJECT

A. Need for the Subproject

13. Currently, there is no safe drinking water, which does not meet the demands of a growing urban center, with its increasing local commercial activities, institutions, new residential settlements, educational institutions, and commercial establishments in Bheemdutta. The Siddhanath Baijanath water supply and sanitation subproject is envisioned to address the community's water supply and sanitation requirements.

14. There is no existing water supply scheme in the Siddhanath Baijanath. People use tube wells, dug wells, kuwa and river for their daily water consumption. The household survey conducted shows 80.2% of the population use tube wells, while 19.2% use dug well, kuwa and river for their daily water needs.

15. In general, the overall sanitation condition of the project area is satisfactory. In the project area, most of the households in the market area have permanent type of private latrines, while others have the temporary kind. 97.8% of the households have toilets, along with local schools, medical institutions and government offices.

16. The current practice of human excreta management and disposal is on-site sanitation consisting of individual household or institutional septic tanks often without a proper effluent disposal system. The septic sludge is often discharged, though illegally, in to surface water. The existing practice is unhygienic and unhealthy for the population. No sewerage system has been developed in the service area.

B. Relevance of the Subproject

17. The proposed water supply and sanitation subproject is intended to serve drinking water to complete area of ward numbers 6, 8 abd 10 of Bheemdutta Municipality of Kanchanpur district. The proposed project shall be ground water sources to benefit a design population of about 21,809 (Design Year 2039).

18. **Subproject Selection.** Siddhanath Baijanath water supply and sanitation subproject is demand driven by WUA or municipalities, and selected based on transparent criteria, including population growth, poverty index, existing WSS infrastructure, formed WUA, community willingness for cost sharing and long-term O&M contract.[10]

C. Overview of the Subproject

19. Siddhanath Baijanath is situated in Kanchanpur district of Province 7. It is situated in the Terai belt, lying between 28°55'0" N latitude and 80°20'0" E longitude. The Siddhanath Baijanath

[10] Subproject selection criteria are defined in the PAM. Procurement of services can only commence after the DWSS and municipality sign a management agreement with the WUSC for O&M of services for 20 years. The municipality will own the system, while WUSC will be the operator.

town lies in Bheemdutta Municipality, which is the business and educational hub of the Mahakali Zone. The project area is in close proximity to the border of India in the south and west, Kailali district in the east, and Dadeldhura district in the north. It lies within the Bheemdutta municipality which is a hub of activity for industries running between India and Nepal. It is also a gateway to Shuklaphanta Wildlife Reserve. East-West highway passes through the project area. Siddhanath Baijanath is located about 42 kilometer (km) away from Attariya.

D. Subproject Components

20. Siddhanath Baijanath water supply and sanitation subproject is a groundwater-based water supply system project covering wards 6, 8 and 10 of Bheemdutta Municipality. The subproject includes water supply and sanitation components. The water supply part comprises of pumping from deep tubewell and its gravity-based distribution system from an overhead tank (OHT). One existing reservoir with a total capacity of 450 cubic meters (m^3) will be used. Sanitation component includes small-scale sanitation intervention with focus on household toilets.

21. The water is pumped from the tube well to the water treatment plant (WTP), from which water is pumped to the reservoirs. This system is proposed to cover service areas in wards 6, 8 and 10 of Bheemdutta Municipality.

Table 1: Designated Service Area and Population Projection

Distribution System	Survey Year (2017)		Base Year (2019)		Design Year (2039)	
	Population		Population		Population	
	Own House	Floating	Own House	Floating	Own House	Floating
Siddhanath Baijanath	9,178	132	9,903	144	21,464	345
Total	**9,178**	**132**	**9,903**	**144**	**21,464**	**345**

22. **Water source.** The proposed source is a deep tube well. The proposed tube well site for Siddhanath Baijanath is located at Thapachauraha in ward 8 of the Bheemdutta Municipality. The water from tube wells will be pumped to the overhead reservoir tank after proper treatment. Table 2 provides the yield of sources.

Table 2: Yield of Proposed Water Source

SN	Required Safe Yield (lps)	Pumping Hours a day in Design Period	Tube Well Size	Well Numbers	Location
1	2 x 20.12	18	250 x 250mm	2 operating + 1 standby	Siddhanath Tole, Thapachauraha, Ward 8 and Gajjar Tole ward 10

23. **Water Quality Assessment/Treatment Facilities.** The water samples were collected from existing tube well of about 30 m depth installed for irrigation purpose located inside Sidanath temple at Thapachauraha, ward 8 of Bheemdutta municipality on 28 November 2017 to assess the raw water quality of the groundwater in the subproject area. The physical and chemical parameters of the water sample were analyzed at the Nepal Environmental and Scientific Services (NESS) Laboratory, Thapathali, Kathmandu. The following table exhibits the findings with respect to the National Drinking Water Quality Standard (NDWQS) 2062:

Table 3: Water Quality Assessment

SN	Parameters	Units	Test Methods	Observed Values	NDWQS, Nepal
1	pH at 27°C		Electromeric, 4500 – H^+ B,: APHA	6.8	6.5 – 8.5
2	Electrical Conductivity	µS/cm	Conductivity Meter, 2510 B, APHA	547	1500
3	Turbidity	NTU	Nephelometric, 2130 B, APHA	4	5
4	Total Hardness as $CaCO_3$	mg/l	EDTA Titrimetric, 2340 C, APHA	342	500
5	Total Alkalinity as $CaCO_3$	mg/l	Titrimetric, 2320 B, APHA	335	-
6	Chloride	mg/l	Argentometric Titration, 4500 – Cl^- B, APHA	13.90	250
7	Ammonia	mg/l	Direct Nesslerization, 4500 – NH_3C APHA	0.30	1.5
8	Nitrate	mg/l	UV Spectrophotometric Screening, 4500 –No_3 B, APHA	6.79	50
9	Nitrate	mg/l	NEDA, Colorimetric, 4500 – NO_2^- B, APHA	<0.02	-
10	Calcium	mg/l	EDTA Titrimetric, 3500 –Ca B &3500 –Mg B APHA	76.95	200
11	Magnesium	mg/l		36.46	-
12	Arsenic	mg/l	SDDC, 3500 - As, C: APHA	N.D. (<0.01)	0.05
13	Iron	mg/l	Direct Air – Acetylene AAS, 3111 B, APHA	0.27	0.3
14	Manganese	mg/l		N.D. (<0.01)	0.2

AAS = Atomic Absorption Spectrophotometer; °C = degree Celsius, mg/l = milligram per liter, NDWQS = National Drinking Water Quality Standard.

24. Although all the water quality the parameters were found comply with the NDWQS for drinking water, the water quality report showed the total hardness of water to be considerably high. The total alkalinity is also present in significant amount. Although the water quality is found to be suitable as per NDWQS, the deposition of calcium in the pipe may be likely to occur due to high concentration of hardness and alkalinity. However, the deposition of calcium in the pipe was not found visible during the field survey. A big threat to Terai groundwater “Arsenic” has not been detected. Comparing the results of the water quality test with WHO Guideline values (Appendix 14), the water quality of the raw water shows that the water is potable. Tube well is not constructed until now. Water quality on the nearby wells has no any arsenic contamination. Hoever, some treatment will ensure drinking water supply system requirements for long term operation of the system.

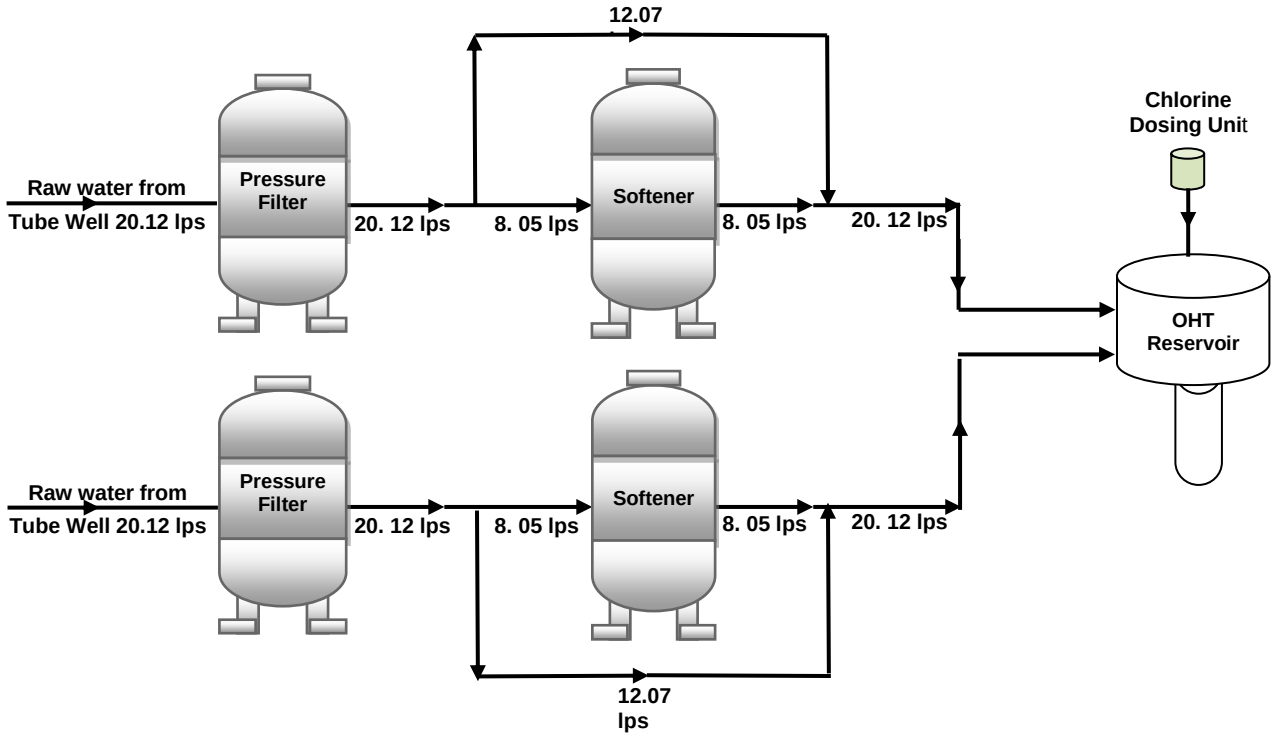
25. **Treatment Process.** Since the water quality has been analyzed only once, it cannot be accurately reliable. The proposed tube wells are about 100 meter (m) depth which is much greater than existing tube well of about 30 m depth from which sample was taken for water quality analysis. The quality of water in the proposed tube well may not show exactly the same results as the existing tube well. From the consideration of the water quality of the existing tube well, the water treatment system consisting of pressure filter, softening and disinfection is recommended. It is recommended to analyze the water quality from the proposed tube well once it is drilled and modify the treatment system accordingly. The treatment process consists of various steps of treatments which are described below.

26. **Pressure Filter.** Pressure filters made of mild steel with food grade epoxy coating inside is proposed to remove turbidity and precipitated minerals. The pressure filters is to be packed

with sand and gravel as per the design specifications. The under drainage system and back wash system should also be installed in the pressure filters. The pressure filter is expected to bring down the turbidity of water as per the NDWQS and WHO Guideline values for drinking water. Large number of coliforms is also expected to be removed in the pressure filter due to biological action. Two numbers of pressure filters of 2.5 m diameter has been proposed.

27. **Softener.** Softeners made of mild steel with epoxy painted (MSEP) is proposed to remove hardness of water so that there is no calcium deposition in the pipelines. The softener is to be packed with Na cation exchange resin (zeolite). The expected hardness in the effluent of softener is 5 milligram per liter (mg/l). Treating 40% water from softener and blending remaining 60% with filtered water is expected to produce 342*0.6+5*0.4 = 207 mg/l of hardness, which is quite acceptable and economical. The consumption os salt is about 0.80 kg per 1,000 liter of water softened. Two numbers of softeners of 1.6 m diameter has been proposed.

Figure 1: Schematic Diagram of Treatment Process



28. **Disinfection.** Although pressure filter removes coliforms to certain extent, the effluent of the pressure filter might still contain coliforms which might be harmful to human health. These coliforms are killed by disinfection process and make the water safe. The disinfection is proposed by the addition of bleaching powder in the reservoir. Bleaching powder is to be dosed from chlorine dosing tank through a doser. Appendix 13 provides the Chlorine Guidance Value based on WHO Guidelines for Drinking Water Quality (2004). The chlorine dose of 1 mg/l is proposed. This chlorine dosing concentration will be recalculated after completion and testing of boring groundwater.

29. **Transmission Mains.** The transmission main conveys the water from the tube well to overhead service reservoirs. Since the water is conveyed by pumping it is also known as pumping

main. Pipe sizes are so selected that velocity of water within the pipes remain within the range of 0.5 meter per second (m/s) to 1.5 m/s. Ductile iron pipes are proposed to use in both the systems. The water is pumped from the tube well with sufficient head so that the water passes through the water treatment plant and delivers it into the ground reservoir/sump well. The water is then pumped again from ground reservoir/sump well to overhead reservoir. The total transmission main pipe length of the proposed systems is 4.865 km.

30. **Distribution Reservoir.** The service reservoir is required to store the water to meet the hourly fluctuation of consumers' water demand. This allows the peak flow in the distribution network. The total storage requirement for the system at the end of design period i.e. 2039 is calculated as 450 m^3.

31. **Distribution Network.** The distribution system comprises of pipe network, which consists of mainly loops and branch. The water is supplied from the service reservoir to the consumers by the distribution pipe network. This network is analyzed using EPANET 2, a design analytical software tool. Distribution pipes are laid on both sides of the all metal and major roads. Single line pipes are proposed in earthen and other roads. High Density Polyethylene (HDPE) pipes are predominantly used. Pipe of class and size less than 6 kilogram-force (kgf) and 50 mm will not be used. Existing pipes will not be used as these are leaking and found substandard (class of 4 kgf). The length of the distribution network pipes proposed for various systems is shown in the table below. The total distribution pipe length of the proposed system is 52.904 km.

32. **House Connections.** The system has been designed for house to house connection, providing a total of 3,749 house connections at the end of design period. Initially, only 1,730 house connections have been provided to satisfy the need for the base year population during construction phase.

33. **Appurtenances.** These will consist of valve chambers to control flows in the pipeline. Eighty nine valve chambers and 10 pipe valve boxes are expected to be installed in the system. Other appurtenances, such as air valves, scour valves, and fire hydrants will be provided at suitable locations. Road crossing has also been initially provided. This will also facilitate for less road cuttings during the operational phase.

34. **Generator/Operator Room.** One structure will be constructed to house the generator. In case of power failure, the generator will supply power to the pumps to deliver water. A permanent area to accommodate the pump / plant operator will be provided in this generator house.

35. **Office Building/ Laboratory Room.** There is no office building in the project area, hence, the construction of a facility to house the laboratory, cash counters, meeting hall, and managers room.

36. **Guard House.** There is no guard house in the project area, hence, the provision of a one-storey guard house, complete with all the amenities (bedroom, toilet and bathroom). This will be located at the reservoir site.

37. **O&M Equipment and Tools.** An assessment was done for items necessary for operation and maintenance. The list of tools required for O&M has been listed in the Quantity/ Cost Estimate Volume document. The following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out.

(i) leakage detecting equipment - 1 set;
(ii) submersible sludge pump - 1 no;

(iii) electro-fusion machine for joining the HDPE pipes including portable generator - 1 set;
(iv) water quality testing laboratory equipment – 1 set; and
(v) other tools and plants like: electric pipe cutters, pipe wrenches etc.

38. **Land Availability.** All the structural components of the project will be built on the land acquired by the WUSC. These lands are selected on the basis of technical feasibility and it is kept in mind that no tree cutting is required and minimum vegetation cover needs to be cleared. The distribution lines will be through the ROW.

E. Implementation Schedule

39. Environmental management will be implemented from the detailed design phase through to procurement, construction, and operation. Table 4 presents the indicative timeframe of key activities about the subproject implementation schedule.

Table 4: Implementation Schedule

Activity			Indicative Time Frame
Project Implementation			
	Detailed Design and Bidding Documents		1 month
	Procurement		3 months
	Construction		18 months
	Defects Liability Period		12 months
	Operation and Maintenance		12 months
Environmental Management			
	Overall		
	1.	Design Review and Technical Audit Consultant of Environmental Specialist	Starting (4 yrs of intermittent inputs)
	2.	PMO's submission of Environmental Monitoring Report (EMR)	
		Monthly EMR for Project's Monthly Progress Report	Eighth day after effective month
		Semi-Annual EMR during construction for submission to ADB	Eighth day after effective 6-months
		Semi-Annual EMR for submission to ADB during O&M until ADB issues a Project Completion Report.	Eighth day after effective year
	Before Construction Mobilization		
	1.	Finalization of environmental management plan (EMP), (if applicable) revision of initial environmental examination (IEE)	
	2.	ADB review and approval of revised IEE and EMP.	1 month
	3.	Obtaining Government's approval of IEE Report	4 months
	4.	Community preparation (including disclosure of Final IEE and its EMP)	1 month
	5.	Establishment of baseline data (as set out in the EMP)	(shall have been done before award of contract)
	6.	Preparation of SEMP by selected Contractor, review of SEMP	before start of works on site
		against Safeguard Policy Statement-compliant EMP.	or establishment of construction-related facilities.
	Construction		
		Mobilization to Demobilization	14 days
	1.	Implementation of mitigation measures and conduct of environmental effects monitoring following the SEMP.	Regularly during construction
	2.	Submission of Environmental Monitoring Report (EMR)	Bi-annual
		Monthly, by Contractor	Fifth day of the month following the effective month

Activity			Indicative Time Frame
		Quarterly, by Contractor or by Licensed Laboratory	Third day of the month following the effective quarter
	Operation (potentially could start even before Defects Liability Period is over)		
	1.	Implementation of mitigation measures & monitoring activities as	Starting Q/Q Y
		specified in the EMP	
	2.	Submission of EMR	Starting Q/Q Y
		Monthly, by Operator	Fifth day of the month following the effective month
		Quarterly, by Operator or (if applicable) by Licensed Laboratory	Third day of the month following the effective quarter

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Safeguard Policy Statement

40. ADB SPS requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, UWSSP is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS.[11]

41. **Screening and Categorization.**[12] Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category (Footnote 13). Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMO shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are in Section V below.

42. **Environmental Assessment.** Environmental assessment shall include description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or

[11] ADB. 2009. *Safeguard Policy Statement*. Manila.

[12] Per ADB SPS, (i) **Category A**: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required; (ii) **Category B**: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and, in most cases, mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required; (iii) **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed; and (iv) **Category FI**: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

restoration. The IEEs of sample subprojects prepared during the ADB loan processing stage[13] may be used as model documents for UWSSP subprojects.

43. **Environmental Planning and Management.** The PMO and RPMOs shall prepare environmental management plan (EMP) to be included in the IEE report. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

44. **Public Disclosure**. The MOWS, through PMO, shall submit to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:[14]

(i) final IEE upon receipt;
(ii) a new or updated environmental impact assessment (EIA)/IEE and corrective action plan prepared during subproject implementation, if any; and
(iii) environmental monitoring reports submitted during subproject implementation upon receipt.

45. **Consultation and Participation.** The PMO and RPMOs shall carry out meaningful consultation[15] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

46. **Grievance Redress Mechanism.** The MOWS, through PMO, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for UWSSP, a Grievance Redress Mechanism has been established and discussed in detail in Section VI below.

47. **Monitoring and Reporting.** The PMO shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMO will identify the necessary corrective actions, and reflect them in a corrective action plan. PMO will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual

[13] Subprojects with IEEs prepared during project processing include (i) Charikot WSS, (ii) Ilam WSS, (iii) Siddhanath Baijanath WSS, (iv) Charikot DEWATS, and (v) Katahariya Storm Drain.

[14] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

[15] Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;1 (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

basis until ADB issues a project completion report.

48. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PMO shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

49. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards.[16] These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the Government of Nepal regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

50. **Occupational Health and Safety.** PMO[17] shall ensure that workers[18] are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMO shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

51. PMO shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's *Environmental, Health and Safety Guidelines.*[19]

52. **Community Health and Safety.** PMO (footnote 16) shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

53. **Physical Cultural Resources**. PMO is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by

[16] This IEE sets out performance standards on key environmental parameters such as noise, odor and discharge that accord with the more stringent of international good practice (as set out in World Bank/IFC Environmental, Health and Safety guidelines) and Government of Nepal requirements.

