Initial Environmental Examination

Final Report

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NEPAL: Urban Water Supply and Sanitation (Sector) Project, (Jhumka Urban Water Supply and Sanitation Subproject, Sunsari)

Prepared by Ministry of Water Supply, Government of Nepal as per requirement of the Asian Development Bank.

Initial Environmental Examination

May 2021

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

(Package No. - W13) Jhumka Urban Water Supply and Sanitation Project, Sunsari District

Prepared by Ministry of Water Supply (MOWS)

For

The Asian Development Bank (ADB)

ABBREVIATIONS

ADB	Asian Development Bank
DED	Detailed Engineering Design
DRTAC	Design Review and Technical Audit Consultant
DSMC	Design, Supervision and Management Consultant
DTW	Design Tube Well
DWSSM	Department of Water Supply and Sewerage Management
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
ESA	Environmental Safeguard Assistant
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
GRVT	Ground Reservoir Tank
HDPE	High Density Polyethylene
HHs	Households
IBAT	Integrated Biodiversity Assessment Tool
ICG	Implementation Core Group
IEE	Initial Environmental Examination
LPCD	Liter Per Capita Per Day
MoFE	Ministry of Forests and Environment
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard
NGO	Non-Governmental Organization
NPR	Nepalese Rupees
PCRs	Physical Cultural Resources
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultant
PPM	Parts Per Million
REA	Rapid environmental assessment
ROW	Right of way
RPMO	Regional Project Management Office
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goal
SEMP	Site-specific environmental management plan
SPS	Safeguard Policy Statement
TDF	Town Development Fund
TPO	Town Project Office
UWSSP	Urban Water Supply and Sanitation Sector Project
USD	United States Dollar
VDC	Village Development Committee
WHO	World Health Organization
WTP	Water Treatment Plant
WUA	Water Users Association
WUSC	Water Users and Sanitation Committee

WEIGHTS AND MEASURES

C	Celsius/centigrade
dBA	decibel audible
Ha	hectare/s
Km	kilometer/s
Kph	kilometer/s per hour
M	meter/s
m^3	cubic meter/s
Amsl	above mean sea level
mg/l	milligram/s per liter
Mm	millimeter/s

NOTES

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

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

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EXECUTIVE SUMMARY

The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal's 15-year Development Plan improving water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal. Jhumka Urban Water Supply and Sanitation Project is located in Ramdhuni Municipality of Sunsari district in Province no. 1 of Nepal. The location of the subproject area lies 26°40'08.6"N latitude 87°11'49.4"E longitude. The municipality is bordered by Dharan sub-metropolitan city on the north direction, Inaruwa Municipality on South-West direction, Itahari on South-East direction and Baraha on south west direction. The Project area of Jhumka Urban Water Supply and Sanitation Project lies in ward no. 1, 2, 3 and 5 wards of Ramdhuni Municipality of the district.

The service area of the proposed subproject covers 4 wards comprising partial area of ward no. 1, 2 and 3 and whole area of ward no 5 of the Municipality. Altogether 4031 Hhs use Public Tap, Private tap, Hand pump, Mul/ River/Canal in the municipality. However, coverage is not enough and is not systematic. In dry season of months, the proposed service area faces water scarcity. The level of services in terms of quality, quantity, coverage is quite insufficient. Regarding the perception of beneficiaries towards water quality, 57.4% of the respondents replied that the quality of supplied water is unsatisfactory due to bad taste and smell. In general, the overall sanitation condition of the subproject area was observed satisfactory. Most of the households in the market area have permanent type of private latrine and few of them have temporary type of private latrine. It was observed that all the colleges/schools, hospital and government offices have toilets.

Subproject Selection. The selection of Jhumka Urban Water Supply and Sanitation Subproject complies with the subproject selection criteria discussed in the Project Administration Manual (PAM) and Environmental Assessment and Review Framework (EARF) developed for the project. Consistent with the EARF, compliance of Jhumka Urban Water Supply and Sanitation Subproject with these criteria has been confirmed prior to the conduct of initial environmental examination.

Categorization: Jhumka subproject is classified as Category B for Environment per ADB SPS, 2009 as no significant impacts is envisioned. This initial environmental examination (IEE) report has been prepared based on final detailed design and following requirements of ADB SPS and Government of Nepal laws, rules and regulations have been referred. The IEE has been undertaken to assess the environmental impacts of the subproject, and provide mitigation and monitoring measures that will ensure no significant environmental impacts occur as a result of the subproject.