[17] In case where responsibility is delegated to subproject contractors during construction phase, PMO shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

[18] Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

[19] World Bank Group. 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC.

the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

54. **Environmental Audit.** When the subproject involves existing activities or facilities, PMO is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

55. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by the RPMOs. The PMO and RPMOs shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[20] and (ii) to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP), including proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (iii) specific mitigation measures following the approved EMP; (iv) monitoring program as per SEMP; and (v) budget for SEMP implementation. No works can commence prior to approval of SEMP. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and shall require corrective actions.

56. **Conditions for Award of Contract and Commencement of Work.** PMO shall not award any Works contract for a subproject until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMO has obtained ADB's clearance of such IEE. For "design, build, and operate" type contracts, PMO shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMO has obtained ADB's clearance of such IEE.

B. Government Environmental Impact Assessment Law

57. **Environmental Protection Act (EPA), 1997.** This Act 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 (CSA)[21] or Ministry of Science, Technology and Environment (MOSTE),[22] respectively, prior to implementation.

[20] Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

[21] The concerned sector agencies (CSAs) are responsible for the: (i) review of applications for EIA scoping and approval of IEE schedules of work and ToRs; review of submitted IEE or EIA Reports; (iii) approval of IEE Reports; (iv) forward of reviewed EIA Reports together with its review opinions and suggestions to MOSTE; and (v) monitoring and evaluation of project implementation impacts.

[22] MOSTE is responsible for the: (i) approval of EIA schedules of work and ToRs; (ii) approval of EIA Reports; and (iii) conduct of environmental audit of completed project after two years of operation.

58. **Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007**. The Rules defines implementing rule and regulations of the IEE or EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA Reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that require IEE and EIA respectively, as amended in 2007. Table 5 presents the required environmental assessment for activities/works under the water supply and sanitation sector and their applicability to UWSSP subprojects.

Table 5: Required Environment Assessment for the Activities of the Subproject Per Environmental Protection Rules

S. No.	Schedule 1: Activities Requiring Initial Environmental Examination Only	Schedule 2: Activities Requiring Environmental Impact Assessment	Applicable Environmental Assessment
Drinking Water Supply			
1	Surface water source with not more than 4 ft^3 safe yield and supply of not more than 50% of the water during the dry season.	Surface water sources with more than 1 ft^3 safe yield, and the use of its entire part during the dry season.	Initial Environmental Examination (IEE)
2	Processing of water at the rate of more than 25 lps.		IEE
3	Recharging of up to 50% of the total aquifer for the development of underground water sources.	Recharging of more than 50% of the total aquifer for the development of underground water sources.	IEE
4	Displacement of not more than 100 persons for operating a water supply scheme.	Displacement of more than 100 persons for the operating a water supply scheme.	IEE
5	Settlement of not more than 500 persons on the upper reaches of water sources.	Settlement of more than 50 persons on the upper reaches of water sources.	IEE
8	Supply of drinking water to a population ranging between 2,000 to 20,000.	Supply of drinking water to a population of more than 20,000.	IEE
9	Supply of drinking water to a population ranging between 10,000 and 100,000 upon connecting new sources.	Supply of drinking water to a population of more than 100,000 upon connecting new sources.	IEE

59. **Compliance of the subproject with EPR 1997 (as amended in 1999 and 2007).** The subproject falls under Schedule 1 activities and therefore requires an IEE. In compliance with this requirement, the PMO needs to prepare an IEE report following the procedures in the EPR and submit the report for approval to MOWS, which is the CSA (footnote 21) for the subproject. PMO needs to obtain an approved IEE from MOWS prior to award of any contracts under the subproject. PMO may opt to use one IEE report for compliance with ADB and government's environmental clearance requirements, provided that the IEE report complies with both ADB SPS and EPR 1997 requirements.

60. **Status of securing MOWS−approved IEE.** The PMO is currently in the process of securing MOWS-approved IEE in compliance with the EPR. PMO will ensure that the MOWS-approved IEE will be secured prior to the award of any contract under the subproject. A copy of the approval document from MOWS will be attached in the updated version of this IEE that will be submitted to ADB for final review and disclosure.

C. Other Relevant National Laws, Policies and Guidelines

61. Table 6 below summarizes all other relevant national laws, policies and guidelines that will be complied with under UWSSP. As UWSSP will avoid projects with potential triggers for Category A classification per ADB SPS, all laws, policies and guidelines governing these types of projects are already excluded in the table.

Table 6: Other Relevant National Laws, Policies, and Guidelines of Nepal

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
Aquatic Animal Protection Act	1960 (1997)	It prohibits the closure or demolition of fish ladders and other structures that are placed in streams, rivers, lakes and other surface water bodies, to aid movement and migration and/or protect aquatic animals (Article 3A). Concerned water supply projects shall build fish ladder or make an aquatic nursery in the vicinity of affected water bodies for the artificial breeding of aquatic animals (Article 5B).	Relevant to subprojects that will tap surface water as source.
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 environmental impact assessment (EIA) and preparation of EIA Report before granting license to use water resources for any purpose. Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4). Article 7 ranks “drinking & domestic use” as first in the priority order of use of water resources, which will be one of the bases of decision in case of water use dispute Article 17 requires proponents to apply for any necessary land acquisition accordingly; Article 18, 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.	Relevant to all subprojects. Initial environmental examination (IEE) required for grant of use of water resources. Compliance with National Drinking Water Quality Standards (NDWQS)
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with arrangements for the use of protective devices	Environmental management plan (EMP) provides measures to mitigate workers’ health and safety hazards.

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
		and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from lifting of heavy weights.	
National Environmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, the most relevant to UWSSP are to: (i) mitigate adverse environmental impacts of projects; and (ii) safeguard national &cultural heritage and preserve bio-diversity, within and outside protected areas.	EMP implementation is the overall measure to mitigate adverse impacts. Heritage sites and protected areas shall be avoided.
National Water Supply and Sanitation Policy	1998	The Policy requires the monitoring of water quality supplied by completed WSS projects.	Monitoring of supplied water in compliance with the NDWQS and its Directives will meet the Policy's requirement.
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 water quality 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.	Subprojects to ensure adequate consideration of other water uses of same source during design to avoid disputes; to implement the EMP (both mitigation and monitoring) during construction and operation.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties and powers to, among others: (i) conserve and protect their local environment and natural resources; (ii) plan, implement and/or operate and maintain local water supply projects; (iii) implement or arrange for implementation local sanitation/sewerage and drainage projects; (iv) protect cultural heritage and religious sites; and/or (v) monitor project activities within their jurisdictions.	Provides basis for Local Government to monitor the environmental performance of the subprojects.
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.	Relevant to all subprojects.
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 and EPR. Such assessments are to: (i) incorporate consultations with key stakeholders, including end-point users; and (ii) specify measures to mitigate environmental impacts prior to and during construction and during operation, as well as corrective measures.	Requires IEE or EIA of all subprojects.

Policy/Law/ Guideline	Year *	Relevant Provisions	Remarks
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.	Guide to drinking water quality 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 shall 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.	All subprojects to manage generated solid wastes accordingly.

* (Year) - Year last amended.

62. Following requirements of ADB SPS, PMO and RPMOs shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the Government of Nepal regulations differ from these levels and measures, the executing agency shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

63. International Guidelines are presented, where applicable, to show comparison and will be useful if evaluation of quality monitoring results include checking of how subproject's environmental performance fare with international standards).

Table 7: Ambient Air Quality Standards

Parameter	Averaging Period[a]*	Nepal's Ambient Air Quality Standard, 2003[b] (µg/m^3)	WHO Air Quality Guidelines (µg/m^3)		Standard values to be followed by the subproject[,e] (µg/m^3)
			Global Update[c] 2005	Second Edition[d] 2000	
TSP	Annual	-	-	-	
	24-hour	230	-	-	230
PM_{10}	Annual	-	20	-	20
	24-hour	120	50	-	50
PM_{25}	1-year	-	10	-	10
	24-hour	-	25	-	25
SO_2	Annual	50	-	-	50
	24-hour	70	20	-	20
	10-minute	-	500	-	500
NO_2	1-year	40	40	-	40
	24-hour	80	-	-	80
	1-hour	-	200	-	200
CO	8-hour	10,000	-	10,000	10,000
	15-minute	100,000	-	100,000	100,000
Pb	1-year	0.5	-	0.5	0.5
Benzene	1-year	20	-	-	20

[a] Due to short term duration of civil works, the shortest period will be more practical to use.

[b] as implementing rules on ambient air quality standards under the Environmental Protection Act, 1997. Summary available from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

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

[d] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

[e] If less stringent levels or measures are appropriate in view of specific project circumstances, the PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS; Subject to capacity of executing agency to do the test, including the availability of facilities to do the test in the country.

Table 8: Noise Level Standards

Receptor/ Source	National Noise Standard Guidelines, 2012* (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors** (One Hour LA_q in dBA)		Standard values to be followed by subproject (footnote 25) (dB)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day	Night
Industrial area	75	70	70	70	70	70
Commercial area	65	55	70	70	65	55
Rural residential area	45	40	55	45	45	40
Urban residential area	55	50	55	45	55	45
Mixed residential area	63	55	55	45	55	45
Quiet area	50	40	-	-	50	40
Water Pump	65		-		65	
Diesel generator	90		-		90	

* Environmental Protection Act, 1997 (as implementing rules on noise standard guidelines). Source: Government of Nepal National Planning Commission Secretariat, CBS. 2014. *Environment Statistics of Nepal 2013.*

Guidelines for Community Noise, WHO, 1999.**Source: Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

Table 9: Drinking Water Quality Standards

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011*	Applicable Standards to Subproject (footnote 25)
	Parameter	Unit	Max. Concentration Limits		
Physical	Turbidity	NTU	5(10) **	-	5(10) **
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	TCU	5 (15)	none	5 (15)
	Taste & Odor		Would not be objectionable	-	Would not be objectionable
	TDS	mg/l	1000	-	1000
	Electrical Conductivity	µc/cm	1500	-	1500
	Iron	mg/l	0.3 (3)	-	0.3 (3)
	Manganese	mg/l	0.2	-	0.2
	Arsenic	mg/l	0.05	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.07	none	0.07
	Fluoride	mg/l	0.5 – 1.5 ^	1.5	0.5 – 1.5 ^
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	1.5	none established	1.5

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011*	Applicable Standards to Subproject (footnote 25)
	Parameter	Unit	Max. Concentration Limits		
Chemical	Chloride	mg/l	250	none established	250
	Sulphate	mg/l	250	none	250
	Nitrate	mg/l	50	50	50
	Copper	mg/l	1	2	More stringent
	Total Hardness	mg/l	500	-	500
	Calcium	mg/l	200	-	200
	Zinc	mg/l	3	none established	3
	Mercury	mg/l	0.001	0.006	0.001
	Aluminium	mg/l	0.2	none established	0.2
	Residual Chlorine	mg/l	0.1 - 0.2	5 ^^	0.1 - 0.2
Micro Germs	E-coli	MPN/100ml	0	Must not be detectable in any 100 ml sample	0
	Total Coliform	MPN/100ml	0 in 95%of samples taken		Must not be detectable in any 100 ml sample

* 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 national 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. Source: Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

D. International Environmental Agreements.

64. Table 10 below lists the relevant international environmental agreements that Nepal is party to, and their relevance to various subprojects under UWSSP.

Table 10: International Environmental Agreements Relevant to Urban Water Supply and Sanitation (Sector) Project

International Environmental Agreement	Year *	Relevant Provisions	Remarks
World Heritage Convention	1978	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will not support subprojects that negatively impact cultural and natural heritage of the country.
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	1987	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will not support subprojects that will locate in wetlands and other protected areas of the country.
Convention on Biodiversity	1992	Parties to require the environmental assessment of projects that are	UWSSP will help the Government of Nepal comply

International Environmental Agreement	Year *	Relevant Provisions	Remarks
		likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	with this agreement. UWSSP will not support subprojects that impact biodiversity in the country.
UN Framework Convention on Climate Change	1992	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will ensure implementation of EMPs as measure to minimize the causes of climate change.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1996	Parties to, among others, minimize the amount and toxicity of hazardous waste generated, manage the hazardous and other wastes they generate in an environmentally sound manner and as close as possible to the source of generation.	UWSSP will help the Government of Nepal comply with this agreement. UWSSP will ensure implementation of EMPs as measure to avoid or minimize the generation and disposal of hazardous wastes.

* (Year) - Year last amended.

IV. ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

65. The project area is a major junction and booming market place. The town faces serious water supply problems. The overall sanitary condition of the project area is reasonably satisfactory, but improvements are still required.

66. Doing nothing about these challenges means letting the subproject municipality to further go on as an “under-serviced” area, putting the health of its residents and the general public at more risks, worsening their living environment. This would impede: (i) further social and economic development project municipality and (ii) Nepal’s delivery of its commitment to Sustainable Development Goal (SDG) 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation. The “do-nothing” or “without-project alternative” is, therefore, not chosen.

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

B. With Subproject’s Location Alternative

68. The project area is in dire need of potable drinking water. The investment in water and sanitation in this belt is a strategic method to improve the overall socio-economic aspects of the province, which serves as a market junction to the surrounding rural municipalities as it also lies close to the Dhangadhi and Attariya, both sub-metropolitan cities in far western Nepal.

69. The project components are situated in sites without any social disputes. Minimum loss of vegetation cover was also considered. Tree clearance and damage to cultivated land were also avoided and considered in site selection.

70. Since the settlements in Siddhanath Baijanath are scattered, three separate District Management Areas (DMAs) were established. This is based on the principle of managing a large water network into several areas, ranging between 500 to 3,000 connections, each established area having a defined and permanent geographical and/or hydraulic boundary. The proposed sub-systems aim to become easy-to-operate and cost-effective options for the scattered location of the settlements.

C. Alternatives Related to Technology, Materials and Implementation Procedure

71. The proposed system is a small-scale project. Aside from the deep tube wells, which is a reliable source of water, another probable source of water is the Mahakali River, which is located about 5 km west of the project area, with several points touching on the borders of Nepal and India. Although low in terms of water hardness (no calcium deposit problems in the pipes), the cost of tapping water from the Mahakali river will be considerably high due to materials (pipes) and energy cost.

72. Major components of a ground water-based water supply system consist of boreholes with pumps, treatment unit, reservoir and distribution system. Assessments indicate that with adequate treatment, the proposed water supply system will have minimal impact on the environment. On the other hand, substantial improvement in terms of personal hygiene will increase the quality of life and community health. All water supply components will be constructed on land owned by WUSC.

73. The work involved is labor intensive and minimum use of mechanical equipment is involved. Most of the construction work will be done manually, avoiding heavy equipment which will produce minimum environmental impacts. Trained human resources will be employed.

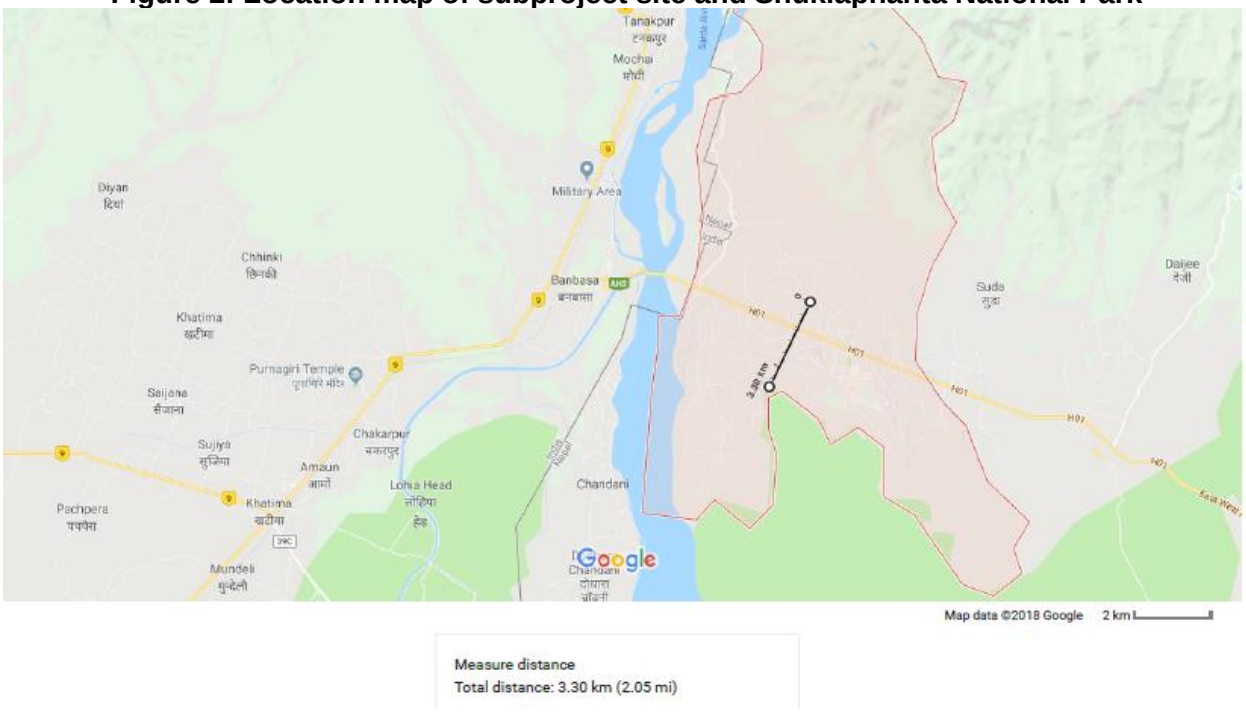
74. The working procedures proposed are such that the beneficiaries will be actively participating in all phases of the project. Except from some mechanical equipment for drilling of boreholes, most of the raw materials used will be sourced locally. Similarly, local people will be employed for the project so that the chances of conflict are minimal.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

75. **Location:** Siddhanath Baijanath is a growing town in Kanchanpur district. The project area lies at 28°55'0" N laltitude and 80°20'0" E longitude, with borders at Kailali district in the East, Dadeldhura district in the North and India in the South and West. It lies within the Bheemdutta municipality, which is an activity hub for industries between India and Nepal. It is also serves a gateway to Shuklaphanta National Park (SNP) (formerly Shuklaphanta Wildlife Reserve). East-West highway passes through the project area. Siddhanath Baijanath is located about 42 km away from Attariya, one of the sub-metropolitan cities in Nepal. The subproject is located 3.3 km from the nearest boundary of SNP and 1.1 km from the nearest boundary of designated buffer zone of SNP. The SNP is predominated by grassland, forests and patches of tropical wetlands. With this distance, the subproject will not disturb SNP. Further, the water supply will tap underground water source, and hence will not disturb the surface water flow in the area. See Figure 2 for the location map.

Figure 2: Location map of subproject site and Shuklaphanta National Park



76. **Climate, Topography and Geology:** It has humid type of climate. The maximum temperature varies from 37°C-40°C in summer and 4°C to 18°C in the winter. The relative humidity is in the range of 84-87%. The average rainfall is 1,900 mm. Almost 80% of rainfall occurs during monsoon (June to September).

77. The project area lies in a part of alluvial deposit of Mahakali River and its tributaries. The altitude of the project area is varying from 203 m to 225 m above mean sea level. The project area is a flat-land with frequent waterways flowing across mostly from North-East to South wards.

78. Geologically it is situated in the foothills of Mid- Hills of far western Nepal. The underline formation of the area is of cobbles, gravels and sand with pockets of clay. Acidic soil is usually found in the forest area. The main four orders of soil are entisols, inceptisols, mollisols, and alfisols. The areas around the borehole compounds are stable without any apparent occurrence of land instabilities. The area is rich in ground water potential, shallow as well as deep aquifers are being extracted for drinking, irrigation and industrial purposes.

B. Biological Environment

79. **Flora in the Project Area.** The project area is a mix of agricultural land, settlements and forest areas with rich surface flow of water bodies. There is only scattered tree cover and grassland within the project area. Natural Sal (*Shorea robusta*) forest is predominant in the project aera. Khayar (*Senegalia catechu*), Sisso (*Dalbergia sisso*), Betelnut (*Arecacatechu*), Kadam (*Anthrocephalus chinensis*), Peepal (*Ficusreligiosa*), Liptis (*Eucalyptus*), Bamboo (*Bambusa vulgaris*) and Amriso (*Thysanolaena*) are the common species found in the project area. Amp/Mango (*Magnifera Indica*), Banana trees (*Musa Velutina*), Guava (*Psidium guajava*) are among the common fruit species found in the project area.