Subproject Scope: The subproject is formulated under UWSSP to improve water supply and sanitation service delivery in partial area of ward no 1, 2, 3 and whole area of ward 5 of Ramdhuni Municipality. Investments under this subproject include DTWs, storage tanks, valve chambers, transmission mains with distribution lines, household connections, and other allied components.

Implementation Arrangements: The Ministry of Water Supply is the executing agency. The Department of Water Supply and Sewerage Management (DWSSM) is the implementing agency. Implementing activities will be overseen by a separate Project Management Office (PMO) which is established in DWSSM head office in Kathmandu and regional PMO established at Itahari. A team of technical, administrative, and financial officials including safeguard specialists will be provided at the PMO/RPMO to implement, manage and monitor project implementation activities. Consultant teams are responsible for subproject planning and management and ensuring technical quality of design and construction; designing the infrastructure and supervising construction; and safeguards preparation.

Description of the Environment: The project area is characterized by plain terrain. The altitude ranges from 100 m to 110m above mean sea level. The project area has undulating lower tropical temperate climatic conditions. The maximum temperature varies from 32^0-38^0 C in summer and

4^0 to 18^0 C in the winter and the average annual rainfall is 2000 mm. Most precipitation falls between June to August. Generally April and May are the driest months of the year. Some small ponds and chatara cannel is passing through the project area. The project area doesn't fall within protected area. No ecologically sensitive areas are present in close vicinity of the project area.

The project area is featured with agricultural belts, scattered vegetation/forest and clustered settlements along with some scattered small settlements in hills. Although, the economy of the area is agriculture based, the survey shows that primary occupation of 9.03% household heads is services while 34.16% of them are involved in agriculture and 11.46 % of them are involved in business. Around 11.68% are involved in foreign employment, and 15.26% in wage-based works.

Environmental Impacts: During the construction phase, impacts mainly arise due to soil erosion concerns and concerns of pollution. These temporary impacts of construction and will be minimized by using best construction methods. Traffic management will be necessary during pipe laying on busy roads. Occupational health and safety along with community health and safety aspects are also to be considered during the construction phase. Risks while working along the bazar area, and the current context of possible spread of viral infections are also among the challenges for the project development. During operation, the delivery of unsafe water is a crucial concern that can be mitigated with good operation and maintenance, prompt action on leaks and quality monitoring of supplied water. The appropriate mitigation measures have been proposed for adverse environmental impacts. The IEE has suggested the measures for addressing adverse impacts during construction and operation phases.

Environment Management Plan: An environmental management plan (EMP) is included as part of this IEE, which includes i) mitigation measures for environmental impacts during implementation, ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting, iii) public consultation and information disclosure, and iv) a grievance redress mechanism. A number of impacts and their significance have already been reduced by amending the designs. Locations and siting of the proposed Jhumka UWSSP were considered to further reduce impacts. The concepts considered in design of subproject are like; demand for new piped water supply, maximum population coverage mostly in residential areas and areas of high growth rate and ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

To ensure that the recommended mitigation and monitoring actions are duly implemented, monitored, assessed, evaluated and disseminated to the stakeholders for feedback and improvement, the safeguards teams will be mobilized in all work fronts and tiers. The contractor will be required to prepare a Site Specific EMP document before start of the construction works, and the contractor will be required to depute a site based EHS focal person for the subproject. Indicative cost for EMP implementation is NRs 5443095.00 which is about 1 % of the total sub project cost. The EMP including relevant cost will be included in civil works bidding and contract documents.

Consultation, Disclosure, and Grievance Redress Mechanism: Public consultations were done in the preparation of the subproject and IEE. The beneficiaries, the municipality office, WUSC and other stakeholders were consulted during the consultation. Consultations will be carried throughout the subproject development and its implementation period. A grievance redress mechanism will be in place to ensure any public grievances are addressed quickly.

Monitoring and Reporting: The PMO/RPMO and the ERDSMC will be responsible for environmental monitoring. The ERDSMC will submit monthly, quarterly and bi-annual monitoring reports to PMO. The PMO will consolidate the monthly reports and will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports in its website.

Conclusions and Recommendations: Jhumka Urban Water Supply and Sanitation Project will bring a wider benefits to the local people - primarily improved accessibility to quality drinking water, and improved sanitation. However, there are some risks in biological, physical and socioeconomic environment of the area. The analysis shows that subproject benefits outweigh the risks and these potential risks can be overcome through proper planning, coordination and management with constructive engagement of the local people. Based on the findings of this environmental study, there are no significant adverse impacts and the classification of the subproject as Category B for environment is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken.

I. INTRODUCTION

A. Background

1 The Urban Water Supply and Sanitation (Sector) Project (UWSSP) will support the Government of Nepal (the government) in providing better access to water supply and sanitation (WSS) in selected municipalities (project municipalities)[1] in Nepal. The Asian Development Bank (ADB) has supported the government in providing improved WSS services through three earlier projects.[2] Drawing on experience and lessons, this project will fund physical investments in WSS infrastructure in project municipalities and non-physical investments strengthening institutional and community capacity, service delivery, and advanced preparation of future investments.[3]

2 The Ministry of Water Supply (MoWS) is responsible for planning, implementation, regulation, and monitoring of WSS. The Department of Water Supply and Sewerage Management (DWSSM) under the MOWS supports the provision of WSS facilities in municipalities where large utilities do not exist, and these are operated by municipalities or water users' associations (WUAs). The DWSSM assists municipalities and WUAs in preparation of investment plans, project design, and establishing sustainable service delivery. The Local Governance Operation Act (2017), established municipalities as autonomous government institution with responsibility for WSS services.[4] However, shortage of investment funds, skilled personnel, and inadequate operation and maintenance (O&M) budgets, hinder municipalities from providing adequate, cost-effective services. While municipalities' capacity is being built, the government and residents have been receptive to an established decentralized, participatory, and cost-sharing service provision model through Water Users' Steering Committees (WUSCs).[5] Development support for municipal WSS is mainly being channeled through budget allocation as grants to DWSSM and loans through to the Town Development Fund (TDF)[6] with contributions from municipalities and beneficiaries. The TDF is also supporting WUSCs in institutional and financial management including the introduction of tariffs.

3 UWSSP is being implemented over a five-year period (2018 to 2023) and supported through ADB financing using a sector lending approach. In continuation of ongoing third small towns WSS sector project[7] MoWS is the executing agency and Department of Water Supply and Sewerage Management (DWSSM) as the implementing agency. The project management office (PMO) established under ongoing ADB Loan 3157-NEP: Third Small Towns Water Supply and Sanitation Sector Project is also responsible for the overall management, implementation and monitoring of UWSSP. There are Regional PMOs (RPMOs) to manage day-to-day project implementation at the subproject/municipality levels. After construction

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[1] Interventions will be in preselected urban areas of municipalities, previous to Nepal's federalization referred to as small towns, defined as (i) population of 5,000 to 40,000; (ii) located on a road linked to the strategic road network; (iii) has perennial road access, grid power, telecommunication, and potential for growth; (iv) has an average population density of 10 persons per hectare; and (v) has jurisdiction of one administrative boundary.

[2] ADB. 2000. *Report and Recommendation of the President to the Board of Directors: Small Towns Water Supply and Sanitation Sector Project*. Manila; ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Second Small Towns Water Supply and Sanitation Sector Project*. Manila; and ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Third Small Towns Water Supply and Sanitation Sector Project*. Manila.

[3] Project preparation was supported by loan consultants under the ongoing *Third Small Towns Water Supply and Sanitation Sector Project*.

[4] Government of Nepal, 2017. *Local Governance Operation Act*. Kathmandu.

[5] The WUSCs, formed under the Nepal Water Resource Act (1992), are the elected executive bodies of the WUAs. WUSCs are required to have women (at least 33%) and marginalized ethnic groups Representatives, and for a woman to occupy at least one of the key posts (Chair, Vice Chair, Secretary, or Treasurer).

[6] The TDF is a government-owned entity established under the Town Development Fund Act, 1997.

[7] Loans from the government to municipalities or WUSCs are generally on lend through the TDF.
ADB Loan 3157-NEP: Third Small Towns Water Supply and Sanitation Sector Project.

including a one-year O&M period by the contractor, subprojects will be operated by the municipality itself or a user association such as the Water Users Associations (WUAs).[8]

4 Overall, UWSSP will have the following impact: quality of life for urban population, including the poor and marginalized, through provision of improved sustainable water supply and sanitation services.[9]UWSSP will have the following outcome: inclusive and sustainable access to water supply and sanitation services in project municipalities improved.[10]UWSSP will have two outputs;

(i) Water supply and sanitation infrastructure in project municipalities improved; and
(ii) Institutional and community capacities strengthened.