80. **Fauna of in the Project Areas**: Many species of mammals and birds are observed in the project area. Both large and small mammals are present. Spotted dear (*Axis axis*), Muntjac deer (*Muntiacus*), Fox (*Canisaurens*), Wild Boar (*Sus scrofa*), Langoor Monkeys (*Trachypithecus francoisi*), Squirrel (*Sciuridae*), Hispid hare (*Caprolagus hispidus*), Rabbit (*Lepus nigricollis*), etc are found in and around the project area. Birds such as Crow (*Corvus splendens*), Peacock (*Hubaropsis bengalensis*), Hutityau (*Tringa hypoleucos*), Sparrow (*Passer domesticcus*), Pigeon (*Columba livia*), Parrot (*Cacatuasp.*), Eagle (*Haliaeetus leucocephalus*) are among the bird species found in the area.

81. There are no protected areas within the project area. The project area is situated more than 3 km North from the closest boundary of Shuklaphanta National Park.

C. Socioeconomic and Cultural Environment

82. **Demography:** Service area of the project has been established to cover wards 6, 8 and 10 of Bheemdutta Municipality. While carrying out the household survey, the local community people, leaders and key informants provided great assistance to identify the exact service area to be considered in the proposed project. Household survey within service area accounted the total households as 1,603 and permanent population as 9,178. The ward numbers and the cluster settlements including the survey year households and the population is presented in table below.

Table 11: Service Area, Household and Population

VDC / Municipality	Ward No.	Cluster / Settlements	HHs	Population		
				Permanent	Rental (Floating)	Total
Bheemdutta Municipality	6	Baijnath, Bhumi Raj Tole, Banagau, Purnima Tole	111	710	32	742
	8	Sidhanath, Bhanu, Jyoti	142	880	5	885
	10	Adarsha Tole, Amarjyoti Tole, Badimalika Tole, Basanta Tole, Baijnath Tole, Danu Baba tole, Divya Jyoti Tole, Gadda Chauki Tole, Gajar, Gyanu Baba Tole, Gauri Shankar, Gorakhnath, Jay Jagarnath, Jimuwa, Mahalaxmi Tole, Maheshori, Malikarjun Tole, Mankamana Tole, Nagarjune, Pashupati Tole, Pragati Tole, Purnagiri, Sangam Tole, Shanti Tole, Sarswati Tole, Shiva Tole, Sidhanath Tole, Sidheshori Tole, Sukasal, Tintara, Bijaya Tole	1350	7588	95	7683
Total			**1603**	**9178**	**132**	**9310**

HH=household, VDC=Village Development Committee.
Source: Socio-economic Survey, 2017.

83. The project area has average household size of 5.7 and male to female ratio is 1.02 in average.

84. **Caste / Ethnicity:** The proposed project service area comprises different caste / ethnic

groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Dalit comprising 23.8% of total families are prevailing caste group in the service area. Brahmin/Chhetri is the major group with 75.7% as shown in table below.

Table 12: Caste / Ethnicity

Ethnicity	Bheemdutta Municipality Ward No.			Total	Percentage (%)
	6	8	10		
Brahmin/Chhettri	72	130	1011	1213	75.7
Janjati		1	6	7	0.4
Dalit	39	11	332	382	23.8
Other			1	1	0.1
Total	111	142	1350	1603	100.0

Source: Socio-economic Survey, December 2017.

85. **Occupation:** Although, the economy of the area is gradually shifting from rural agricultural economy to trade/ business and service based, majority of the households are still dependent on agriculture. As the socio-economic data shows, nearly 43% of the households have agriculture as main occupation. Service is another main occupation (25%) followed by business (13%). The ward-wise households by occupation are presented in table below:

Table 13: Main Occupation of Household

SN	Occupation	Bheemdutta Municipality Ward No.			Total	Percentage (%)
		6	8	10		
1	Agriculture	63	108	524	695	43.4
2	Business	5	13	195	213	13.3
3	Services	1	15	377	393	24.5
4	Industry		2		2	0.1
5	Foreign Employment	3		55	58	3.6
6	Wages	4	3	175	182	11.4
7	Others	35	1	24	60	3.7
	Total	**111**	**142**	**1350**	**1603**	**100.0**

Source: Socio-economic Survey, December 2017.

86. **Existing Water Supply Condition.** The finding of socio-economic census survey December 2017 is given in table below, which signifies that more than 80.2% households in the service area have tubewells and 19.8% of them are getting water from other sources such as Dug Well, swallow wells, and River. There is no systematic water supply distribution facility in this area.

Table 14: Existing Sources of Water

SN	Water Source	Ward No			Total	Percentage (%)
		6	8	10		
1	Public Tap	0	0	0	0	0
2	Private Tap	0	0	0	0	0
3	Tube well	80	107	1100	1287	80.2
4	Others (Dug well/Kuwa/Mul/River)	31	35	250	316	19.8
	Total	**111**	**142**	**1350**	**1603**	**100.0**

87. **Existing Sanitation Condition and Access to Household Latrine:** Most of the households in the market area have the permanent type and others have the temporary type of private latrines. 97.8% (1567 out of 1603) of the households have household toilet. Among the

households with access to household latrine, 90.3% of them have water-sealed type latrine, 7.0% have ventilated pit latrine and 2.7% have pit latrine. The following table shows ward-wise the access to household latrines:

Table 15: Access To Household Latrine And Latrine Types

SN	Toilet Type	Ward No.			Total	
		6 (Total 111 HHs)	8 (Total 142 HHs)	10 (Total 1350 HHs)	No.	Percentage (%)
1	Pit Latrine	30	2	11	43	2.7
2	Ventilated Pit	64	3	42	109	7.0
3	Water Seal	17	135	1263	1415	90.3
Total		**111**	**140**	**1316**	**1567**	**100.0**

HH=household, %=percent.
Source: Socio-economic Survey, December 2017.

86. **Existing Health Situation:** The services are seems privileged in terms of availability of health service. There is Health Post in Ward 10 with 2 bed facilities and a Health Desk in Ward-10. The data of water borne disease from Jimuwa Health Post shows that there is significant number of cases of typhoid and dysentery in the project area.

Table 16: Data of Water Borne Diseases from Jimuwa Health Post

SN	Types of Diseases	FY 2073/74	FY 2074/75 (6 months)
1	Typhoid	302	179
2	Dysentery	240	78
3	Jaundice	11	9
4	Tape-worms	50	15
	Total	**603**	**281**

Source: Field Survey, February 2018.

D. Site-specific Environmental Condition of the Subproject Areas

88. **Air Quality**. There are no major industries in the project area. There are 2 brick factories and 10 cottage industries. Air pollution is caused by emissions from these along with the fugitive dust from vehicle movements particularly over unpaved roads, and by local small-scale constructions activities. Emissions from these sources are scattered/spread apart both in terms of locations and timing. These emissions may couple with the low scale emissions from any new construction activities.

89. **Acoustic Environment**. The sources of noise in the project area are the local small-scale construction activities and vehicle movements. These are confined in few clustered settlements and in market places and only during daytime. From field observation, noise level in Siddhanath Baijanath is perceived low. More specific noise level measurements will be gathered prior to construction activities under the subproject.

90. **Water Quality**. There are no major threats to surface water sources except for disposal of waste onto water bodies in some places. No case of ground water contamination has been recorded.

91. **Solid Waste Management**. There is no proper system of solid waste collection and disposal. There is lack of proper education and knowledge regarding management of solid waste and waste water. Since there are no industries in the project area, the waste water generated is mostly from residents. Residential wastewater is disposed into septic tanks and soak pits where

the natural treatment of effluent happens.

92. **Sanitation Services**. Most of the households have their own toilets in or outside the house. In the core, most of the buildings have been constructed with attached water sealed toilet or flush toilet with septic tanks. The newly constructed houses, offices and camps need to be monitored to ensure there is no open defecation. Most of the households do not have access to proper drainage and sewerage facility.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Beneficial Impacts

93. Availability of clean and adequate drinking water and sanitary facility are basic human needs. The development of water and sanitation facilities will have numerous beneficial impacts to individuals and communities. Improved water and sanitation needs will significantly improve the quality of life of the area. Some of the major beneficial impacts (Table 18) of the project are described below along with suggestions for achieving optimal benefits.

94. **Employment Generation.** The project will generate direct employment opportunities e.g. skilled and non-skilled work for the local people. Construction activities such as laying and joining of pipelines will create opportunities for about fifty local people. The earning will positively affect the local economy, thereby reducing the chances of seasonal migration of the local people. To obtain such benefits, priority will be given to employing local laborers. The impact is thus direct in nature, local in extent, medium in magnitude and short term in duration.

95. **Skill Enhancement.** The construction of the project will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The project activities i.e. constructing mechanical treatment plants, surface drains, valve chambers and buildings will generate transferable skills. In future, these skills will be useful for locals to generate income as well as implement when the need arises. To obtain or augment such benefits, proper work plans and codes of conduct should be implemented during the construction. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

96. **Local Trade and Business Opportunity.** The proposed project creates business opportunities in the project area. Because construction work involves many workforces, sales from few shops with food items and agriculture and livestock products will increase around the construction site. This demand and supply chain will boost local trade and the business sector. The impact is thus direct in nature, local in extent, medium in magnitude and long-term in duration.

97. **Improved Health and Hygiene.** Deteriorating water quality and unsanitary conditions are often the causes of waterborne communicable diseases. After the implementation of the project, the hygiene of the local people will improve which will reduce the occurrence of waterborne diseases thereby improving the public health in the area. Regular maintenance of the project components needs to be carried out so that the project operates smoothly, and the benefits are kept intact. The impact is thus direct in nature, local in extent, high in magnitude and long-term in duration.

98. **Increased Economic Opportunity**. After the completion of the project, there might be increased rural-town migration due to better facilities and opportunities. The increased economic level may increase the value of the land, thereby uplifting the economic status of the local people.

These benefits can be maximized by ensuring regular maintenance of water supply and sanitation components and by promoting land development activities in the area. The impact is thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

99. **Women Empowerment.** Women and girls are mainly responsible for household activities. Improved water supply and sanitation will contribute towards better health and hygiene of women, girls and the entire household members. The beneficial impacts to women and girls can be augmented by conducting health and awareness programs to the local community. The impact is thus indirect in nature, local in extent, low in magnitude and long-term in duration.

100. **Quality of Life Values. T**he general provision of potable water and proper sanitation facilities will bring about better personal, household and community hygiene practices, resulting to better health for the family and community, and ultimately an overall improvement in the locals' quality of life.

101. Overall, the Project will lead to improved public health and environment, significantly improving the quality of life of the Bhimeshwor Municipality residents.

102. To sustain the positive outcomes, effective operation and maintenance guided by an O&M manual that contains Water Safety Guide, among others, is essential. Continuing hands-on training of WUSC in EMP implementation particularly water quality monitoring is necessary.

B. Assessment of Potential Impacts Due to the Subproject

103. The nature of this subproject and scope of the civil works will generate impacts, issues and concerns prior to construction, during construction and during operation. The potential impacts, issues and concerns from assessed sample subprojects and future subprojects using ADB REA checklists for water supply and sanitation (Appendix 1) and "no mitigation measures scenario" checklist developed for UWSSP (Appendix 2) are presented in Table 17 below.

Table 17: Water Supply Subproject Potential Environmental Impacts, Issues and Concerns (No Mitigation Measures Scenario)

Design	Construction	Operations and Maintenance
• hazard of land subsidence caused by excessive groundwater pumping • inadequate protection of intake works or wells, leading to pollution of water supply • increase in production of sewage beyond capabilities of community facilities • inadequate buffer zone around pumping and treatment plants • health hazards arising from inadequate design of facilities for receiving, storing and handling of	• noise • dust • traffic • impairments associated with transmission lines and access roads • health and safety hazards to workers • continuing soil erosion/ silt runoff • population influx that causes increased burden on social infrastructure and services (such as water supply and sanitation systems) • social conflicts if workers from other regions or	• unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents) • delivery of unsafe water to distribution system • excessive algal growth in storage reservoir • increase in production of sewage beyond capabilities of community facilities inadequate disposal of sludge from water treatment plants • health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards • delivery of unsafe water due to

Design	Construction	Operations and Maintenance
chlorine and other hazardous chemicals • increased sewage flow due to increased water supply • disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups • permanent or temporary change in land use or topography including increases in intensity of land use	countries are hired • risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals • community safety risks due to both accidental and natural hazards, especially where structural elements or components of the project are accessible to the members of the affected community or where failure could result in injury to the community • clearance of existing land, vegetation or building • pre-construction investigations (boreholes, soil testing, etc) • construction works • demolition works • temporary sites used for construction works or housing of construction workers • cut and fill or excavations • working in stream crossings • use of resources (materials, water, energy, etc.) • changes in occurrence of disease or affect disease vectors (e.g. insect or water-borne disease) due to worker's camp • solid wastes such as spoils, overburden, etc. • solid wastes from worker's camp • emission from burning of waste in open air (e.g. worker's camp, slash materials, construction debris)	poor O&M treatment processes (especially mows accumulations in filters) • inadequate chlorination due to lack of adequate monitoring of chlorine supply • delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals • accidental leakage/spillage of chlorine • increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant • population influx that causes increased burden on social infrastructure and services (such as water supply and sanitation systems) • social conflicts if workers from other regions or countries are hired • risks to community health and safety due to transport, and use and/or disposal of materials such as explosives, fuel and other chemicals • community safety risks due to both accidental and natural hazards, especially where structural elements or components of the project are accessible to the members of the affected community or where failure could result in injury to the community • use of resources (materials, water, energy, etc.) • water treatment plant sludge • positive impacts - employment to local people; safe and easy access to improved water supply which will enhance people's health, and boost economic conditions of municipalities

104. **Location and Design.** As subproject locations/sites are screened during selection process, environmental impacts due to location are not anticipated in Chakkifanta water supply and sanitation subproject. The environmental assessment of the subproject shows that it is not likely to have significant adverse environmental impacts that are irreversible, diverse, or

unprecedented. Potential impacts are unlikely to affect areas larger than the sites or facilities subject to physical works. These impacts are site-specific and few if any of them are irreversible.

105. Planning principles, subproject selection criteria, and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location were not significant (Table 18). Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result significant measures have already been included in the subproject designs.[23]

106. In most cases mitigation measures can be designed with uncomplicated measures commonly used at construction sites and known to civil works contractors. Once the subprojects are operating, the facilities will operate with routine maintenance, which shall not affect the environment. Improved system operation will comply with the operation and maintenance manual and standard operating procedures to be developed for all the subprojects.

Table 18: Impacts and Mitigation Measures during Design Phase

Project Activity		Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design				
Incorporation of sloped areas in project design		Soil erosion and slope instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	Project Management Office (PMO), Regional Project Management Office (RPMO) and design, supervision and management consultant (DSMC)
Manual preparation		Health and safety of community and workers	• Prepare training manuals in Nepali with sketches on community health and safety and potential occupational health and safety	PMO, RPMO and DSMC
Location of pipes and photographs of sites and		False claims from people; water quality changes due to	• Place water pipes away from utilities during design • Provide budget for	PMO, RPMO and DSMC /Contractor

[23] For the water supply and sanitation subprojects, various design-related measures suggested for: providing safe water following WHO Guideline values, uninterrupted power supply provision; standard operating procedures for operation and maintenance; and imparting necessary training for WUCs and Municipality staff, personal protection equipment for workers and WTP sludge handling, and development of green buffer zone around the WTP, OHTs and GLSRs. For the sanitiation subprojects, various design-related measures suggested for: providing safe disposal of treated wastewater; efficient treatment to meet disposal standards, odor control at facilities, uninterrupted power supply provision; standard operating procedures for operation and maintenance; and imparting necessary training for WUCs and municipality staff; providing necessary safety no manual cleaning of sewers, and personal protection equipment for workers (protection against oxygen deficiency, harmful gaseous emissions) and sludge handling, and development of green buffer zone around the DEWAT plant.

Project Activity		Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
utilities before construction, particularly in heritage areas		construction. Interference with other utilities and photo of heritage areas to avoid impacts to heritage structures during construction	restoration/replacement of damaged utilities • Avoid placing alignment near heritage buildings • Photograph all sites within heritage areas to enable before and after comparison (note: all roads are to be reinstated to original character especially in heritage areas) • Ensure compliance with any Department of Archaeology (DOA) rules during design including preparation of Archaeological Impact Assessment, or other agreed document by DOA if required.	
Inadequate protection of intake structures		The water from intake will flow & may cause soil erosion.	• Intake well has adequate land for perimeter fencing	PMO, RPMO and DSMC
Sludge disposal		Inadequate disposal of sludge from reservoirs and treatment plant will cause nuisances to affected properties.	• The design of sludge disposal sites will be made at designated sites approved by the municipalities.	PMO, RPMO and DSMC

Table 19: Potential Impacts/Issues/Concerns and Mitigation Measures Taken during Project Preparation Phase

Rapid Environmental Assessment Identified Impacts/Issues/Concerns	Measures taken during Feasibility Study/Detailed Engineering Design to Mitigate Impacts/Issues/Concerns
Unsatisfactory raw water quality	During the detailed engineering design stage, water sample from existing tube wells was tested. Tests revealed that the total hardness and alkalinity are significant. This information has guided the design of the water treatment
Delivery of unsafe water to the distribution system	Design proposes basic treatment using pressure filter, softening and disinfection. This IEE proposes “hands on” training by a licensed and accredited laboratory for the first few years of operation under the Water Safety Plan included in the sub project design & continuing training thereafter.
Health hazards arising from inadequate design of facilities for receiving, storing and handling of	Design has included a “housed” dosing unit.

Rapid Environmental Assessment Identified Impacts/Issues/Concerns	Measures taken during Feasibility Study/Detailed Engineering Design to Mitigate Impacts/Issues/Concerns
chlorine and other chemicals	
Delivery of water to distribution system, which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed ductile Iron, and High Density Polyethylene (HDPE) pipes. The PE pipes of class 6kgf is chosen to avoid any leakage issues
Contamination of drinking water source and other environmental receptors from household and public toilets	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m down-stream of the drinking water source.
Risk to public and environmental health due to inappropriate siting and design of septage disposal pit.	The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best practice and acceptable standards (e.g. USEPA standards etc). This includes; (i) locating disposal pits at least 300 m away from the nearest dwelling, and 30m down-stream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown.

107. **Impacts during Preconstruction Phase.** The preconstruction works will involve field survey and investigation, development of design and detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary. As there will be no construction activities involved; there will be no anticipated environmental impacts.

108. **Impacts during Construction Phase.** Except the pipelaying works, all other construction activities will be confined to the selected sites, and the interference with the public and community around is minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.,), mining of construction material, occupation health and safety aspects. Impacts mainly arise from the construction dust and noise; from the disturbance of residents, businesses, traffic by the construction work, safety risk to workers, public and nearby buildings due to trench excavations, especially in narrow roads, dust, access impediment to houses and business, disposal of construction waste, etc. These are all general impacts of construction in urban areas, and there are well developed methods of mitigation that are suggested in the EMP. This section discusses the impacts and general approach to avoid and mitigate these impacts. The detailed mitigation measures are presented in the Section on EMP.

1. Physical Environment

109. **Erosion and Land Surface Disturbance.** Excavation and digging works during construction may lead to soil erosion, silt runoff, and unsettling of land and street surfaces. Haphazard disposal of the excavated earth can disturb the road surface. The activity as such will be a nuisance and discomfort to the road users and inhabitants. Accordingly, water stagnation in the construction area especially during the rainy season may occur. The construction sites are public lands and are unused lands.

110. Public land will be used for construction of project components such as deep boring, treatment unit, OHT, office building and guard house at Sidhanath tole beside the open space of

Thapachaur. Nearly 1,790.06 m^2 land will be used for the project structures.

111. Pipe-laying works are proposed through existing public road ROWs as far as possible. Hence, disturbance is minimal. However, some disturbances and damages to public or private properties can take place at Thapachauraha, Banagau, Bhanu tole, Mahalaxmi tole and Sangam tole.

112. Precautionary measures will be taken, proper backfilling of excavated trenches will be done and the excavated soil will be stacked properly. Construction activities will be, as far as possible, avoided during the rainy season. Topsoil will be conserved and resurfaced with compaction.

113. **Underground Water Quality and State of Water Table.** Due to the continued extraction of ground water, fluctuation in ground water level is inevitable. With the proposed subproject where water will be extracted at a depth of 120 m, below the impervious strata, existing shallow tube wells will not be affected as they are usually 10 to 15 m deep.

114. **Damage to the Existing Facilities.** During the construction period, while excavating the earth, existing water supply distribution pipe lines, side-drains and compound walls may get damaged in few places particularly in the major settlement and market areas of Thapachauraha, Banagau, Bhanu tole, Mahalaxmi tole and Sangam tole.