5 The municipality is served by existing sources. However, the system does not sufficiently meet the needs of the people, regarding both quantity and quality. For the knowledge of water quality, a DTW ground water sources close to project area has been referred. The results of the test have shown that chemical quality of water does not meet National Drinking Water Quality Standards (NDWQS) and thus required water quality treatment structures are set up to satisfy the quality standards. The laboratory test report of the operating boring is provided in Annex 8.

B. Subproject Selection Based on Environmental Assessment and Review Framework

6 An EARF has been developed to provide guidance on subproject selection, screening and categorization, information disclosure and consultation, assessment, planning, institutional arrangement, and processes to be followed in the formulation and implementation of subprojects during project implementation. The subproject has been screened to ensure that it complied with all the subproject selection criteria provided in the EARF. No subproject will be funded by ADB unless it complies with all these selection criteria. Table I-1below shows the status of compliance with the selection criteria;

Table I-1: Status of Compliance with the Subproject Selection Criteria in the EARF

Subproject Selection Criteria in EARF		Status of Compliance	Remarks (Provide basis of compliance)
General Criteria			
1.	Not located in ecologically sensitive areas.[11]	Complied.	Section V para. 72; IBAT in Annex 4 REA Checklist in Annex 1 No Mitigation Measures Scenario Checklist in Annex 1
2.	Does not directly affect environmentally protected areas, core zones of biosphere reserves, highly valued cultural property.	Complied.	Section V para. 134 IBAT in Annex 4 REA Checklist in Annex 1 No Mitigation Measures Scenario Checklist in Annex 1
3.	Does not cause damage/destruction, removal, alteration or defacement of adjacent or nearby structures/monuments and sites of international, national and local significance.[12]	Complied	Table II-2 mentions no PCR will be affected.

[8] WUAs are registered entities with the district water resources committee as users' associations under the Water Resources Act (1992). Water Users and Sanitation Committees (WUSCs) are the elected executive bodies of the WUAs.

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

[10] The design and monitoring framework is in Appendix 1.

[11] Wildlife/bird sanctuaries, national parks, tiger reserves, elephant reserves, conservation reserves, core zone of biosphere reserves, centrally protected monuments or critical habitat (as defined in ADB Safeguard Policy Statement or SPS)

[12] Subprojects with component activities near (within 50 m from) such sites shall have prior coordination with the Department of Archaeology

Subproject Selection Criteria in EARF		Status of Compliance	Remarks (Provide basis of compliance)
4.	Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS).	Complied	Screening has been carried out
5.	Provides replacement ratio of 1:10 for any tree cutting. (Complying with the national requirements)	Complied	No any trees Need of felling and has been mentioned in EMP
Specific Criteria for Sources			
6.	Necessary agreement and approval for raw water extraction have been obtained in accordance with relevant laws and regulations.	Complied	The WUSC has obtained permission (Annex 10)
7.	Water source can sustain the quantity needed to meet demand during the planned service period even during climate change-induced drought events without adversely affecting other beneficial uses of the resource and downstream users.	Complied	No such issues in case of proposed and operating DTWs. and hence no downstream water user issue
8.	Detailed investigations (e.g. hydrogeological surveys, bore tests, etc.) have been carried out to confirm adequate and sustainable yield is available from the proposed source for supply of minimum 100 lpcd.	Complied	The design is based on 100 lpcd for household connections
9.	Tube well sites and/or surface water intake locations are designed to be fenced or have security provided to them.	Complied	Protection has been included in technical Design
10.	Any intake source is located at least 30m upstream of any sanitation facilities.[13]	Complied	Source selection in sites around 50 m away from any sanitation facilities
11.	Water quality test of the proposed source/s has/have been carried out and confirmed to comply with National Drinking Water Quality Guidelines on Arsenic.[14]	Complied	Base data of Water quality test report from 3 different operating boring planned for using to this project is carried and included in (Annex 8)
Specific Criteria for Water Treatment Plant			
12.	No water treatment plant (WTP) will be established in floodplains.	Complied	The sites are not in the flood plains and fenced by rigid structures
13.	Proposed location of any WTP is at least 50 m away from any premises used by people (house, shops) to avoid noise impact.	Complied	In line with water quality test report, WTP Units are compact units
14.	Proposed location of any WTP will be fenced or have security provided to them.	Complied	Location is inside the premises of rigid compounded area of WUSC
15.	Operate and maintain any WTP in accordance with national requirements and internationally accepted standards to meet national water quality standards or, in their absence, World Health Organization (WHO) Guidelines for Drinking Water Quality.	Complied.	Section II of the Initial Environmental Examination (IEE) discusses compliance with national and internationally accepted standards, whichever is more Stringent. Water quality test report after treatment from existing WT system is presented in Annex-8
16.	Operate and maintain any WTP in accordance with a sludge management plan.	Complied	This has been mentioned in EMP (Operation Phase)