115. Timely and proper reinstatement of any damage to public or private property will be carried out. A proper inventory of any damages to existing facilities will be kept. Any grievance regarding such damage will be dealt with priority and will be addressed timely.

116. **Air and Noise Pollution.** The construction activities like laying of transmission and distribution pipes, construction of storage reservoirs, transport and installation of pumps, construction of deep tube-well will produce some extent of air pollution and noise for a certain time period. There will be some activities such as transportation, loading/unloading of construction materials, stockpiling of construction materials, disposal of spoil, and earthworks. These will cause effect into air quality due to dust generation and vehicular emissions. Use of power horns and movement of heavy vehicles can cause serious disturbance to the community, educational institutes, hospitals/health posts and residences. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or should not result in increase in background noise level of 3 decibels at the nearest receptor location off-site in accordance with the EHS guidelines.

117. Mitigation measures on impacts of air pollution include:

(i) confining earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
(ii) watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, or 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) place signage at active work sites in populated areas;
(vi) requiring trucks delivering aggregates and cement to have tarpaulin cover;

(vii) limiting speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
(viii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
(ix) use of vehicles complying with Nepal Vehicle Mass Emission Standards (NVMES), 2069 enforcement, and green sticker standards; and
(x) prohibition of open burning of solid wastes.

118. Migitation measures on impacts of noise include:
(i) using equipment that emits the least noise, well-maintained and with efficient mufflers;
(ii) restricting noisy activities to day time;
(iii) avoiding use of noisy equipment or doing noisy works at night time;
(iv) limit engine idling to a maximum of one minute;
(v) spread out the schedule of material, spoil and waste transport; and
(vi) minimizing drop heights when loading and unloading coarse aggregates.

119. **Impact on Water Bodies.** There will be some impacts on water bodies located within the project area during the construction phase. Tilkeni khola, Tilachaur khola, Bangau khola and Jimuwa khola are the surface water bodies that are likely to be polluted. Possible activities, which may influence the water quality, are listed below.
(i) haphazard disposal of solid waste in the vicinity of water bodies;
(ii) haphazard quarrying of construction materials from river beds;
(iii) sediment and excavated materials may be transported to water bodies during rain; and
(iv) leakage and disposal of oil and grease from construction equipment.

120. The excavation works will cause water turbidity. This is limited to water discharge into the Mahakali River, and for a short period of time.

121. Spoil and waste disposal into the water bodies will be avoided. Workers will be restricted from washing and fishing in the local surface water bodies. There will be designated areas for effluent and sludge discharges. Regular monitoring of the river or stream quality will be done on a regular basis.

122. **Waste Disposal.** Waste like excess grease, lubricants, and paints may pollute soil and water resources. Solid wastes from construction campsites are also likely to be a visible source of pollution. Waste segregation, containment and safe disposal will be conducted in compliance with waste standards.

123. Proper waste management and disposal system will be done during construction period. Proper toilets for the workers will be installed before starting the work. Waste like excess grease and lubricants will be collected in plastic containers and sold to scrap dealers. Solid waste and other construction waste deposited near the labor camp and will be cleared post-construction works.

2. Biological Environment

124. The major project structures will be built on unused and vacant land surfaces. These will be constructed on land owned by WUSC. However, transmission and distribution lines may pass through agricultural land and private lands. Only scattered plants of local species and fruit plants

are observed in these sites, thus, minor impacts are anticipated only during the construction period. Most of the pipe lines pass along the roadside (right of way and only a few numbers of plants and patches of bushes will be cleared within the transmission pipe line stretches.

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

126. **Loss of Vegetation Cover.** The loss of vegetation cover and species diversity due to earthwork in the construction sites of deep tube wells, reservoir, treatment units and office building sites is anticipated. However, project sites are situated in open grassland and barren lands. During construction, only shrubs cover and some small plants will be affected.

127. Some of the topsoil and vegetation may also be lost during pipe laying works. No distribution line passes through the forest area. To protect the topsoil and vegetation, the topsoil will be kept separately and replaced in its original position after laying the pipes. Tree cutting will be avoided and fetching of fuel-wood by workers will be prohibited.

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

129. **Impact on Fauna.** The project site is within the built-up area. Population dynamics of resident and migratory birds and reptiles at the project site may be affected during the construction period due to various construction activities. But these effects will be temporary in nature. The condition will be normal after construction is over.

130. Any kind of bird hunting or poaching by workforce will be strictly prohibited. Awareness programs will be conducted in the campsites and in the project communities regarding conservation of the wildlife.

131. **Impact on Aquatic Life.** Some of the construction activities and protection works are proposed on the river banks. These construction activities will physically disturb the water quality for a short period and may cause adverse impact on aquatic life. But these effects will be temporary in nature.

132. Disposal of waste or spoil onto water bodies will be strictly prohibited, and workers will be restricted from fishing.

3. Socioeconomic Environment

133. **Disturbance to Community Activities.** Construction activities, particularly construction works on roads will cause disturbances to the community activities, festivals and social events. The free movement of vehicular traffic and pedestrians will be affected. Noise produced due to the operation of machines may disturb the neighborhood in construction areas. The impacts to human settlement including villages, cattle sheds and farmlands will be very low.

134. Construction schedules will be shared with the locals and notice of any major works that might hinder public activities will be provided well in advance.

135. **Social Dispute and Dissatisfaction.** There is a possible influx of outside workforce,

which may pose threats of disharmony with the local community workforce. Irresponsible behavior, such as gambling and excess drinking, may trigger social disputes. Irresponsible waste disposal and sanitation practices may also bring dissatisfaction to the local communities. The influx of migrants also poses competition for the locals in terms of the job market, which may be potential sources of dissatisfaction and conflicts.

136. **Community Health and Safety Hazards**. Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

137. Mitigation measures include:

(i) contractor's implementation of SEMP;

(ii) contractor's inclusion in the SEMP the implementation of community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities.[24] As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

(a) implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;

(b) restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;

(c) removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and

(d) implement measure to prevent proliferation of vectors of diseases at work sites;

(iii) adequate space and lighting, temporary fences, shining barriers and signage at active work sites;

(iv) contractor's preparedness in emergency response;

(v) adequate dissemination of GRM and contractor's observance and implementation of GRM; and

(vi) upon availability, local people should be given an opportunity for work in the subproject activities.

138. **Workers' Health and Safety Hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and 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

[24] World Bank Group. IFC. 2007. *Environmental, Health, And Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

to the health and safety of construction workers. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce. The impact is thus indirect in nature, local in extent, medium in magnitude and short term in duration.

139. Mitigation measures include implementation of an occupational health and safety plan to include international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote 24). The occupational health and safety plan should be included in the SEMP. As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

(i) Communication and Training
    (a) Training of all workers on occupational health and safety prior to construction works;
    (b) Conduct of orientation to visitors on health and safety procedures at work sites;
    (c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;
    (d) Proper labeling of equipment and containers at construction and storage sites; and
    (e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station;

(ii) Physical Hazards
    (a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
    (b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
    (c) Use of bracing or trench shoring on deep excavation works;
    (d) Adequate lighting in dark working areas and areas with night works;
    (e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
    (f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
    (g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;

(iii) General Facility Design and Operation
    (a) Regular checking of integrity of workplace structures to avoid collapse or failure;
    (b) Ensuring workplace can withstand severe weather conditions;
    (c) Enough work spaces available for workers, including exit routes during emergencies;
    (d) Fire precautions and firefighting equipment installed;
    (e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;

(f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
(g) Good working environment temperature maintained;
(h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
(i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

140. **Resettlement, Relocation and Compensation Issue.** The major structures will be constructed on land belonging to WUSC. The distribution system network falls within the public property line/ROW, therefore, resettlement or relocation is not required. Some cases of crop loss during pipelaying, damage to compound wall may arise. These will be avoided as much as possible.

141. **Impacts during Operation and Maintenance Phase.** During operation, the facilities may generate noise, odor from sanitation and sewage treatment facilities and discharges to the environment. The facilities will also require repair from time to time.

142. **Non-compliance with Relevant Environmental Legislation.** This issue will arise when there is a lack of awareness of Project staff and management of environmental safeguards requirements, compliance with the requirements and conditions specified in the IEE Report and approvals and permits for the use of water resources. The impact is thus direct in nature, local in extent, medium in magnitude and long-term in duration.

143. Measures to mitigate this concern include
(i) capacity strengthening of WUSC and continuing capacity strengthening of Project staff; and
(ii) ensuring compliance with EPA/EPR, NDWQS, applicable conditions in IEE approvals and registration for the use of water resources.

144. **Risk to exposure to chemicals.** Direct exposure to Bleaching Powder is toxic and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose, and mouth are of extreme hazard to the workers handling chlorine and bleaching powder.

145. Mitigation measures include:
(i) installation of clear, visible signage in premises on the observance of safety measures;
(ii) setting up of a mechanism for quick response to spills of chemical and hazardous substances; and
(iii) Proper training and required safety gears will be made available for the use of worker involved in handling of bleaching powder.

146. **Impact on Water Bodies and Aquatic Life.** The effluent produced from the periodic backwashing of the filter plant, if discharged directly into the river course, may harm the water bodies and aquatic life, especially during dry season when the flow will be less.

147. **Risk of Supply of Contaminated Water.** Contamination of source or in reservoir, leakage and contamination through pipelines and contamination at point-of-use during operation phase may adversely affect the health of the consumers. Lack of regular maintenance could be a concern.

148. Any leaks in pipes will be immediately maintained. Water Safety Plan (WSP) will be formed for the project, and its team will be trained and mobilized affectively.

149. **Generation of Waste Water and Sullage.** Reliable and sufficient water supply will increase the generation of wastewater and sullage. If inadequately managed, this situation will lead to contamination of the water supplied through leaks or broken pipes in the distribution system. The impacts are thus indirect in nature, local in extent, medium in magnitude and long-term in duration.

150. Mitigation measures include:

(i) prompt action to repair broken pipes and leaks;
(ii) monitoring incidence of waterborne disease in the dry and wet seasons; and
(iii) construction of soakpits, diversion of waster after treatment into natural drainages and infiltration trenches will be adopted considering the ground conditions, topography, quality and quantity of waste generated.

C. Indirect, Induced and Cumulative Impacts

151. **During Construction - Indirect and Induced Impacts.** The volume of vehicles that will be operated from the simultaneous construction at project component sites may create traffic jams on narrow access roads and hinder the mobility of people, good, and services, particularly in the bazaar areas. A greater number of people may be exposed to safety hazards from the constricted road space. Coupled with disruption of economic activities and social services from extended interruption of power supply due to the relocation of power poles or likely accidental damages, production outputs will suffer a slowdown. Dust on crops nearby project area would have some effect on the crops' yields. Apart from the applicable mitigation measures, proper coordination with relevant ward authorities, social service institutions and businesses would further mitigate indirect and induced impacts.

152. **Cumulative Impacts.** The cumulative impacts will arise mainly from the construction of the main Project components and associated facilities. The project's "main area of influence covers component sites, i.e. footprints and areas within 200 m from their edges, considering the potential reach of noise, dust and socio-economic impacts; "Point works" refer to such main components as pumps, RVTs, treatment units/ancillaries, public markets; "Horizontal works" refer to the transmission main and distribution pipes; the "Construction period" (excluding O&M) for horizontal works is estimated to be 1 year, and 6 months for the collection chamber and water treatment plant and RVT and design tube well (DTW) unit/ancillaries is six months.

153. Assuming all components are started simultaneously, without mitigation, cumulative impacts will be "moderate" in magnitude during the peak construction (for the first four months of the construction). After this, the magnitude of cumulative impacts will lessen to "low" magnitude. The sensitiveness of the resources, natural and artificial, within the main areas of influence has been taken into account, together with the types of works involved and their intensities.

154. The potential moderate and high cumulative impacts would be dust, noise, road space limitation leading to slow mobility, access blocking, disruption of social services and economic

activities, community and workers' health and safety hazards, generation of solid wastes and spoils. To reduce the cumulative impacts down to acceptable levels:

(i) civil works must be well planned, strategized and completed promptly;
(ii) the contractor should implement SEMP fully, and key institutions should act their roles in EMP implementation effectively;
(iii) there must be adequate consultations with stakeholders, including vehicle operators, and local authorities and coordination, particularly regarding expected cumulative impacts. vehicle operations should temporarily adjust to the circumstances to relieve some road space limitations and for public safety and convenience; and
(iv) the GRM should be disclosed (through public meetings, display at strategic places and media) to the communities affected by the cumulative impacts.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Information Disclosure, Consultation and Participation

155. Stakeholder consultation and participation is an essential process in project preparation and IEE study. The process in engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table 21 lists the persons consulted during the IEE Study.

Table 20: Lists of People and Institutions Consulted

SN	Name	Organization/Address
1	Mr. Kamal Chand	Treasurer/Water User Committee
2	Mr. Mahabir Jhakri	Local beneficiary
3	Mr. Dil Bdr. Dhami	Local beneficiary
4	Mr. Khagendra Singh Bista	Representative of ward-8
5	Mr. Hari Pratap Mishra	Secretary of ward-8
6	Mr. Tilak Khatri	Local beneficiary
7	Mr. Ganesh Giri	Senior Health Assistant/Jimuwa Health Post
8	Mr. Surendra Bista	Mayor, Bheemdutta Municipality
9	Mr. Permananda Joshi	Ward Chairman, Ward 10
10	Mt. Harak Singh Dhami	Member, Ward 6
11	Mr. Dal Bahadur Bohora	Ward Member, Ward 6
12	Mr. Dhwaj Bahadur Bista	Ward Chairman, Ward 8
13	Ms. Bhanu Devi Sunar	Ward Member, Ward 8
14	Mr. Bhawan Singh Bista	Teacher, Ward 8
15	Ms. Annu Khadayat	Member, Ward 8
16	Mr. Padam Singh Bista	Member, Ward 8
17	Mr. Mangal Singh Dhami	Member, Ward 8
18	Mr. Nanda Lal Fidali	Member, Ward 8
19	Mr. Deepak Bahadur Singh	Member, Ward 8
20	Mr. Nar Bahadur Dhanuk	Member, Ward 8
21	Mr. Nar Pati Dhami	Member, Ward 8
22	Mr. Gagan Khadka	Member, Ward 8

156. **Summary of Consultations.** The public meeting was organized on 28 November 2018 in the premises of Municipality Office for the discussion of the environmental impacts due to the construction of Chakkifanta subroject.

157. Another consultation was conducted on 21 April 2018 at Thapachauraha with the WUSC members. The common issues discussed with the local stakeholders are as follows:

(i) Project will minimize any possible impacts on environment and local socioeconomy during design and implementation phases; and
(ii) Social surveys and environmental studies will ensure best practices through incorporation of EMP in contract document.

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

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

159. The public consultations and information disclosure will be continuous throughout the project cycle. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

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

VIII. GRIEVANCE REDRESS MECHANISM

161. A project-specific GRM will be established to receive, evaluate and facilitate resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. The GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns. Grievances may be channelled through letters, emails, text messages (SMS), verbal narration, grievance boxes and registers. Suggested template for grievance redress form is in Appendix 4.

162. 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. Project will publish the sample grievance registration form on its website, and publish it in local language and/or indigenous people dialect, at the hoarding board of each of the participating WUA or municipalities' office. Every grievance shall be registered with careful documentation of process adopted for each of the grievance handled, as explained below. The environmental and social safeguards officer (ESO/SSO) at the project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.

163. A municipal-level public awareness campaign will be conducted on a regular basis as per the communication strategy of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the project management and quality assurance consultant (PMQAC) and regional design, supervision and management consultants (RDSMCs) will support the WUA or municipalities in conducting municipality-wide awareness campaigns, which will ensure that all stakeholders including poor and vulnerable are aware of the GRM and project's entitlements.

164. A grievance redress committee (GRC) will be formed at the Municipality level, comprising the Mayor as Chairperson of GRC, and Regional Project Manager RPMO as Secretary. The GRC members will comprise of (1) WUSC Secretary; (2) RPMO Engineer; (3) RPMO social /environmental (as relevant) officer, (4) representative of affected persons, (5) RDSMC's safeguards specialist (social/environment as relevant), (6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee,[25] and (7) contractor's representative. The secretary of the GRC will be responsible for convening timely meetings and maintaining minutes of meetings. The concerned social safeguards expert of RDSMC will support the RPMO safeguard's officer and Project Manager of RPMO to ensure that grievances, including those of the poor and vulnerable are addressed. All GRCs shall have at least two women committee members. Along with representatives of the affected persons, civil society and eminent citizens can be invited as observers in GRC meetings.

165. 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 WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC. The GRM procedure is depicted in Figure 3, and is outlined below in detail, 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. If affected persons are not satisfied with the response they can elevate it to the next level:

(i) **First Level of GRM** (WUA level): The first-level, which is also the most accessible and immediate venue for quick resolution of grievances will be the contractors, RDSMC field engineers and RPMO supervision personnel, who will immediately inform the WUA. Any person with a grievance related to the project works can contact UWSSP to file a complaint. The municipal-level field office of the RPMO,

[25] If the complaints are related with indigenous people/Dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities shall be involved.

in WUA's building, will document the complaint within 24 hours of receipt of complaint in the field, and WUA or local bodies will immediately address and resolve the issue at field-level with the contractor, supervision personnel of RPMO and RDSMC field engineers within 5 days of receipt of a complaint/grievance. The assigned RDSMC's 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 as well as to provide feedback to the complainant. If the complaint remains unresolved at the local level within 5 days, the WUA will forward the complaint to the municipality level GRM.

(ii) **Second Level of GRM** (Municipality level): The complainant will be notified by the WUA that the grievance is forwarded to the Municipality-level GRC. The Municipality-level GRC will be called for a meeting, called and chaired by the Mayor. 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 WUA. If the grievance remains unresolved within 10 days of receipt of complaint by WUA, the matter will be referred to the third level. The RPMO Engineer will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out.

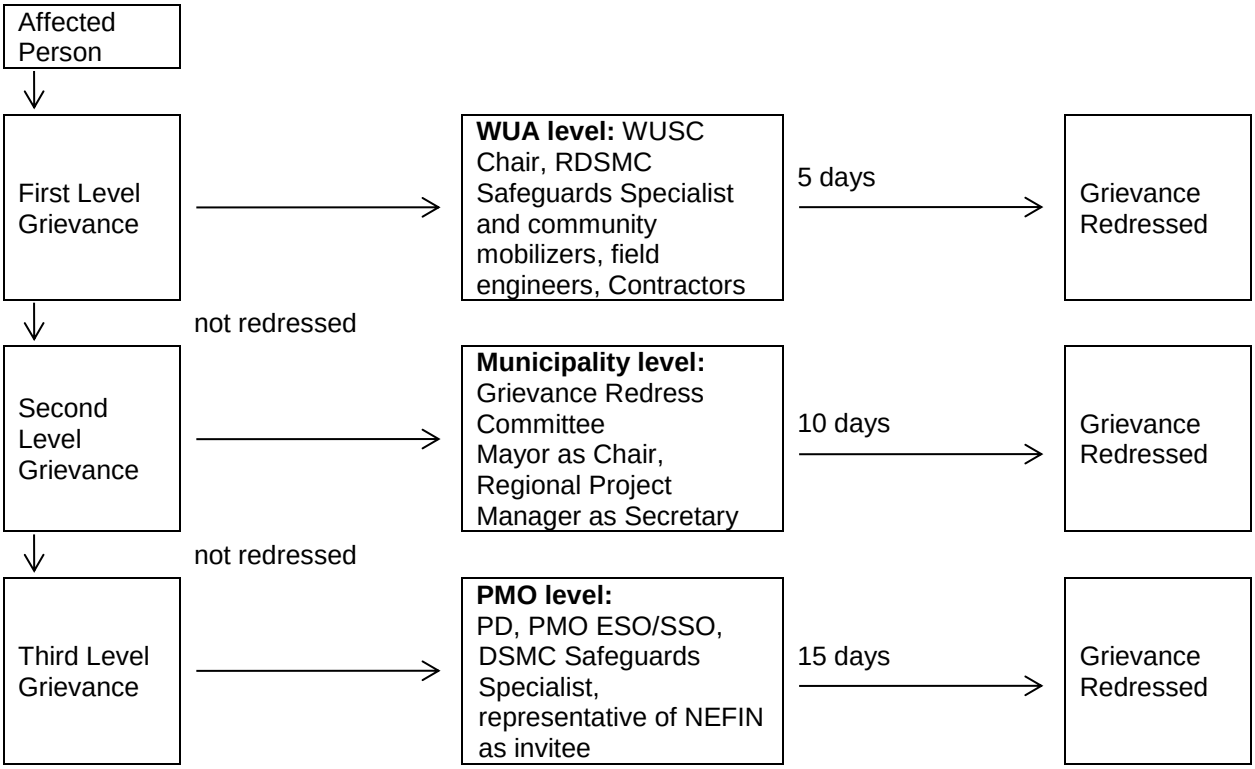
(iii) **Third Level of GRM** (PMO Level)**:** Any unresolved or major issues at Municipality level will be referred to the PMO for final solution. A representative of the Nepal Foundation for Indigenous Nationalities (NEFIN) will be invited to attend any meetings related to resolution of Indigenous Peoples grievances. Decision has to be made within 15 days of receipt of complaint from the Municipality-level GRC. The Project Director will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO and SSO) of PMO will be involved with support from the PMQAC's social/environment safeguards experts. The SSO will be responsible to convey the final decision to the complainant.

166. All paperwork (details of grievances) needs to be completed by the WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, DWSS, Mayor and other GRC members, prior to the scheduled meetings. The RPMO's Engineer will be responsible for follow-through of all escalated grievances. All decisions taken by the GRC will be communicated to the affected persons by the RPMO's SSO.

167. 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.

168. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use ADB's Accountability Mechanism 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 developing member countries (DMCs). The ADB's Accountability Mechanism information will be included in UWSSP Information Datasheet (PID), to be published in web and distributed to the affected communities, as part of the project GRM.

Figure 3: Grievance Redress Process



DSMC = design, supervision and management consultant; ESO = environmental safeguards officer; NEFIN = Nepal Federation of Indigenous Nationalities; PD = project director; PMO = project management office; RDSMC = regional design, supervision and management consultant; SSO = social safeguards officer; WUA = water users' association; WUSC = water users' and sanitation committee.

169. **Record Keeping and Disclosure**. Records at the municipal-level will be kept by the concerned WUA or local bodies member secretary, assisted by RDSMC, 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, WUA, 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/ Municipality level, the RPMO's Engineer assigned as GRM focal person will be responsible for record-keeping, calling of GRC meetings and timely sharing of information with WUA or municipalities. For grievances escalated to PMO and above, the PMO's SSO will be responsible for maintenance of records, sending copies to RPMO and WUA for timely sharing of information with the person filing complaint.

170. **Periodic Review and Documentation of Lessons Learned**. The PMO's SSO will periodically review the functioning of the GRM at municipality or WUA level and field 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, WUA to RPMO SDO, and by RPMO to PMO SSO) in monthly and quarterly progress reports.

171. **Costs.** All costs involved in resolving the complaints (meetings, consultations,

communication and reporting/information dissemination) at local (field/ward/municipal) level will be borne by the concerned focal organizations at each level: WUA at local level, and municipality at municipal level; and PMO at central level. Cost estimates for grievance redress are included in resettlement cost estimates.

Table 21: Suggested Format for Record Keeping of Grievances

S. No.	Date of Receipt of Grievance	Name and Contact Details of Complainant	Description of Complaint	Nature of Complaint	Decisions Taken	Response given to Complainant and Date	Whether Closed

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangement

172. The Ministry of Water Supply (MOWS) will be the Executing Agency, working through the DWSS, which will establish a Project Management Office (PMO) for the project[26] headed by a Project Director. The DWSS will also establish two Regional PMOs (RPMOs).

173. The PMO will be responsible for overall project planning, management, implementation, monitoring and reporting for the project. The PMO will also be responsible for screening the proposed subprojects in accordance with the subproject selection criteria for the project,[27] assisting the municipalities in conducting feasibility studies,[28] reporting to and being point of liaison with ADB on the project; quality control of detailed design and construction supervision; procurement of civil works contractors; support for capacity building; and overseeing safeguard compliance. The PMO will liaise with WUSCs or municipalities to sign the management agreement prior to the award of contract for each subproject. The PMO will also engage all consultants under the project.

174. The RPMOs will be established using the existing infrastructure in (i) Itahari, Sunsari, for the eastern region, (ii) in Nepalgunj, Banke, for the western region, and (iii) PMO (Kathmandu) will act as RPMO for central region projects. The RPMOs will report to the PMO and be supported and monitored by PMO to implement the projects in the field and manage contractors and consultants. The RPMOs will manage the detailed design and construction supervision with support from DSMC that PMO would engage (DSMCs for eastern, western, and central region each). Each of the DSMCs will be based at the respective RPMO. For each subproject, a dedicated implementation core group will be established in the field, at each WUA's office,[29] headed by a qualified engineer from the RPMO to conduct day-to-day project management, planning and construction supervision. The TDF will coordinate with RPMOs, WUSCs and municipalities at least on monthly basis.

[26] DWSS will continue the existing PMO established and operational for the Third Small Towns Water Supply and Sanitation Sector project.

[27] Subproject selection criteria (covering all aspects of a proposed subproject other than the specific subproject selection criteria for environment as discussed in this EARF) is attached as Appendix 1 of the PAM.

[28] TDF will assist the municipalities in conducting financial appraisal of the subprojects and advice DWSS on its outcomes prior to the start of detailed design process.

[29] The implementation core group, as a minimum, comprises of (i) an Engineer, a Social mobilizer, and an EMP monitor, RPMO; (ii) an Administration Staff, a Finance Staff, and an Engineer or Junior Engineer, WUSC.

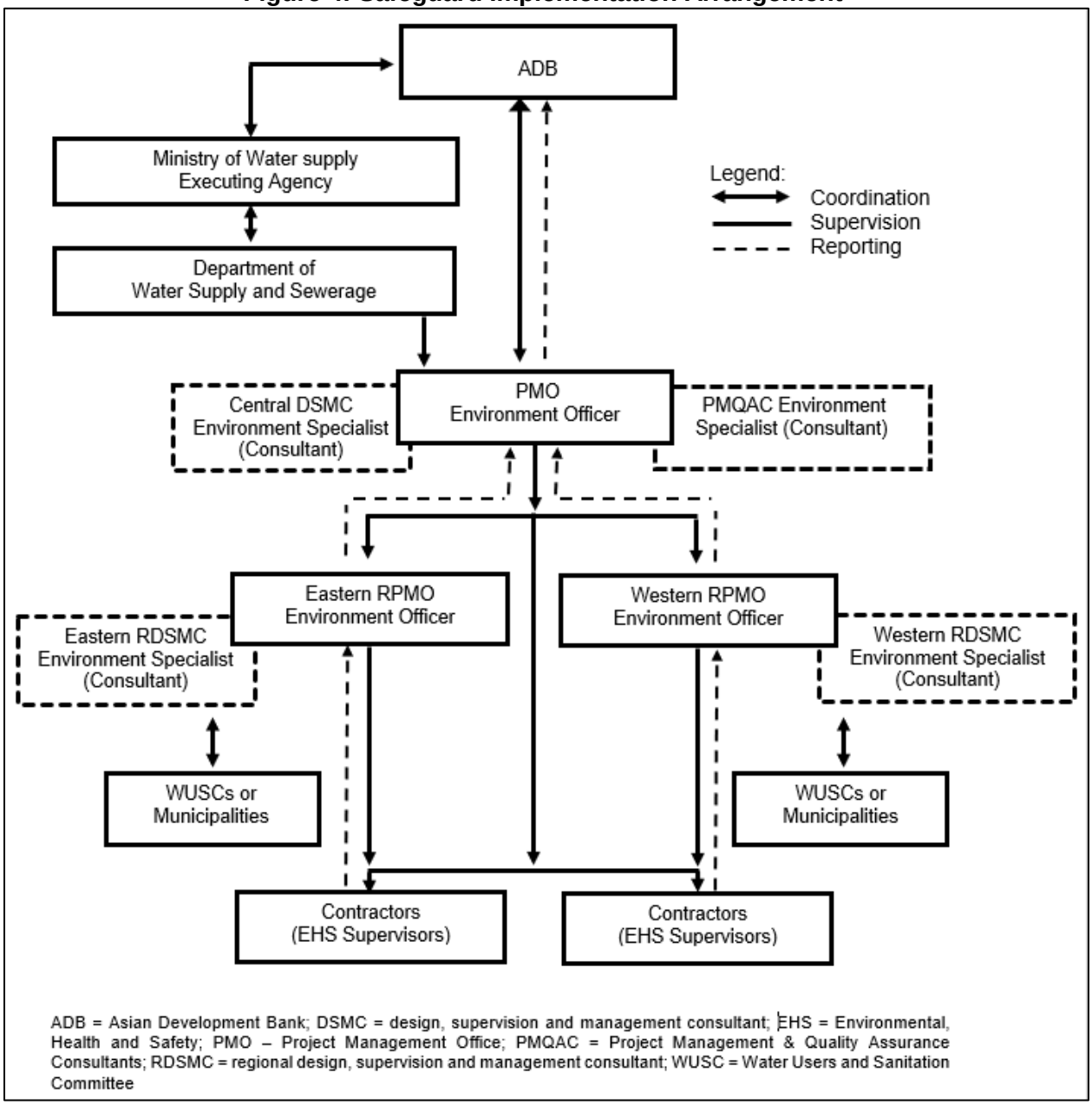
175. The WUSC, on behalf of the WUA[30] or the municipality[31] will be responsible for operation and maintenance (O&M) of the water supply and sanitation facilities constructed, operating under a management agreement with DWSS. WUSCs consist of nine executive members,[32] at least three of whom are women. The project will fund the WUA's minimum prescribed staffing and other resource requirement, as outlined in the management agreement with DWSS for sustainable operations of the system during the project period. For the subprojects yet to be selected and where WUA does not exist initially, or when the municipality doesn't have the capacity and chooses to delegate the operation to user's representatives, an interim user committee (IUC) will be first established in the feasibility stage by representing potential consumers. The IUC will work with the RPMO and DSMC in undertaking a feasibility study, confirm the technical proposals and the boundaries of the service areas. WUAs will be developed from IUCs at the detailed design stage.

[30] WUAs are registered with the district water resources committee as a user association under the Water Resources Act (1992).

[31] As the project is a demand based open access project, the WUAs or the municipalities can apply for funding a proposed subproject that meets the subproject selection criteria.

[32] WUSCs will be formulated by ensuring proportional representation of gender, caste and ethnic groups. It shall include at least 33% representation of women.

Figure 4: Safeguard Implementation Arrangement



176. **Project Management Office.** A project officer (Environment) will be engaged in PMO to ensure implementation of environmental safeguards. He/ she will be provided with necessary consultant support, and capacity development and training. The responsibilities of the Environment Officer are:

(i) review and confirm existing IEEs and EMPs are updated based on detailed designs, that new IEEs/EMPs prepared by DSMCs comply to exclusion criteria and project selection guidelines as stipulated in the environmental assessment and review framework (EARF) and government rules; and recommend for approval to PMO;
(ii) approve subproject environmental category;
(iii) ensure that EMPs are included in bidding documents and civil works contracts;

(iv) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by RPMOs and contractors;
(v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
(vi) 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;
(vii) supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
(viii) review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;
(ix) consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
(x) ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;
(xi) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns;
(xii) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
(xiii) undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
(xiv) organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

177. **Regional Project Management Offices.** The environmental officer assigned by DWSS to the RPMOs will receive support from (i) the PMO environmental officer, (ii) environmental specialist from PMQAC, and (iii) the environmental specialist and EMP monitors of the regional DSMCs to carry out the following:

(i) prepare new IEEs and 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;
(viii) assist with ongoing meaningful consultation and assist in setting up of GRM in respect of environment concerns; and
(ix) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

178. **Project Management and Quality Assurance Consultant.** The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas. The detailed TORs are in the PAM:

(i) ensure that the quality of the designs and construction of all water supply and sanitation components implemented under the project are to the required standards; and
(ii) assist the PMO with the overall planning, implementation and monitoring of the project during all stages of implementation including adherence to all environmental and social safeguards' requirements.

179. **Regional Design, Supervision and Management Consulltants.** The RDSMCs will provide support to the RPMOs in the following areas. The detailed TORs are in the PAM:

(i) prepare quality feasibility studies, detailed engineering designs, safeguards documents and bid documents;
(ii) provide effective construction supervision and contract management of all water supply and sanitation components implemented under the project in its region;
(iii) assist the RPMOs with the overall planning, implementation and monitoring of each subproject during all stages of implementation including adherence to all environmental and social safeguards requirements;
(iv) work closely with the Water User and Sanitation Committees (WUSCs), respective project municipalities and communities to ensure that the citizens are aware of project benefits and their responsibilities; and
(v) ensure that poor and vulnerable groups will benefit equally from the project.

180. **Civil Works Contracts and Contractors.** The contractor will be required to designate an Environmental, Health and Safety (EHS) 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 contractor will be required to submit to RPMO, for review and approval, a site-specific environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP. The contractor will be required to undertake day to day monitoring and report to the respective RPMO and DSMC.

181. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP or SEMP constitutes a failure in compliance and will require corrective actions. The EARF and IEEs specify responsibilities in EMP implementation during design, construction and O&M phases.

180. The PMO and RPMOs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

182. **Capacity Building.** The design, review and technical audit consultant (DRTAC) 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 following both ADB and government requirements as specified below:

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

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

184. **Before Construction.**

(i) Facilitate public consultation and participation, information dissemination and social preparation;
(ii) Provide available data to DSMC-ESS during IEE;
(iii) Assist in securing tree-cutting permits and/or registration of water source; and
(iv) Participate in training programs.

185. **During Construction.**

(i) Assist in the observance of the grievance redress mechanism;
(ii) Actively participate in the monitoring of Contractor's compliance with the IEE and its EMP and the conditions set out with Government's approval of the IEE Reports; and
(iii) Facilitate public consultations, as necessary.

186. **During Operation.**

(i) Implement the Environmental Management Plan and Water Safety Plan;
(ii) If applicable, actively work with the engaged licensed and accredited laboratory in water quality monitoring;
(iii) Prepare the environmental monitoring report as per IEE; and
(iv) Ensure observance of the grievance redresses mechanism.

187. **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 WUSC. 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 WUSC.

B. Environmental Management Plan

188. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMO, RPMO, project implementation units (PIUs), consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

189. The contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved EMP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE, EMP and SEMP. The contractor shall allocate budget for compliance with these IEE, EMP and SEMP measures, requirements and actions.The contractor will be required to submit to PIU, for review and approval, a site environmental management plan (SEMP) including (i) proposed sites/locations for construction work camps, storage areas, hauling

roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program as per EMP. No works can commence prior to approval of SEMP.

Table 22: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Prior to Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc can result to design revisions and /or stoppage of works	- Obtain all of the necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. - Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. - Include in detailed design drawings and documents all conditions and provisions if necessary	Project Management Office (PMO), Regional Project Management Offices (RPMOs) and Design, Supervision and Management Consultant (DSMC)	Incorporated in final design and communicated to contractors	Prior to award of contract
Existing utilities	Disruption of services	- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction - 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 spoil management plan (see Appendix 5 for outline).	DSMC, RPMOs	List of affected utilities and operators; Bid document to include requirement for a contingency plan for service interruptions (for example provision of water if disruption is more than 24 hours),	During detailed design phase
Drinking water	Extraction of unsatisfactory	- During the detailed	PMO, RPMOs and	Incorporated in	Prior to award of

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
supply	raw water quality Delivery of unsafe water to the distribution system	engineering design stage, water sample from existing tube well was tested. Total hardness and total alkalinity are significant. Although the water quality is found to be suitable as per NDWQS, the deposition of calcium in the pipe may be likely to occur due to high concentration of hardness and alkalinity. - The water treatment system consisting of pressure filter, softening and disinfection is recommended. This IEE proposes "hands on" training by a licensed and accredited laboratory for the first two years of operation under the Water Safety Plan included in the subproject design and continuing training thereafter.	DSMC	final design and communicated to contractors	contract
Sanitation (Toilets and septage disposal)	Contamination of drinking water source and other environmental receptors from household and community toilets	- The design of toilets includes septic tanks that are designed as per national standards and codes to allow for	PMO, RPMOs, and DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Risk to public and environmental health due to inappropriate sitting and design of septage disposal pit	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 EPA standards etc). This includes; (i) locating disposal pits at least 300m away from the nearest dwelling, and 30 m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown. - The sanitation condition will be maintained to deter			

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		flies, mosquitos, and other vectors for breeding, free from odor and aesthetically pleasing. - A proper septage management shall be developed and followed.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations prior to award of construction contracts	DSMC, RPMOS	List of selected sites for construction work camps, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	- Mechanism of safe disposal will be developed in the project site before the actual commencement of work - Prohibition of unwanted littering and discharge of waste. - Proper management of solid waste will be done using pits for waste disposal	Contractor	Contractor records. visual inspection	During detailed design phase
Sources of	Extraction of materials can	- Prepare list of	DSMC, RPMOS	List of approved	During detailed

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
materials	disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution	approved quarry sites and sources of materials		quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	design phase, as necessary with discussion with detailed design engineers and Project implementation units (PIUs) suitability of sources and permit for additional quarry sites if necessary.
Quality of ambient air, surface water bodies, and noise	Construction activities and construction camps can impact the ambient quality of air, quality of surface water bodies, and level of noise in the areas of works.	- Conduct baseline data gathering for ambient air, surface water quality and noise level at all construction sites. - Compare all results of environmental quality monitoring during construction and O&M phases with these baseline data to determine any negative impact.	PMO, RPMOs and DSMC	Results of laboratory analyses	Once before construction works commence.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	- Project manager and contractors should undergo EMP implementation including spoils management for construction works; standard operating procedures (SOP) for construction works as it is a method of	PMO, RPMOs and DSMC. Contractor's Environmental Supervisor	Record of completion (safeguards Compliance Orientation)	During detailed design phase prior to mobilization of workers to site

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		identifying a work process and breaking it into the specific step by step procedure needed to successfully execute the process right from the beginning and result to greater quality via conforming to proven steps therefore, the written SOP provide instruction for less experience workers and benefits to the contractor is it serves as a benchmark for all workers on how a work process is to be completed ; health and safety (H&S), Labor Act (1992), applicable environmental laws, etc.			
WTP operations	Impact to the environment, workers, and community due to accidents, leaks, etc.	- Development of O&M manual that is comprehensive by integrating international best practice and guidelines such as the WB EHS Guidelines on Water and Sanitation.	PMO, RPMOs, and DSMC.	Availability of final version of O&M manual	Ongoing basis until O&M manual is finalized, but prior to O&M phase.
2. During Construction Activities					
A. Physical Characteristics					
Topography landforms, geology and soils and/or river morphology and	Excavation works may degrade surface land state. Impacts are possible in the public land at Sidhanath tole beside the open space of	- Contractor's should be required to first utilize readily available sources with environmental	Contractor	Records of sources of materials and records of potential areas	Monthly by RPMOs Weekly by DSMC-Environmental Safeguard Expert

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
hydrology	Thapachaur where the core construction works are planned. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on river).	clearance and license to and that still have a high ratio of extraction capacity over loss of natural state. - Borrow areas and quarries (if these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor. - Soil erosion will be minimized by taking precautionary measures such as; excavated soil will be reused, and proper backfilling of the trenches will be done, and the excavated soil will be placed properly against erosion.		of soil erosion; transmission mains and distribution pipelines core area	
Community facilities	Damage to existing facilities like drains, compound walls and pavements	- Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject	Contractor	List of any public or private infrastructure disturbed by the proje project works Minutes with the	Weekly prior-inspection to know if there could be any such cases As per need, field-inspection if any such case is

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		sites. - Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. - If construction work is expected to disrupt, users of community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to prework conditions.		locals	foreseen
Water bodies and water quality	Pollution of water bodies, contamination of water sources due to waste disposal, transport of sediments, effluent disposal, leakage/disposal of oil and grease from construction campsites	- All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. - Location for stock yards for construction materials shall be identified at least 300m away from water courses. Place storage - Areas for fuels and	Contractor	Water quality of the surface and ground water sources Areas for stockpiles storage of fuels and lubricants and waste materials; Number of physical measures (like silt traps installed along trenches leading	Visual inspection by RPMOS and DSMC-ESS on weekly basis Weekly field monitoring, and quarterly water quality monitoring

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		lubricants away from any drainage leading to water bodies - Take all precautions to prevent entering of waste water into streams, watercourses, or irrigation system. Install temporary silt traps or sediment basins along the drainage leading to the water bodies. - 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 off in a manner that may block the flow of water of any watercourse		to water bodies)	
Ambient air	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon, monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites.	- Water sprinkling at dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - If re-surfacing of distributed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces - Require trucks	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; Certification that vehicles are	Visual inspection by RPMOS & DSMC-ESS on monthly basis Weekly field monitoring, and biannual air quality monitoring

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2” free board - Limit speed of construction vehicles in access roads to maximum of 30kph. - Ensure use of equipment and fuel complying with applicable emission standards		compliant with air quality standards.	
Acoustic environment	Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and people.	- 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 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. - Minimize drop heights when loading and unloading coarse aggregates.	Contractor	Results of monitoring noise levels (Maintain maximum sound levels not exceeding 80 decibels when measured at a distance of 10m or more from the vehicle/s) Number of complaints from sensitive receptors;	Inspection by RPMOS and DSMC-ESS on monthly basis, and as required additionally

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- 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 manufactures' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators (if required) - 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. Identify any building at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.			