[13] Where this cannot be maintained, the design and implementation will ensure that (i) septic tanks will be sealed to make them water tight and emptied as per the design requirements; (ii) appropriate borehole case and screen are installed; and (iii) a test pit is established, and water quality monitoring is conducted regularly (at least once every quarter)

[14] Water source with arsenic levels above the national standards will not be selected. If small traces of arsenic (below the national standards) have been detected, testing for arsenic will be conducted once a month for the duration of 3 months. Arsenic test results will be submitted to ADB for review before the water source is developed for drinking purposes.

Subproject Selection Criteria in EARF		Status of Compliance	Remarks (Provide basis of compliance)
17.	Operate and maintain any WTP in accordance with an operation and maintenance manual, which includes proper storage and use of chemicals.	Complied	This has been mentioned in EMP (Operation Phase)
Specific Criteria for Network Pipes and Other Structures			
18.	Will not involve use or installation of asbestos cement (AC) pipes	Complied	No such use
19.	All pipes are designed to be constructed underground.	Complied	The provision is include in Design document
20.	Infrastructure, such as OHT, GRVT, etc. is located considering high flood level in floodplains.	Complied	These considerations have been made
21.	Includes road access to WTP, pumping stations, and reservoirs/tanks for operations and maintenance activities.	Complied	There is already access to these sites
Specific Criteria for Public Toilets			
22.	Located in, or adjacent to, a frequently used public area on the WUA or municipality land with no or minimum involuntary resettlement/ social impacts	NA	No public toilet in the proposed design
23.	If the municipality doesn't have adequate capacity, the WUA has agreed to manage the public toilet on behalf of the municipality until the municipality has adequate capacity.	NA	No public toilet in the proposed design
24.	Septic tanks will be designed as per national standards and codes to allow for maximum retention of septage (minimum 3 years) and water sealing.	NA	No public toilet in the proposed design
25.	Toilets will be established at least 30m downstream of the drinking water source, and not in floodplains or flood prone areas. Where this cannot be maintained, the design and implementation will ensure that (i) septic tanks of the toilets will be sealed to make them water tight and emptied as per the design requirements; (ii) appropriate borehole case and screen are installed; and (iii) a test pit is established, and water quality monitoring is conducted regularly (at least once every quarter).	NA	No public toilet in the proposed design
26.	An O&M plan is developed providing details on the frequency and responsibility for collection and disposal of septage at approved site, and commitment to provide minimum operational staff and operate the facilities sustainably is given by WUAs or municipalities.	NA	No public toilet in the proposed design
27.	Hygiene promotion campaign and educational program is developed to promote open defecation free (ODF) in the town, and WUA or municipality commits to implement it.	Complied	The total sanitation promotion has been inbuilt in this subproject; (Section VIII; Page 98)

C. Basis and Extent of IEE Study

7 A 15-year development plan of Government of Nepal (GoN) has been prepared to implement the water supply and sanitation programs in emerging towns or small towns in order to

improve the health and the quality of life of the people living in the subproject towns by constructing and extending water supply system, drainage and sanitation facilities and providing health and hygiene education programs in the towns. The project follows the community managed demand responsive approach where the community will be involved from the very planning phase to the implementation phase for the operation and maintenance of the subprojects soon after it is completed. The project, 'Urban Water Supply and Sanitation Sector Project, UWSSP' is the outcome of that effort. The "Asian Development Bank" (ADB) has been providing financial assistance to implement the project in both the phases. The "Department of Water Supply and Sewerage Management" (DWSSM) is the implementing agency whereas the "Ministry of Water Supply" (MoWS) is the executing agency.