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Waste disposal	Pollution of water and land resources, and caes of vector borne diseases due to haphazard waste disposal	- Waste minimization and waste segregation will be prioritized - Practices of composting will be promoted - Containment of hazardour waste will be carried out	Contractor	On-site situation in campsites and its vicinity	Monthly monitoring by RPMOs and DSMC-ESS
B. Biological Characteristics					
Vegetation	Loss of vegetation cover during construction works and laying of the pipelines	- Greenery promotion around the construction sites and road alignments where possible - Tree felling will be avoided, and if any such cases occur, prior approval from the local bodies will be received and compensatory plantation at1:25 will be carried out - Locally demanded spcies like lokta should be promoted.	Contractor	Area of greenery that has been cleared Number of trees cut (only if unavoidable) Complaints or grievances by the locals	Weekly monitoring by RPMOs and DSMC-ESS
Impacts on Fauna	There could be some disturbances to local and migratory birds, reptiles and mammals No major impacts on animals area expected	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the area - Horn prohibited sign will be placed in nearby wildlife inhibited area - Code of conduct will be developed and implemented for the workforce to prohibit	Contractor	Vehicles running nearby wildlife inhibited area will be monitored; Number of complaints from sensitive receptors on disturbance of poaching fishing, etc.	Visual inspection by RPMOS and DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		them from any wood logging, hunting - Other mitigation measures include: (i) installing clear signage to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) providing alternative fuel to workers for cooking. - Since the project area is in same district as the Shuklaphanta National Park, any applicable provisions and useful guidelines issues by the park should be used and followed by the project			
Aquatic system	Disposal of slurry from treatment plant directly onto water bodies, disposal of waste on or nearby water bodies, sediment transport and leakage/disposal of hazardous waste may harm the aquatic lives in the rivers/steams of project area	- Only sedimented back-wash will be disposed to rivers - Washing of vehicles on local rivers will be restricted - Disposal of waste of any kind on water bodies will be strictly prohibited - Fishing in rivers will be prohibited for workforce	Contractor	Local streams and rivers will be monitored; Any grievances from locals regarding disposal of waste onto water bodies will be referred	Visual inspection by RPMOS and DSMC-ESS on monthly basis
C. Socioeconomic Characteristics					
Community activities	The construction related activities that generate dust, noise and impede access will disturb the local residents	- To minimize the disturbances, construction work will be conducted as	Construction contractor	Time schedule of construction work; Information	Visual inspection by RPMOs and DSMC-ESS on weekly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		quickly as possible. - The local residents will be consulted and informed about the work schedule and possible disturbances in advance. - Temporary diversions and signboards will be provided for the pedestrians.		related to construction activity to local residents Number of temporary diversions sign, signboards etc.	
Social harmony	Poor sanitation practices by workforce may cause pollution of surrounding environment. Social problems may arise due to bad behavior of the workforce such as gambling, alcoholism and disrespect to local people and culture	- A Code of Conduct will be developed for the workforce - Local people should be given priority to work (recommended that more than 60% local workers whenever available) in the project which helps to minimize the chances of cultural discrepancy and conflict due to increased labor from outside.	Construction contractor	Daily entry-sheet of the workforce in the campsites Number of local people versus outside workers in the project area will be regularly monitored	Inspection at campsites by RPMOS and DSMC-ESS on monthly basis
Occupational Health & Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and are prone to accidents	- A site Health and Safety Plan will be prepared encouraging use of safety measures (PPEs) such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Provide safe drinking water for labours	Construction contractor	Site-specific H&S Plan, Equipped first-aid stations, Medical insurance coverage for workers, Number of accidents, Campsite standards,	Visual inspection by RPMOs (monthly) and DSMC-ESS on weekly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- Workers working at height above the ground especially during the construction will be provided with safety gears. - First aid box will be kept at a proper and easily accessible place. - The child labour will be totally prohibited from all the constructional activities. - There will be no discrimination in wage for male and female workers in the project		Record of H&S orientation trainings, Availability of personal protective equipment at construction site, Signage for storage and disposal areas Condition of sanitation facilities for workers	
Community Health & Safety Hazards	Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; Chances of accidents, Communicable and transmittable diseases may potentially be brought into the community by construction workers	- Contractor's will maintain adequate space and adequate lighting, temporary fence, barriers and signage at campsites; - Construct gender friendly toilet for labours - Children will be prohibited from active construction sites - Proper fencing of stockpile areas and campsites will be done - Awareness programs on communicable diseases and hygiene practices will be carried out	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (Appendix 6); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at project location	Visual inspection by RPMOS and DSMC-ESS on weekly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		- GRM will be formed and implementation of the GRM will be made mandatory			
Resettlement, relocation and compensation issues	There is no any resettlement or relocation issue. Unforeseen/unavoidable small-scale cases of compensation may arise for disturbance on existing facilities	- Any disturbance or damage to local facilities or properties will be well recorded - Any compensation required will be paid through WSUC's coordination	Contractor/WUSC	Records of any grievance from the locals regarding any disturbance or damage on public or private properties	During O&M of the system.
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	Project area holds no archaeological, paleontological, or architectural sites of heritage significance	- If by chance any such findings are spotted or suspected, the contractor will immediately stop work to allow further investigation	Contractor	Records of chance finds	Visual inspection by RPMOS and DSMC-ESS on quarterly basis.
During Operation and Maintenance Phase					
Exposure to chemicals	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting	- i) All disinfection chemicals require proper storage and handling practices: ii) providing safe storage for chemicals; iii) ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation; iv) Ensure use of PPE while using chemicals; v) Use of chlorine guideline as per WHO (Appendix 13)	WUSC	Water quality test	

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Water bodies	The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.	- A settling tank is proposed for decanting of the slurry from the effluent during backwash	Contractor	Effluent status	For first year, DSMC After that WSUC every six months
Drinking water supply system	Delivery of unsafe water due to srouce contamination, leakage in pipes	- The operations and maintenance plan and training for staff will cover; (i) competent/cautions handling and storage of calcium Hypochlorite and qualified persons to implement/oversee disinfection and treatment; (ii) providing safe storage for chemicals; (iii) ensure capacity of WUSC to implement quick response to hazardous substance/waste spills; (iv) implement SPS-complaint EMP and a water safety plan; and (v) monitor water quality.	PMO, RPMOs, DSMC and WUSC	Water Quality reports WTP records in the log book	During O&M of the system Quarterly monitoring

C. Environmental Monitoring Program

190. Environmental monitoring will be done during construction at three levels:
(i) Monitoring development of project performance indicators by the PMO-ESS;
(ii) Monitoring implementation of mitigation measures by the Contractor; and
(iii) Overall regulatory monitoring of environmental issues by the PMO.

191. In addition to regular monitoring onsite (at town level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table 23 presents the indicative environmental monitoring program 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 23: Environmental Pollution Monitoring Program

	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
1	Air quality	Prior to construction to establish baseline Construction phase	PM_{10} SO_2 NO_x	Work site locations Along water transmission main 1-km interval from PTWs Construction campsite locations	24-hour monitoring once in a season (except monsoons) for the construction period	National Ambient Air Quality Standards, 2003 and WHO standards	Contractor
2	Noise and vibration levels	Prior to construction to establish baseline Construction phase	Equivalent day and night time noise levels	PTWs location Along water transmission main 1-km interval from PTWs Construction campsite locations	Once in a season (except monsoons) for the construction period	National Noise Standard Guidelines, 2012 and WHO standards	Contractor
3	Water quality	Prior to construction to establish baseline Construction phase	TDS, TSS, pH, hardness, BOD, total coliform, E-coli, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons, mineral oils, phenols,	Adjacent to construction sites (to be identified by thedesign, review and technical audit consultant or design, supervision and management consultant	Twice a year (pre-monsoon and post-monsoon) for the entire period of construction	National Drinking Water Quality Standards, 2006	Contractor

			cyanide, temperature				
4	Treated Water quality	Operation phase	All NDWQS and WHO standard parameters, and follow whichever are more stringent.[a]	End of WTP line (after final disinfection)	Daily or as often as practicable.	National Drinking Water Quality Standards, 2006	WUSC
5	Survival rate of landscaping, tree plantation	O&M phase	Survival rate	In the areas where re-plantation/ landscaping is proposed	Twice a year for 2 years	None	WUSC
6	Community and occupational health and safety	Construction phase O&M phase	Incidence and types of health and safety issues	Subproject sites	Twice a year	Zero incidence	Contractor – construction phase WUA or municipality – in the whole period of O&M of the plants.

BOD = Biochemical Oxygen Demand, DO = Dissolved Oxygen, km = kilometer, NO_x = nitrogen oxide, PM_{10} = particles equal to or smaller than 10 microns, PTWs=permit to work, pH = potential of hydrogen, SO_2 = Sulphur Dioxide, TDS = total dissolved solids, TSS = total suspended solids.

[a] Depending on what parameters laboratories in Nepal can test or analyze.

D. Institutional Capacity Development Program

192. 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.

193. WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSS has five regional laboratories however, some are not functioning fully due to lack of human resources. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with WUSC actively participating to develop its capacity. Water quality monitoring should be carried out in such a way that WUSC will be "learning by doing". After the engagement period, there should be continuing periodic training of new persons to ensure that the capacity of WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engaged for both the monitoring requirements and to train WUSC. A Water Safety Plan is included in subproject design and will oblige the operator to carry out water quality monitoring accordingly. The amount of NRs500,000 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.

194. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work site. The proposed training project along with the frequency of sessions is presented in Table 24. The Environmental Safeguard specialist and EMP Field Monitloring Staffs are responsible for organizaing different training program for Environmental Management.

Table 24: Training Program for Environmental Management

Items	**Preconstruction/prior to Construction**	**Construction**	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Nepal 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 the government.	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Nepal Environmental Laws and Regulations **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 the 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, ICGs, and (provide if design

Items	Preconstruction/prior to Construction	Construction	
			review and technical audit consultant or design, supervision and management consultant)
Participants	Executing and implementing agencies, project management office (PMO), and PMO staff (technical and environmental) involved in the project implementation	PMO Implementation Core Groups (ICGs) Contractors	PMO ICGs Contractors

E. Staffing Requirement and Budget

195. 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.

196. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMO-ESS assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for the PMO-ESS.

197. 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.

198. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase and the responsibility remains to WUSC. All monitoring during the operation and maintenance phase will be conducted by WUSC. The Water Safety Plan, included in the project design, will allocate NRs500,000, 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.

199. The indicative costs of EMP implementation are shown in Tables 25 (by source of funds).

Table 25: Indicative Cost of Environmental Management Plan Implementation and Monitoring

	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
A	**Mitigation Measures**						
1	Greenary management/ Promotion	Construction phase				200,000.00	Civil works contract
2	Compensation	Construction				250,000.00	Civil works

	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
	costs	phase					contract
B	**Monitoring Measures**						
1	Air quality monitoring	- Preconstruction -Construction	Per location	5	30,000.00	150,000.00	Civil works contract
2	Noise levels monitoring	- Preconstruction -Construction	Per location			50,000.00	Civil works contract
3	Water Quality Test	Preconstruction -Construction	Per Location	12	5,000.00	60,000.00	Civil works contract
C	**Capacity Building**						
1	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Nepal environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the (provide if DRTAC or DSMC) environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 - Upon completion of the project	Lump sum	1 8 1	Module 1 – 300,000.00 Module 2 – 100,000.00 Module 3 – 200,000.00	300,000.00 800,000.00 200,000.00	Covered under DRTAC or DSMC contract
D	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc					
		IEE preparation and its presentation in MOWS	Lump sum	1	500,000	500,000	DSMC contract
E	**Other Costs**						
1	Public consultations and information disclosure	Information disclosure and consultations including public awareness campaign	As per requirement	Lump sum		90,000	Covered under DSMC contract

	Particulars	Stages	Unit	Total Number	Rate (NRs)	Cost (NRs)	Cost covered by
		through media					
2	GRM implementation	Meetings, consultations, communication, and reporting/information dissemination		Lump sum		150,000	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 defect liability period
F	**Expert Monitoring Costs**						
	Environmental Specialist			1 MM	100,000	100,000	This cost is under the Contractor's contract
	Sociologist			1 MM	75,000	75,000	
	Support staff			2 MM	25,000	50,000	
	Cost of monitoring by MOWS/DWSS					200,000	
	Transportation and logistics					75,000	
TOTAL						**3,250,000**	

ADB = Asian Development Bank; DSMC = design, supervision and management consultant, DWSS = Department of Water Supply and Sewerage, EMP = environmental management plan, IEE = initial environmental examination, GRM = grievance redress mechanism, MOWS=Ministry of Water Supply, NRs = Nepalese rupees; PMO = project management office.

200. The provisional amount of NRs500,000 has been provided to execute all necessary environmental mitigation measures.

X. MONITORING AND REPORTING

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

202. RPMO will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Appendix 6. Subproject budgets will reflect the costs of monitoring and reporting requirements. For the projects likely to have significant adverse environmental impacts during operation phase, reporting will be continued at bio-annual & annual basis. Monitoring reports will be posted in a location accessible to the public.

203. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO-ESS will document monitoring results, identify the necessary corrective actions, reflect them in a corrective

action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO-ESO, with support from the PMO-ESS.

204. ADB will review project performance against the Ministry of Water Supply's (MoWSS) 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 executing agencies to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) Work with executive agencies 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.

205. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

XI. CONCLUSION AND RECOMMENDATIONS

206. Field study and analysis of the environmental aspects of the proposed project shows that the proposed project is not an environmentally critical intervention. The IEE shows that:

(i) The proposed Siddhanath Baijanath water supply and sanitation subproject and its components are not within environmentally sensitive area. Although the project area lies in same district as Shuklafanta National Park, there is safe distance and since the potential impacts are site specific or local in nature, there is no significant risk to the national park due to project activities. However, the project will follow the provisions and requirements not to disturb any environmentally sensitive areas or aspects in its vicinity;
(ii) There will be some negative impacts however the extent of these impacts is expected to be local, confined within the projects' main areas of influence, and the routes to and from these sites. With the EMP in place, the potential impacts will either be eliminated or minimized to insignificant levels;
(iii) The significance of impacts during construction will be temporary and short-termed (i.e. most likely to occur only during peak construction periods). These will not be sufficient to threaten or weaken the surrounding resources;
(iv) 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; and

(v) The proposed subproject will bring about: (a) the benefits of access to reliable supply of safe and potable water; (b) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (c) enhanced community health, improved quality of life and safe communities as outcomes. Since it is near Birendranagar Municipality, the implementation of the project will help attract more development and investments in that belt of Province 7.

207. Based on the above findings, the classification of Siddhanath Baijanath Small Town Water Supply and Sanitation Project as Category B is confirmed, and no further special study or detailed EIA needs to be undertaken.

208. However, this IEE shall be updated based on the final detailed design and shall consider the following recommendations:

(i) Conduct site-specific hydrological studies for all tubewells. Studies should consider groundwater level changes and resulting impacts to surface water flows, potential land subsidence, and contaminant mobilization, etc.;
(ii) Location of protected areas and wetlands found in the project area
(iii) Assessment of the amount of waste generated during the construction activities, including the volume of spoils and detailed information of disposal site;
(iv) Avoidance or minimal (when avoidance is not possible) cutting of trees;
(v) Additional information on environmental audit of existing facilities, such as environmental clearances, results of water quality sampling, etc.;
(vi) Site-specific details for location of filter plant, reservoir and water supply pipes. For all components, should confirm land use, habitat types present, nearest property, any physical cultural resources, and if any surface water or groundwater well within 500m; and
(vii) Conduct soil percolation test to assess the appropriate distance between water source and any sanitary facility, if applicable for any tubewell.

209. The updated IEE shall be submitted to ADB for final review and disclosure on ADB website. Ultimately, the updated IEE shall be attached to the bid and contract documents. No works shall commence until ADB clears the updated IEE, including the SEMP.

XII. LITERATURE REVIEWED

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(ix) Local Self-Governance Act, (1999). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu.
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(xiv) The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector, 2009.
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RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST FOR CHAKKIFANTA PROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE SUBPROJECT TOWNS

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area			
Densely populated?		√	The population density is 13.21 per hectare which is not densely populated condition
Heavy with development activities?		√	There are only small-scale development activities going on.
Adjacent to or within any environmentally sensitive areas?		√	Shuklaphanta National Park lies more than 3 km from the project area
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
B. Potential Environmental Impacts **Will the Project cause…**			
Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		√	
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
Hazard of land subsidence caused by excessive ground water pumping?		√	
Social conflicts arising from displacement of communities?		√	No displacement
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	No local water use disputes
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Complete water treatment process is proposed under the Subproject. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√		Design proposes monitoring kits, a lab room. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives and implementation of WSP
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?		√	
Excessive algal growth in storage reservoir?		√	
Increase in production of sewage beyond capabilities of community facilities?		√	Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
Inadequate disposal of sludge from water treatment plants?		√	Minimal sludge expected. EMP provides mitigation measures.
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
Impairments associated with transmission lines and	√		

Screening Questions	Yes	No	Remarks
access roads?			
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		Ca(ClO)2, commonly used in basic water treatment, will be used. EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		√	
Dislocation or involuntary resettlement of people?		√	
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Noise and dust from construction activities?	√		EMP provides mitigation measures.
Increased road traffic due to interference of construction activities?		√	EMP provides mitigation measures.
Continuing soil erosion/silt runoff from construction operations?		√	
Delivery of unsafe water due to poor O&M treatment processes (especially MWSS accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	√		Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.
Accidental leakage of chlorine gas?		√	
Excessive abstraction of water affecting downstream water users?		√	
Competing uses of water?		√	
Increased sewage flow due to increased water supply	√		Municipality plans for drainage manaegement
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		Low cost sludge drying bed is an option for the municipality
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
Social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	√		EMP provides mitigation measures.

Preliminary Climate Risk Screening Checklist for Sample Sub-project Town

Screening Questions		Score	Remarks
Location and design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides	1	Subproject sites for water supply and sanitation infrastructure are highly sensitive to floods and earthquakes and have medium sensitivity to droughts
	Would the project design (e.g. the	0	Not required

Screening Questions		Score	Remarks
	clearance for bridges) need to consider any hydro-meteorological parameters (e.g. sea-level, peak river flow, reliable water level, peak wind speed etc.)		
Materials and maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity, and hydro metrological parameters) affect the selection of project inputs over the life of project outputs (i.e. construction materials)	0	Not likely
Performance of Project Outputs	Would climate/weather conditions and related extreme events likely to affect the performance throughout their design life time?	1	Temperature increase would likely contribute to the reduced capacity of existing infrastructure pumps to meet increased demands and substandard water quality due to algal blooms and pathogens. Increased intensity of precipitation and storm evens will increase turbidity in reservoirs, faster runoff due to less groundwater recharge, and damage or inundate structures. Prolonged droughts will reduce capacity of water resources to absorb and dilute pollution due to lower flows in receiving streams, resulting to reduced treatment performance due to lower flows.

Options for answers and corresponding scores are given below.

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

SIDDHANATH BAIJANATH PROJECT
(No Mitigation Measures Scenario)

Checklist 1: Scoping Checklist Part 1 - Questions on Project Characteristics

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
1. Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc)?				
1.1	Permanent or temporary change in land use, landcover or topography including increases in intensity of land use?	No		
1.2	Clearance of existing land, vegetation and buildings?	Yes	Few trees in the project site will be removed	Moderately significant
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?	Yes	Very limited interventions were needed	Insignificant
1.5	Construction works?	Yes	Construction of structures, small buildings and treatment facilities will use small portion of public land, and will need some vegetation clearance	Moderately significant
1.6	Demolition works?	Yes	Will require demolition of a small shed currently intended for local market promotion, but not used properly	Insignificant
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Temporary work camps will be constructed at unused and barren lands; hence disturbance to local environment is minimized; however some disturbances to local communities is anticipated	Insignificant
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?	Yes	Guard house, office building and public toilet will be constructed; this will need some excavation and will bring small scale changes in land surface	Insignificant
1.9	Underground works including mining or tunnelling?	No		
1.10	Reclamation works?	No		
1.11	Dredging?	No		
1.12	Coastal structures *eg* seawalls, piers?	No		
1.13	Offshore structures?	No		
1.14	Production and manufacturing processes?	No		
1.15	Facilities for storage of goods or materials?	Yes	Small stockpiles and storage site will be established temporarily for construction works. This might bring concerns of safety to the local neighbourhoods. However no toxics will be stored.	Insignificant
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	Yes	A sludge drying bed will be build. The sludge may pollute local environment (soil and water) and may cause nuisance to locals if not well designed and operated.	Moderately significant
1.17	Facilities for long term housing of	Yes	A Guard house and a Office	Moderately

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	operational workers?		building will be constructed. Some vegetation clearance will need for these structures.	significant
1.18	New road, rail or sea traffic during construction or operation?	No		
1.19	New road, rail, air, waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No		
1.20	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No		
1.21	New or diverted transmission lines or pipelines?	Yes	New transmission lines and distribution lines will be used. Less than 10% of the excavated soil will need to be disposed	Insignificant
1.22	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?		No	
1.23	Stream crossings?		No	
1.24	Abstraction or transfers of water from ground or surface waters?	Yes	3 Deep borings will be carried out. Since these are around 120 m deep, shallow aquifers and surface sources will not be disturbed.	Insignificant
1.25	Changes in waterbodies or the land surface affecting drainage or run-off?	No		
1.26	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Construction materials (local and well and non-local) will be transported. This will have slight effect on local traffic, but this is expected to be of periodic nature; not continuous.	Insignificant
1.27	Long term dismantling or decommissioning or restoration works?	No		
1.28	Ongoing activity during decommissioning which could have an impact on the environment?	No		
1.29	Influx of people to an area in either temporarily or permanently?	Yes	Unskilled and skilled workers will be onboard during construction phase. This will add pressure on local logistics/resources, and might bring some concerns of social harmony.	Moderately significant
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?			
2. Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?				
2.1	Land especially undeveloped or agricultural land?	No	Only public land which are barren will be used	

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
2.2	Water?	Yes	Deep underground water resources will be used. Thus no impacts on shallow or surface water sources	Insignificant
2.3	Minerals?	No		
2.4	Aggregates?	Yes	Very limited aggregates will be needed; this will be bought from nearby crushers.	Insignificant
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	Yes	Electricity and fossil fuel will be used during construction, and regular electricity will be consumed during operation phase.	Moderately significant
2.7	Any other resources?			
3. Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?				
3.1	Will the project involve use of substances or materials which are hazardous or toxic to human health or the environment (flora, fauna, water supplies)?	No		
3.2	Will the project result in changes in occurrence of disease or affect disease vectors (eg insect or water borne diseases)?	Yes	Improved health status due to improved drinking water quality	Significant
3.3	Will the project affect the welfare of people eg by changing living conditions?	Yes	Improved quality of life; time saved, improved hygiene; improved business opportunities	Significant
3.4	Are there especially vulnerable groups of people who could be affected by the project eg hospital patients, the elderly?	No		
3.5	Any other causes?			
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?	Yes	Small amount of spoil will be generated. This may affect cultivable land, and also may affect the local land-aesthetics	Moderately significant
4.2	Municipal waste (household and or commercial wastes)?	Yes	Construction camps will generate wastes; this may degrade local environment and cause nuisance to the locals	Moderately significant
4.3	Hazardous or toxic wastes (including radioactive wastes)?	No		
4.4	Other industrial process wastes?	No		
4.5	Surplus product?	No		
4.6	Sewage sludge or other sludges from effluent treatment?	Yes	Sludge from treatment plant is expected every year; but this will be low quantity	Insignificant
4.7	Construction or demolition wastes?	Yes	Very minimal demolition waste	Insignificant
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?			
5. Will the Project release pollutants or any hazardous, toxic or noxious substances to air?				
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources?	Yes	Fuel for construction vehicles and operation generators will have some emissions. However, this will be very low	Insignificant
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	No		
5.4	Emissions from construction activities including plant and equipment?	No		
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	Transportation of construction materials will have some dust emissions which will be harmful to the locals. This will be short term.	Moderate significance
5.6	Emissions from incineration of waste?	No		
5.7	Emissions from burning of waste in open air (*eg* slash material, construction debris)?	No		
5.8	Emissions from any other sources?			
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				
6.1	From operation of equipment eg engines, ventilation plant, crushers?	Yes	Use of excavators, and drilling equipments will have some noise and vibration; however the disturbances is low as the neighbouring settlements are at least 100 m	Insignificant
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	No		
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Construction traffic will have low level noise and vibration effects; this could be nuisance in the market or core areas. The effects are short term	Insignificant
6.6	From lighting or cooling systems?	No		
6.7	From sources of electromagnetic radiation (consider effects on nearby sensitive equipment as well as people)?	No		
6.8	From any other sources?			
7. Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into sewers, surface waters, groundwater, coastal waters or the sea?				
7.1	From handling, storage, use or spillage of hazardous or toxic materials?	No		
7.2	From discharge of sewage or other effluents (whether treated or	Yes	Sludge will be generated from treatment plant and septic tank of public toilet. This can pollute local	Moderately significant

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	untreated) to water or the land?		streams.	
7.3	By deposition of pollutants emitted to air, onto the land or into water?	No		
7.4	From any other sources?	No		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	No		
8. Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?				
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous or toxic substances?	Yes	Exposure to Chlorine (to be used for water disinfection process) is a potential risk. This can have severe impacts on the operator/s if mishandled.	Significant
8.2	From events beyond the limits of normal environmental protection eg failure of pollution control systems?	No		
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (*eg* floods, earthquakes, landslip, *etc*)?	No		
9. Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?				
9.1	Changes in population size, age, structure, social groups *etc*?	No		
9.2	By resettlement of people or demolition of homes or communities or community facilities eg schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	Yes	Temporary influx of workers will need additional short-term residential provision.	Insignificant
9.4	By placing increased demands on local facilities or services eg housing, education, health?	Yes	Water and food sources will be consumed from local markets. This may bring slight demand pressure in local markets.	Low significance
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	Unskilled, skilled and semi-skilled workers will be hired with priority for locals. This will increase skills and income of the locals.	Moderately Significant
9.6	Any other causes?			
10. Question - Are there any other factors which should be considered such as consequential development which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality?				
10.1	Will the project lead to pressure for consequential development which could have significant impact on the environment eg more housing, new roads, new supporting industries or utilities,	No		

No.	Questions to be considered in Scoping	Yes/No/?	Which Characteristics of the Project Environment could be affected and how?	Is the effect likely to be significant? Why?
	etc?			
10.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment eg: • supporting infrastructure (roads, power supply, waste or waste water treatment, etc) • housing development • extractive industries • supply industries other?	Yes	New small scale businesses (like hotels, cottage industries, etc) will be promoted with increased drinking water facility; This will be during the operation phase, and this is expected to have more of beneficial socio-economic environmental effect.	Moderately significant
10.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
10.4	Will the project set a precedent for later developments?	Yes (<)	Successful implementation of the project will attract other developmental and infrastructural project in the project area. This could have environmental implications.	Moderately significant
10.5	Will the project have cumulative effects due to proximity to other existing or planned projects with similar effects?	No		

Checklist 2: Scoping Checklist Part 2 - Characteristics of the Project Environment (Environmental Sensitivity)

Question - Are there features of the local environment on or around the Project location which could be affected by the Project? • Areas which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project? • Other areas which are important or sensitive for reasons of their ecology e.g. • Wetlands, • Watercourses or other waterbodies, • the coastal zone, • mountains, • forests or woodlands • Areas used by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project? • Inland, coastal, marine or underground waters? • Areas or features of high landscape or scenic value? • Routes or facilities used by the public for access to recreation or other facilities? • Transport routes which are susceptible to congestion or which cause environmental problems? • Areas or features of historic or cultural importance?	No. The project doesn't fall under any protected or ecologically sensitive area.
Question - Is the Project in a location where it is likely to be highly visible to many people?	No
Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	No

Question - Are there existing land uses on or around the Project location which could be affected by the Project? For example: • Homes, gardens, other private property, • Industry, • Commerce, • Recreation, • public open space, • community facilities, • agriculture, • forestry, • tourism, • mining or quarrying	No
Question - Are there any plans for future land uses on or around the location which could be affected by the Project?	No
Question - Are there any areas on or around the location which are densely populated or built-up, which could be affected by the Project?	No
Question - Are there any areas on or around the location which are occupied by sensitive land uses which could be affected by the Project? • hospitals, • schools, • places of worship, • community facilities	Yes. The site is within proximity of a local temple.
Question - Are there any areas on or around the location which contain important, high quality or scarce resources which could be affected by the Project? For example: • groundwater resources, • surface waters, • forestry, • agriculture, • fisheries, • tourism, • minerals.	No
Question - Are there any areas on or around the location of the Project which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	No
Question - Is the Project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	No
Question - Is the Project likely to affect the physical condition of any environmental media? • The atmospheric environment including microclimate and local and larger scale climatic conditions? • Water - eg quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils - eg quantities, depths, humidity, stability or erdodibility of soils? • Geological and ground conditions?	No
Question - Are releases from the Project likely to have effects on the quality of any environmental media? • Local air quality? • Global air quality including climate change and ozone depletion • Water quality – rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Nutrient status and eutrophication of waters? • Acidification of soils or waters? • Soils • Noise? • Temperature, light or electromagnetic radiation including electrical interference? • Productivity of natural or agricultural systems?	Yes. Ambient air and local noise levels will be susceptible to intermittent effects/disturbances

Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • Fossil fuels? • Water? • Minerals and aggregates? • Timber? • Other non-renewable resources? • Infrastructure capacity in the locality - water, sewerage, power generation and transmission, telecommunications, waste disposal roads, rail?	Yes. The infrastructural facilities will face short term demand pressure for influx workforce.
Question - Is the Project likely to affect human or community health or welfare? • The quality or toxicity of air, water, foodstuffs and other products consumed by humans? • Morbidity or mortality of individuals, communities or populations by exposure to pollution? • Occurrence or distribution of disease vectors including insects? • Vulnerability of individuals, communities or populations to disease? • Individuals' sense of personal security? • Community cohesion and identity? • Cultural identity and associations? • Minority rights? • Housing conditions? • Employment and quality of employment? • Economic conditions? • Social institutions?	No

Checklist 3: Significance of Impacts

Questions to be Considered	
1. Will there be a large change in environmental conditions?	No
2. Will new features be out-of-scale with the existing environment?	No
3. Will the effect be unusual in the area or particularly complex?	No
4. Will the effect extend over a large area?	No
5. Will there be any potential for transboundary impact?	No
6. Will many people be affected?	No
7. Will many receptors of other types (fauna and flora, businesses, facilities) be affected?	No
8. Will valuable or scarce features or resources be affected?	No
9. Is there a risk that environmental standards will be breached?	Yes
10. Is there a risk that protected sites, areas, features will be affected?	No
11. Is there a high probability of the effect occurring?	No
12. Will the effect continue for a long time?	No
13. Will the effect be permanent rather than temporary?	No
14. Will the impact be continuous rather than intermittent?	No
15. If it is intermittent will it be frequent rather than rare?	Yes
16. Will the impact be irreversible?	No
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

RELEVANT ENVIRONMENTAL QUALITY STANDARDS

Table A3.1. 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.

Table A3.2. 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: International Finance Corporation, World Bank Group. 2007. Environmental, Health and Safety General Guidelines.

Table A3.3. 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.

SAMPLE GRIEVANCE REDRESS FORM

(To be available in Nepalese and English)

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

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

FOR OFFICIAL USE ONLY

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

SAMPLE TRAFFIC MANAGEMENT PLAN

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:

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

B. Operating Policies for Traffic Management Plan

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.

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

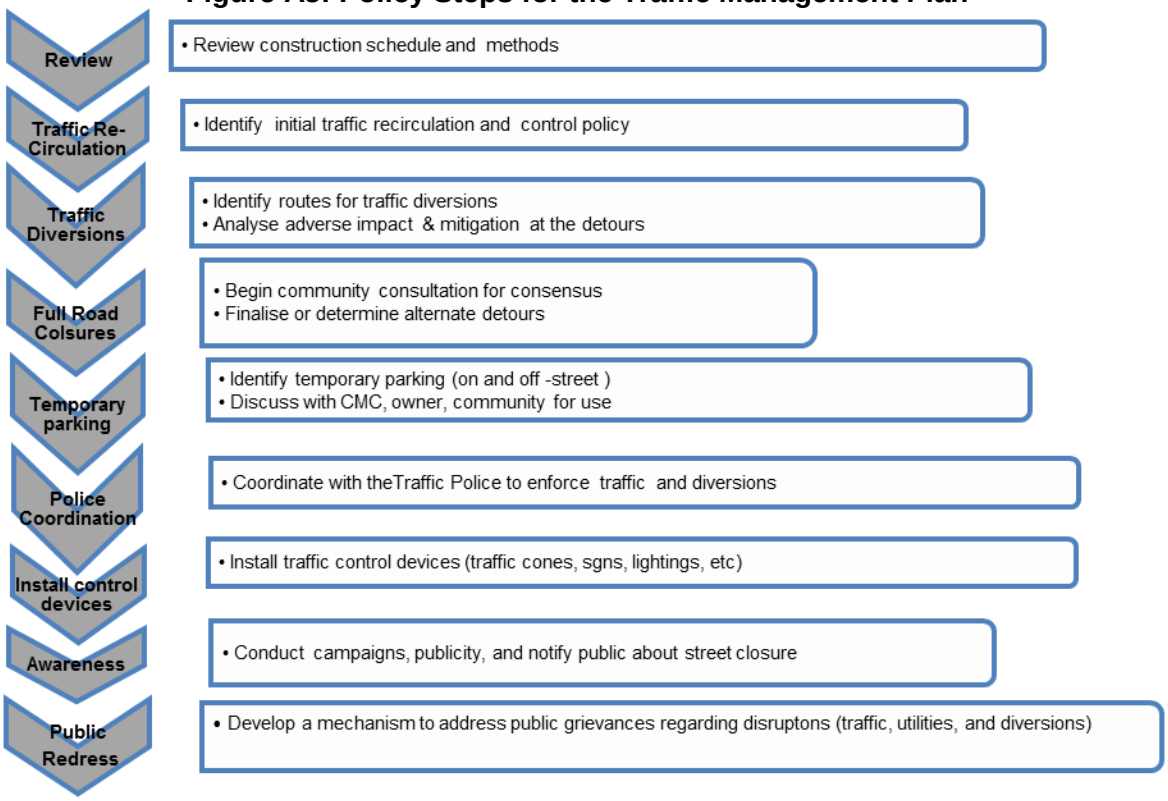
C. Analyze the Impact Due to Street Closure

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

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

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 A5: Policy Steps for the Traffic Management Plan



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 ICG will also conduct an awareness campaign to educate the public about the

following issues:

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

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 ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

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

E. Vehicle Maintenance and Safety

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 prestate 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; and
- Vehicles will be cleaned and maintained in designed places.

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

11. 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

12. 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”).

13. 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.

14. 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.

15. 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.

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

SPOIL MANAGEMENT PLAN

A. Spoil Management Plan

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

2. **Objectives of Spoil Management Plan.** 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; and
   - Manage the transportation of spoil with consideration of traffic impacts and transport related emissions.

3. **Structure of Spoil Management Plan**
   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

B. Aspects and Potential Impacts

4. 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

C. Spoil Volumes, Characteristics and Minimization

5. **Spoil Volume Calculations.** Estimate the volumes of spoils produced from each of the

construction sites.

6. **Characterization of spoil.** Based on the type of spoil; characterization is done (sand stone, MWSS mix materials, reusable materials

7. **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

8. **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.

D. Storage and Stock Piling

1. Transportation and Haulage Route

9. 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.

E. Summary of Key Issues and Remedial Actions

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

SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

INTRODUCTION

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number
1. PMU			
2. PIUs			
3. Consultants			

- Overall project and sub-project progress and status

- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[a]	Contract Status (specify if under bidding or contract awarded)	If On-going Construction	
				%Physical Progress	Expected Completion Date

[a] If on-going construction, include %physical progress and expected date of completion

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS[a]

Package No.	Subproject Name	Statutory Environmental Requirements[a]	Status of Compliance[b]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[d]

[a] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.
[b] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)
[c] Specify if obtained, submitted and awaiting approval, application not yet submitted.
[d] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT PLAN (refer to EMP tables in approved IEE/s)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise Implementation Status

Package Number	Components	Design Status (Preliminary Design Stage/Detailed Design Completed)	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
			Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.
- For each package, provide name/s and contact details of contractor/s' nodal person/s for

environmental safeguards.

- Include as appendix all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.
- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below
- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).
- In addition to the table on EMP implementation, the main text of the report should discuss in details the following items:

(i) **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).

(ii) **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

- Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
- Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
- Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
- Confirm spill kits on site and site procedure for handling emergencies.
- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
- Provide information on barricades, signages, and on-site boards. Provide photographs.
- Provide information on
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary of Environmental Monitoring Activities (for the Reporting Period)[a]

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						

[a] Attach Laboratory Results and Sampling Map/Locations

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 and Additional Measures Required

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (ambient air, water quality and noise levels)

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

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

Air Quality Results

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

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

Water Quality Results

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

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			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) (Monitoring Results)	
			Day Time	Night Time

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

APPENDIXES

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

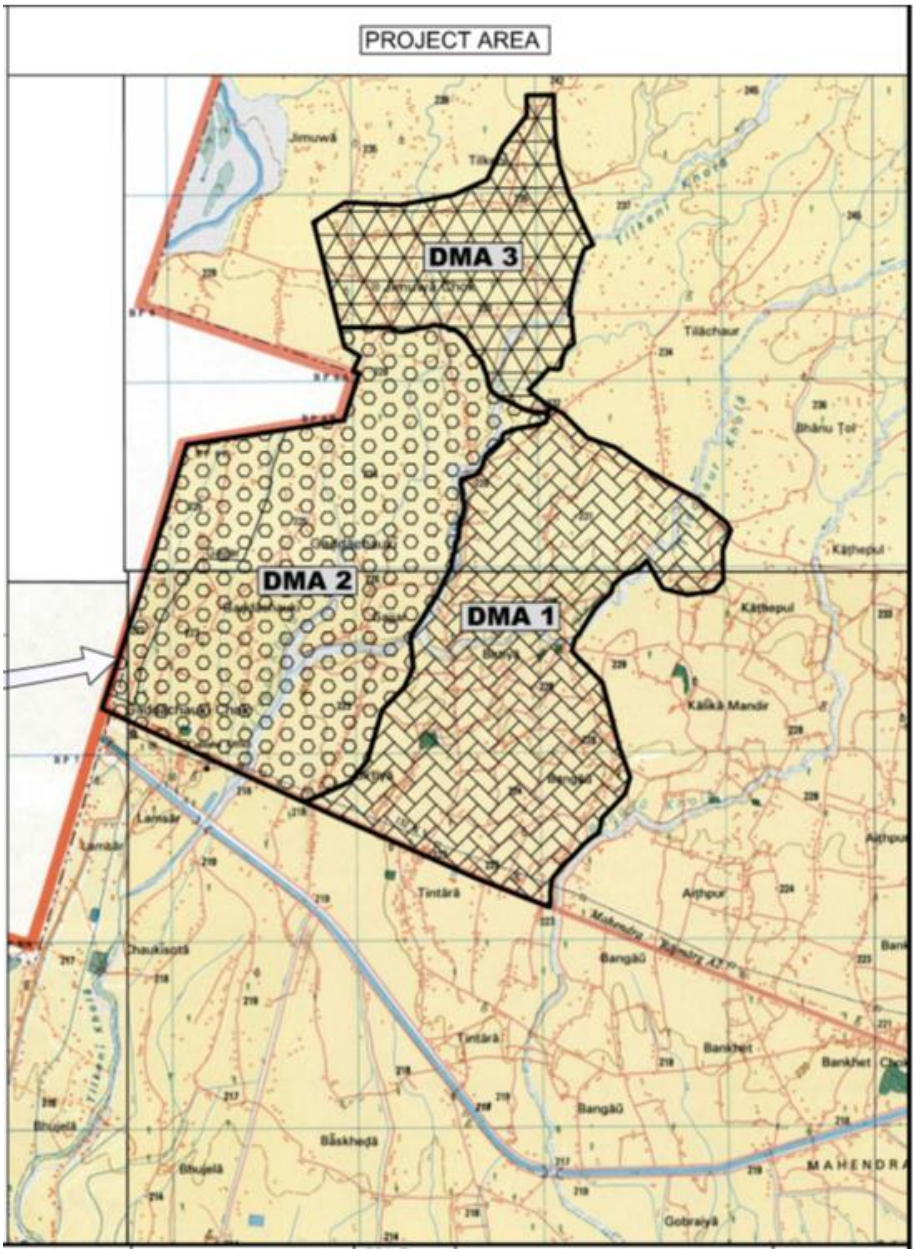
Name _____ **Name** _____
Position _____ **Position** _____

REFERENCE FOR PLANTATION COST BREAKDOWN (INDICATIVE)

SN	Activities	Unit	Description	Quantity	Area Requirement (ha)	Rate (NRe)	Total	Remarks
I	**Purchase of saplings**							
	Species A	Saplings		1000		15	15,000.00	
	Species B			1000		25	25,000.00	
II	**Pitting**							
	Pitting area for Species A	sq m	Spacing of 2.5mx2.5m	1000	0.625			Size: 45cm depth X 45cm diameter
	Pitting area for Species B	sq m	Spacing of 5mx5m	1000	2.5			
	Labour cost							
	Species A	Person/ha	25.6 per ha	16		500	8,000.00	
	Species B	Person/ha	6.4 per ha	16		500	8,000.00	
III	**Transportation**							
	Vehicle cost	Trip		2		10,000	20,000.00	
	Cost of unloading and manual carrying to site		100 saplings/ labour/day up to 3 km	2000		500	10,000.00	
IV	**Clearing plantation site**							
	Species A	Person/ha	4 persons/ha.		0.625	500	1,250.00	
	Species B	Person/ha	4 persons/ha.		2.5	500	5,000.00	
V	**Plantation**							
	Species A	Person/ha	9.6 persons/ha	6		500	3,000.00	
	Species B	Person/ha	2.4 persons/ha	6		500	3,000.00	
	Total						**98,250.00**	
	Overhead cost (@15%)						14,737.50	
	Grand Total						**112,987.50**	
VI	**After care (Cutting, prunning, ….)**	MM	Care taker	6	1	5000	**30000.00**	
							42,987.50	

Note: If plantation is not possible in a single site, it can be carried out in multiple sites. E.g. Community Forest/s near by, Public Parks, road sides, office premise, or any other potential sites.