8 ADB policy requires that the environmental implications of individual developments are taken into account in the planning and decision-making process and that action is taken to reduce the impacts to acceptable levels. This is done through the environmental assessment process, which has become an integral part of lending operations and project development and implementation worldwide. As per the new EPA 2019 and EPR 2020 of GoN, the threshold of water supply projects requiring IEE study is the population range of 50,000 to 200,000. Since the design population of the proposed project is 49,438, the project doesn't require IEE. Requirement of IEE is for water treatment system having the capacity of more than 100 liter per second where the design capacity of treatment system of the proposed project is 67.37 lpc, the project doesn't require IEE.

Table I-2: Criteria for Requirement of Brief Environmental Study/IEE/EIA for Drinking Water Supply Projects as per Schedule 1, 2 & 3 of EPR, 2020 (1'st amendment 24-6-2021)

Described in the EPR, 2020(1'st amendment 2021) Schedule 1, G for Brief Environmental Study	Described in the EPR, 2020, (1'st amendment 2021) Schedule 2, G for Requiring IEE	Described in the EPR, 2020 (1'st amendment 2021) Schedule 3, G for Requiring EIA	Conditions in this Project	Remarks
1. Operation of drinking water project (upto 100 thousand baseline population) including sewage treatment system (upto 5 MLD capacity)	1. Collection of rain-water in an area ranging from 100 to 500 ha, and use of water sources located within the same area	1. Collection of rain-water in an area more than 500 ha, and use of water sources located within the same area	Not applicable	
	2. Surface water source with more than 100 liters per second safe yield and supply of 50 to 75 percent of the water during the dry season.	2. Surface water source with more than 100 liters per second safe yield and supply of more than 75 percent of the water during the dry season	Not applicable	Deep boring is used
	3. Water treatment exceeding the rate of 100 liters per second.		Not applicable	-
	4. Recharging 50 to 75 percent of the total aquifer for the development of underground water source.	3. Recharging of more than 75 percent of the total aquifer for the development of underground water sources	65.4 lps	IEE is not required as per EPR 2020 (1'st amendment 2021)
	5. Construction of 1 to 3 km long tunnels for operating drinking water project		Not applicable	
	6. Displacement of 25 to 100 persons for operating drinking water project	4. Displacement of more than 100 persons for operating drinking water project	Not applicable	

Described in the EPR, 2020(1'st amendment 2021) Schedule 1, G for Brief Environmental Study	Described in the EPR, 2020, (1'st amendment 2021) Schedule 2, G for Requiring IEE	Described in the EPR, 2020 (1'st amendment 2021) Schedule 3, G for Requiring EIA	Conditions in this Project	Remarks
	7. Settlement of people not exceeding 500 on the upper reaches of water sources	5. Settlement of people exceeding 500 on the upper reaches of water sources	Not applicable	
	8. Supply of drinking water to a baseline population ranging from 50 thousand to 200 thousand (2 lakh) population	6. Supply of drinking water to a baseline population of more than 200 thousand (2 lakh)	Not applicable	
	9. Supply of drinking water to a baseline population ranging from 50,000 to 200,000 (2lakh) on connecting new sources	7. Supply of drinking water to a baseline population of more than 200 thousand (2 lakh) on connecting new sources	Within limits (design population is 49,233)	IEE/EIA is not required in reference to GoN's EPR 2020
	10. Diversion activities in more than 1 km area		Not applicable	
	11. Operation of drinking water project (up to 100 thousand baseline population) including sewage treatment system (exceeding 5 MLD capacity)		Not applicable	
		8. Use of biologically or chemically polluted source or underground water sources that may be affected by them	Not applicable	
		9. Operation of multi-purpose projects relating to sources of drinking water which consumes the sources at the rate of more than 500 liters per	Not applicable	
		10. Construction of more than 3 km long tunnels for operating drinking water project		
		11. Project to be implemented in source of public water supply	Not applicable	

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

D. Objectives and Scope of the Environmental Study

10 The main objective of the IEE is to fulfill the requirements of ADB Safeguard Policy Statement (SPS), 2009. It aims to help decision makers to make informed decision about project. The specific objectives of the IEE study are as follows;

a. To identify, predict and evaluate the potential beneficial and adverse impacts of the subproject on the physical, biological and socio-economical resources in the subproject area;
b. To suggest enhancement measures to augment the benefits of the subproject,& to propose mitigation measures to avoid, minimize/compensate adverse impacts of the project;
c. To prepare appropriate Environmental Management Plan (EMP); and
d. To inform public about the proposed subproject and its impact on their livelihood.