PROJECT LOCATION AND SERVICE AREA



IBAT INFORMATION ON BIODIVERSITY SENSITIVITY IN PROXIMITY OF PROJECT AREA

ibat FOR BUSINESS
Integrated Biodiversity Assessment Tool

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

Priority Sites for Biodiversity		
Key Biodiversity Area	Sukla Phanta Wildlife Reserve CR/EN, VU, migratory birds/congregations, other	30,500 ha

Features within 5 km

National-level protected areas		
IUCN Category III-IV	Suklaphanta	39,323 ha
IUCN Category V-VI	Suklaphanta - Buffer Zone	29,289 ha

Features within 10 km

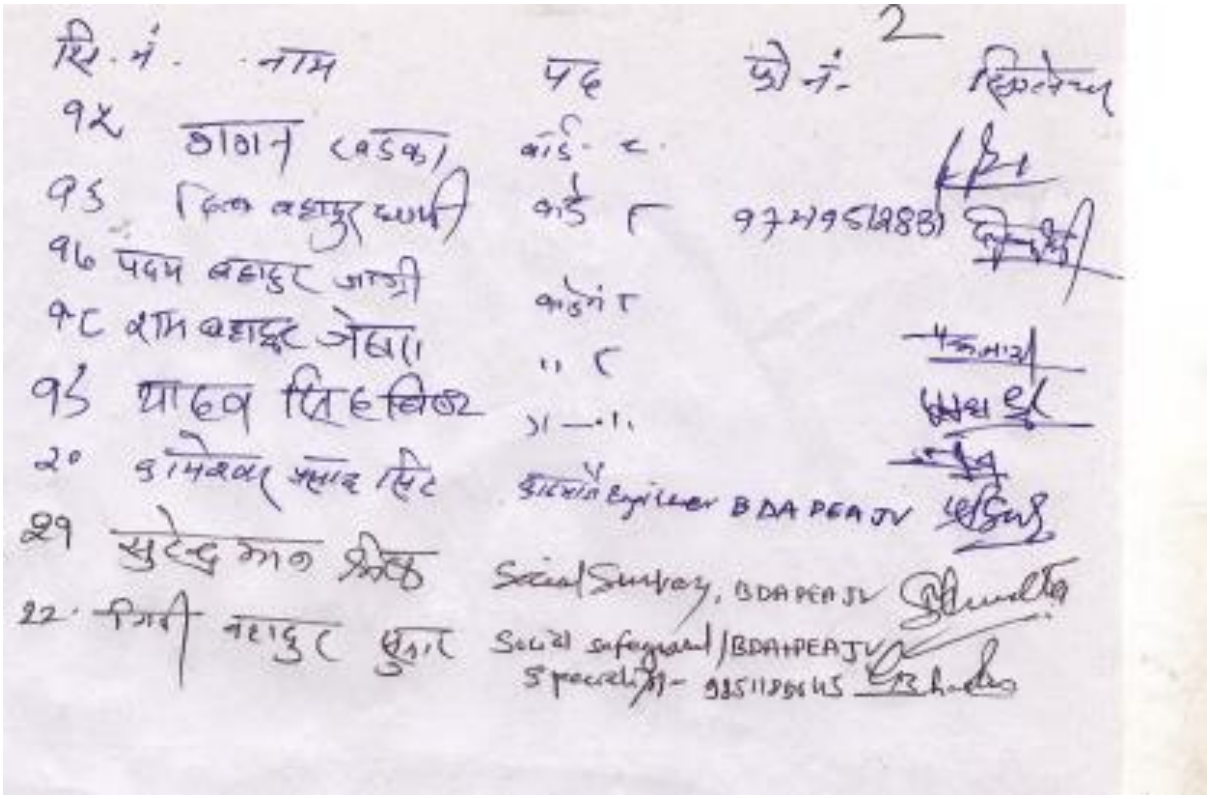
There are no additional features within 10 km.

PUBLIC CONSULTATION

आज मिति २०६८/८/१८ गते आइतबार का दिन यस भिमदत्त नगरपा., कञ्चनपुर को वडा नं. ६, ८ र १० का नवनिर्वाचित प्रमुख तथा तिनै वडाका अध्यक्ष ज्यू हरुको उपस्थिति मा वडा मा विद्यमान खानेपानी तथा सरसफाई को असुविधा भएको हुनाले खानेपानी तथा सरसफाई सेवा सञ्चालन गर्न को लागी निम्न उपस्थिति सहित छलफल बैठक बसियो।

उपस्थिति हरु :-

1.	सुरेन्द्र बिष्ट	नगर प्रमुख	9858750213	[signature]
२.	परमानन्द जोशी	वडा अध्यक्ष-१०	9848783159	[signature]
३.	हरक सिंह धामी	" -६	9858750566	[signature]
४.	[illegible] बोहरा	[illegible] "	9809440391	[signature]
५.	[illegible]	वडा अध्यक्ष	9805759217	[signature]
६	भानु देवी कुमार	वडा म. सदस्य -८	9809420858	[signature]
७	भवान सिंह बिष्ट शिक्षक		9848723023	भानु
८.	अनु खडायत	वडा नं.-८	9	[signature]
९.	पदम सिंह बिष्ट	वडा -८		[signature]
१०.	मंगल सिंह धामी	वडा ८		मंगल सिंह धामी
११.	नन्द लाल फिडाली	वडा नं. ८		नन्दलाल
१२	दिपक ब. सिंह	" ८		[signature]
१३.	नरे ब. धामक	"		नरबहादुर
१४	नर पति धामी	"		नरपति धामी



२

छलफल का विषय हरु :-

(१) तेस्रो साना शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना को लागी सामाजिक, आर्थिक तथा वातावरणीय विस्तृत प्राविधिक सर्भे गर्ने निर्णय गरियो।

(२) तथ्यांक संकलक (जम्मा सं. ८ जना) लाई परिचालन गर्ने निर्णय गरियो।

(३) यस भिमदत्त नगरपालिका अन्तर्गत १४०० देखि १६०० सम्म घरधुरी पर्ने गरी वडा नं. ६, ८, र १० का तिलकेनी / विजयटोल / जीभुबा / गाजड / गड्डा-चौकी / वैजनाथटोल / थापा चौरहा / सुकसाल / तीला चौरहा आदि समेटिने गरी डिजाइन सर्भे प्रकृया अघि बढाउने निर्णय गरियो।

Translation

Today, 28 November 2017, a meeting was held under the chairmanship of the elected mayor and other ward presidents of ward numbers 6, 8 and 10 of Bheemdutta Municipality to address the concerns of proposed water and sanitation project in Bheemdutta Municipality. Following people were participated the meeting.

Name list of meeting participants

S. No.	Participants Name	Designation	Address	Contact No:
1.	SurendraBista	Mayor	Bheemdutta Municipality	9858750213
2.	Permananda Joshi	Ward Chairman	Bheemdutta Municipality-10	98488783159
3.	Harak Singh Dhami	Member	Bheemdutta Municipality- 6	9858750666
4.	Dal BahadurBohora	Ward Member	Bheemdutta Municipality- 6	9809440391
5.	DhwajBahadurBista	Ward Chairman-8	Bheemdutta Municipality- 8	9805759217
6.	Bhanu Devi Sunar	Ward member-8	Bheemdutta Municipality- 8	9809420858
7.	Bhawan Singh Bista	Teacher	Bheemdutta Municipality- 8	9848723023
8.	AnnuKhadayat	Member	Bheemdutta Municipality- 8	
9.	Padam Singh Bista	Member	Bheemdutta Municipality- 8	
10.	Mangal Singh Dhami	Member	BheemduttaMunicipality- 8	
11.	Nanda LalFidali	Member	Bheemdutta Municipality- 8	
12.	Deepak Bahadur Singh	Member	Bheemdutta Municipality- 8	
13.	Nar BahadurDhanuk	Member	Bheemdutta Municipality- 8	
14.	Nar PatiDhami	Member	Bheemdutta Municipality- 8	
15.	GaganKhadka	Member	Bheemdutta Municipality- 8	
16.	DilBahadurDhami	Member	Bheemdutta Municipality- 8	
17.	PadamBahadurJangri	Member	Bheemdutta Municipality- 8	
18.	Ram BahadurJethara	Member	Bheemduttaunicipality- 8	
19.	Yadav Sigh Bista	Member	Bheemdutta Municipality- 8	
20.	Kameshwor Prasad Singh	Engineer	BDA-PEA Jv.	
21.	Surendra Man Shrestha	Social Surveyor	BDA-PEA Jv.	
22.	GiriBahadurSunar	Social Safeguard Specialist	BDA-PEA Jv.	9851189045

Topic of discussion

Decision No. 1: The participants of the meeting were made aware about and agreed on conducting socio-economic, environmental and technical survey of project area, and this will detail out the concerns**.**

Decision No. 2: It was agreed to hire 8 enumerators locally for the surveys.

Decision No. 3: It was also agreed to cover around 1500 to 1700 households of wards 6, 8 and 10 of Tilkani, Bijaya-tole, Jimua, Gajjad, Gadda-chauki, Baijnath-tole, Thapa-chauraha, Sukasal, Tila-chauraha, etc for survey and designing propose of the project**.**

आज मिति २०७५/०१/०८ गतेका दिन यस Chakkifanta Small Town Water Supply and Sanitation आयोजनाको पूर्व तयारीका लागि प्राविधिक, सामाजिक, GESI तथा वातावरणीय विषयमा छलफल र तयारीका लागि "चक्कीफाट्टा साना शहरी खानेपानी तथा सरसफाई समिति" का पदाधिकारी र BDA/PEA JV का परामर्शदाताहरु, बीच छलफल सम्पन्न भएको छ;

क्र.सं.	नाम	संस्था	सही
१	करबीर सिंह खत्री, १०	अध्यक्ष, WUSC	[signature]
२	तुलबहादुर खड्का, ८	सचिव, WUSC	[signature]
३	जानकी देवी बिष्ट, १०	उपाध्यक्ष, WUSC	[signature]
४	लक्ष्मी [illegible], ०८	सदस्य, WUSC	[signature]
५	मोहन ब. कार्की, TL	BDA/PEA JV	[signature]
६	निश्री प्र. श्रेष्ठ, GESI Expert	,,	[signature]
७	Keshav Dhungana, Social Environmental Expert		[signature]
८	Yogesh Shakya, Environmental Expert		[signature]
९	Gunjan Adhikari, Team member		[signature]
१०	भागरती देवी [illegible], ०८	सदस्य, WUSC	भागरत

छलफलका विषय:

१. जग्गा प्राप्तिको प्रक्रिया सम्पन्न भएको।
२. प्राविधिक विषयमा छलफल भएको।
३. सामाजिक सर्वेको Data उपलब्ध गराउने।
४. प्रारम्भिक वातावरणीय अध्ययन (IEE) का प्रक्रिया अगाडि बढेको र आगामी दिनमा छिटो बढेको अध्ययन गरिने बारेमा छलफल भयो।
५. ADB का लागि IEE प्रतिवेदनको draft बुझाई सकेको र नेपाल सरकारको नियम अनुसार IEE बनाउनको प्रक्रिया अगाडि बढेको विषयमा छलफल भयो।

TRANSLATION

Today, on 21 April 2018, a meeting was held in presence of members of *Siddhanath Baijanath Water Supply Users Committee* and BDA/PEA consultancy for readiness of the project regarding its technical, social, GESI and Environmental aspects of the project development and its implementation;

Name list of meeting participants

SN	Participants Name	Designation	Address	Remarks
1.	Karbir Singh Air	Chairman, Siddhanath Baijanath WSUC	Bheemdutta Municipality- 10	
2.	Tul Bahadur Khadka	Secretary, Siddhanath Baijanath WSUC	Bheemdutta Municipality- 8	
3.	Janaki Devi Bista	Vice Chairman, Siddhanath Baijanath WSUC	Bheemdutta Municipality- 10	
4.	Laxmi Khadayat Sedali	Member, Siddhanath Baijanath WSUC	Bheemdutta Municipality- 8	
5.	Mohan B Karki	Senior Engineer, BDA/PEA JV	Kathmandu	
6.	Mishri Pd Sharma	GESI Expert, BDA/PEA JV	Kathmandu	
7.	Keshav Dhungana	Social Expert, BDA/PEA JV	Kathmandu	
8.	Yogesh Shakya	Environmental Expert, BDA/PEA JV	Kathmandu	
9.	Gunjan Adhikari	Team Member, BDA/PEA JV	Kathmandu	
10.	Bharati Devi Suni	Member, Siddhanath Baijanath WSUC	Bheemdutta Municipality- 8	

Discussions and Understandings

Discussion No. 1: The members of UC shared that the process of land acquisition has been completed.

Discussion No. 2: Technical aspects of the project implementation were reiterated to the UC team members.

Discussion No. 3: It was agreed that the UC will be provided with data/information of the social survey that has been completed.

Discussion No. 4:

It was informed that the Initial Environmental Examination (IEE) study has been conducted, and along with the formal process - further studies will be detailed.

Discussion No. 5:

The UC members were informed that the IEE document in ADB format has been submitted, and as per the EPR of Government of Nepal, further process was discussed and shared.

(Background: The background discussions included the probable concerns of physical, biological and socio-economic/cultural environmental aspects while project development and its implementation)

Photo 1: Meeting / Interaction with stakeholders including Municipality at land acquisition site: Thapachaur, Bhimdatta Municipality

Photo 2: Proposed site for the project at Siddhanath near to Thapachaur, Bhimdatta Municipality-8

Photo 3: Proposed site for different structures of the project

Photo 4: Site visit and interaction with WUSC, Municipality representatives and local people at proposed site.

CHLORINE GUIDELINE VALUE

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

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

Table A13. Guideline Values for Chlorine

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

*For effective disinfection, there should be a residual concentration of free chlorine of 0.5 mg/L after at least 30 min contact time at pH<8.0.
Source: WHO Guidelines for drinking water quality (2004).

A. Chlorination Does Not Harm Aquatic Environments

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

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

WATER QUALITY TEST REPORT

Nepal Environmental & Scientific Services (P) Ltd.
G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal
Phone : +977-1-4244989, 4241001, Fax No.: +977-1-4226028, Email: ness@mos.com.np
http://www.nesspltd.com

NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 218(W) (1) - 12 - 2017
Date Received : 05 - 12 - 2017
Sample : Ground Water
Date Completed : 14 - 12 - 2017
Client : BDA-PEA JV
Sampled By : Client
Location : Jhapachauraha Bhimdutta Municipality, Ward No. 8 (Inside Sidhanath Temple)
Owner : Public Land
Area : 5 Katha/ for Used 3 Katha

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 19°C	Electromeric, 4500 - H^+ B,: APHA	6.8	6.5 - 8.5
2.	Electrical Conductivity, (µS/cm)	Conductivity Meter, 2510 B, APHA	547	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	4	5
4.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	342	500
5.	Total Alkalinity as $CaCO_3$, (mg/L)	Titrimetric, 2320 B, APHA	335	-
6.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl^- B, APHA	13.90	250
7.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH_3 C APHA	0.30	1.5
8.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO_3^- B, APHA	6.79	50
9.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO_2^- B, APHA	<0.02	-
10.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	76.95	200
11.	Magnesium, (mg/L)		36.46	-
12.	Arsenic, (mg/L)	SDDC, 3500 - As, C: APHA	N. D. (<0.01)	0.05
13.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.27	0.3
14.	Manganese, (mg/L)		N. D. (<0.02)	0.2

N. D.: Not Detected

Note:
NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethyelenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthyleethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By) (Checked By) (Authorized Signature)

Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (017).
2. The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
3. Liability of our institute is limited to the invoiced test parameters & amount only.
4. Samples will be destroyed after three months from the date of issue of test certificate unless otherwise specified.
5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertizing media without our permission in writing.
6. The clients are requested to take back their hazardous samples along with the report/certificate.

NESS
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http://www.nessptld.com

NESS/Lab. M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 322 (W) (3) - 02 - 2018
Date Received : 12 - 02 - 2018
Sample : Water (Thapa Chok)
Date Completed : 27 - 02 - 2018
Client : PEA-BN JV
Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 19°C	Electrometric, 4500 - H^+ B., APHA	7.3	6.5 - 8.5
2.	Electrical Conductivity, (µS/cm)	Conductivity Meter, 2510 B, APHA	579	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	10	5
4.	Color, (Chromacity Unit)	Spectrophotometric, 2120 C, APHA	N. D. (<0.06)	5
5.	Total Hardness as $CaCO_3$, (mg/L)	EDTA Titrimetric, 2340 C, APHA	378	500
6.	Total Alkalinity as $CaCO_3$, (mg/L)	Titrimetric, 2320 B, APHA	368	-
7.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl^- B, APHA	12.82	250
8.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH_3 C APHA	N. D. (<0.06)	1.5
9.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO_3 B, APHA	14.76	50
10.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO_2 B, APHA	N. D. (<0.02)	-
11.	Fluoride, (mg/L)	SPANDS, 4500 – F D, APHA	<0.05	0.5-1.5
12.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 – SO_4^{2-} C, APHA	2.47	250
13.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B APHA	101.60	200
14.	Magnesium, (mg/L)		30.14	-
15.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.45	0.30
16.	Manganese, (mg/L)		N. D. (<0.02)	0.20
17.	Arsenic, (mg/L)	SDDC, 3500 - As. C: APHA	N. D. (<0.01)	0.05

N. D.: Not Detected

Note:
NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: ***Except turbidity and iron, all observed values complied the prescribed NDWQS for drinking water.***

(Analyzed By) (Checked By) (Authorized Signature)

Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (017).
2. The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
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6. The clients are requested to take back their hazardous samples along with the report/certificate.

CHECKLIST FOR PHYSICAL ENVIRONMENT

A. Topography/Physiography

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

B. Climate and Meteorology

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

C. Air Quality

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

D. Erosion and land Stability

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

E. Land Use

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

Table A15.1. Checklist of Plant Resources

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

Table A15.2. Checklist of Wildlife Animals

Date:

S.N.	Wild Animals	Remarks

Note:……
……
……
……..

Table A15.3. Checklist of Birds

Date:

S.No.	Birds	Remarks

Note:……
……
……
……