11 Scope of the IEE focuses on the adverse environmental impacts and its mitigation measures relating to the location, design, construction and operation of all the subproject activities. This IEE report is based on the final detailed engineering design report of the subproject which has also been informed to the stakeholders.

E. Relevancy of the Project

12 Proposed Jhumka UWSSP is selected on the basis of criteria developed in UWSSP, PAM. The criteria considers the definition of municipal subproject, approval of the municipality, location of project in areas other than protected, poverty level, existing water supply and sanitation situation, community interest and potential of urbanization. The project satisfies all the required criteria mentioned above. From GoN perspective, the project contributes to service level improvement in water supply and sanitation services delivery. Hence, the project is instrumental to meet Nepal's SDG and National Targets. SDG 5 (Gender Equality and Social Inclusion), and SDG 6 (Availability of safe water and adequate sanitation facilities to all) are the main themes addressed by the project.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Nepal's Environmental Policy Framework

13 Most of the national policies and laws of the Government of Nepal (GoN) are in favor of environmentally sound economic development and growth. Following are the summaries of the relevant policies, acts and regulations and guidelines that have been reviewed during the preparation of the IEE report of proposed Jhumka urban water supply and sanitation project.

1. The Constitution of Nepal (2072)

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

2. National Policy on Rural Drinking Water Supply and Sanitation, 2004

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

3. National Urban Policy (2007) Policy

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

4. National Urban Water Supply and Sanitation Sector Policy, 2009

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

5. Fifteenth Plan (2076/77-2080/81)

18 Fifteen Plan Approach Paper 2076 has envisioned to increase accessibility to modern infrastructure. It clearly states the objective of ensuring environmental cleanliness by proper provisions of basic sanitation services, faecal sludge management and waste water management. It also reiterates the need of considering the climate risks and disaster risks in water supply and sanitation interventions. The need of strengthening the capacities of the local government on sustainable service provision in water supply and sanitation sector is also clearly mentioned in the plan.

6. National Environmental Policy, 2076 BS (2019 AD)

19 The policy has versioned for the management of pollution, waste maintenance of greenery to ensure people's right to live in hygienic and healthy environment. Similarly, the policy has objective of mainstreaming the environmental concerns in developmental activities. It has emphasized to promote reuse and recycle of the waste. To prevent, control and minimize the pollution has proposed following policies and strategies;

- ✓ Efficient structure will be formed to prevent, control and minimize the pollution
- ✓ Promotion of environment friendly vehicles.
- ✓ Waste segregation as well as promotion of reuse and recycle technique similarly, proper disposal of the remaining solid waste has to be ensured.
- ✓ To maintain the hygienic aquatic environment direct release of polluted water, sewage and solid waste to the water body will be prevented.

20 While managing the solid and liquid waste, appropriate mitigation measures will be imposed to the source and minimize the potential adverse impacts on downstream area.

B. Government of Nepal Environmental Legal Framework

21 Environment Protection Act (EPA), 2076 B.S. (2019 A.D), requires a proponent to undertake Brief Environmental Study, or IEE or EIA of the proposed subproject and have the report approved by the concerned sector agency or ministry of environment, respectively, prior to implementation.

22 Schedules 1, 2 and 3 list down the projects of activities that require Brief Environmental Study, IEE and EIA, respectively. Screening carried out based on schedule confirms that the proposed sub-project doesn't require IEE study for GoN's EPR 2020.

23 All other statutory clearances such as no objection certificates, site location clearances, permits to construct, permits to operate, and/or road cutting permits as required will be

obtained by the PMO and/or RPMO. No civil works will commence until and unless required statutory clearances are obtained. The contractor will need to comply with all the application national, provincial and local government laws and regulations.

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

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

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Environment Protection Act	2019 (2076 BS)	The act emphasis on new aspects like provisions of Brief Environmental Study, IEE and EIA under the jurisdiction of local authority, provincial government, and central government. Need of Strategic Environmental Assessment for policies/plans/programs, and considerations of climate change for projects are among the newly enforced aspects of this act.	
Environment Protection Rules	2020 (2077 BS)	Environment Protection Rules (EPR), 2020 has defined thresholds for environmental assessment under 3 categories; Brief Environmental Study, IEE and EIA. It has defined the roles of the provincial government and the local government as well in the process of environmental assessment of development projects.	
Labour Act and Labour Rules	2017 and 2018	The Act emphasizes OHS Policy; Safety & Health Committee; OHS arrangements including child care center; workplace safety; environment of work place; and specific Labour Audit Additional rest period for certain female employees, Specific provisions relating to the safety of the works having health hazards are also there in the Act	The bidding document (Section 6, para (4.1.2) includes condition that the contractor shall adopt all safety measures for the safety of its workers and other personnel and shall also adhere to environmental and aesthetic issues identified during the construction works.
Water Resources Act	1992 (2049 B.S.)	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring EIA & preparation of EIA report before granting license to use water resources for any purpose.	As per the new EPR 2020, the subproject doesn't require an IEE. The authority to use water resource for this subproject has been obtained, and relevant documents are attached in Annex 10.
		Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	-
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Sites for main structures have been acquired accordingly. Unidentified sites for temporary use will be acquired accordingly.
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	The EMP provides measures to comply with the relevant environmental quality standards and national drinking water quality standards.

Guidelines for Issuing Permission for Extraction and Use of Groundwater	2015 (2071 BS)	Kathmandu Valley Water Supply Management Board (KVWSMB) has set the criteria for groundwater extraction and its use in this guideline. The guideline also defines the process for obtaining permission from the board for use of ground water in Kathmandu valley. It states the need of standard designs of deep tube wells as well.	The practical implication of this guideline is for non- governmental entities. This guideline is not targeted for the development of ground water projects under the government.
Implementation Directives for the National Drinking Water Quality Standards	2005 (2062 B.S.)	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in eth EMP following the NDWQS Directives.
Land Acquisition, Resettlement and Rehabilitation Policy	2015 A.D.	The policy is based on the principles that the assessment of land requirements needs to be carried out based on the alternatives having minimum impacts of land loss, and also the need of resettlement and rehabilitation works to ensure livelihoods of the affected persons and family is improved or at least restored at pre-project level. It also indicates the need to conduct social impacts assessment to identify impacts on affected people, community and vulnerable group, In case of Land acquisition and ownership transfer, land can be acquired also through voluntary donation which will be accepted only if the land provider has agreed without any pressure, and in presence of local authorities to donate land for the purpose. On the humanitarian ground, the policy also bases on the value that for revenue generating project, the project should create conducive situation in which the benefits generated by the project can be drawn-out to affected people.	No any land acquisition issues are prevailed
Forest Act	2019 (2076 B.S.)	It stipulates that the GON can develop a land use plan of a forest in order to maintain the balance of environment and development. It also provisions that the government can develop a specific forest conservation plan for a particular section of a national forest. It also states that the forest area can be used with approval for national priority projects.	Based on field assessment and site visits, no any trees need to be cut. EMP stipulates no illegal quarrying of natural aggregate materials.
Water Resource Act	1992 (2049 B.S.)	The umbrella Act governing water resource management. This has provision of beneficial use of water resources (surface water/groundwater) without causing damage to others. Provides for the formation of water user associations and establishes a system of licensing and Prohibits water pollution	• WUSC has been formed for this proposed project as per this act • There is provision of control of water pollution through protection works and strict supervision.
National Environmental Policy and Action Plan	1993 (2049 B.S.)	Of its five objectives, most relevant to the Subproject are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	Subproject will not impact on physical, cultural heritage & biodiversity. EMP provides measures to mitigate impacts if any.
Local Government Operations Act	2017	The Local Government Operation Act, 2017 empowers the local authority for the conservation of local natural resources and	Provides basis for Local Government to monitor the environmental performance of the

		implementation of environmental conservation activities along with prime responsibility of conducting development projects which includes water supply, sanitation and awareness activities.	subprojects. EMP provides the responsibilities of LGs in EMP implementation.
Child Labor Prohibition and Regulation Act	2001 (2056 B.S.)	The section 3 of the act prohibits a child from engaging in work, sub clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and sub clause 2 states "Nobody shall engage a child in a risk full occupation or work set forth in the Schedule". The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means".	The bidding document (Section 6, para. 4.1.2) provides condition that contractors shall comply with applicable labor laws and core labor standards of Nepal on prohibition of child labor, equal pay for equal work of equal value regardless of gender, ethnicity or caste, elimination of forced labor and disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local Communities.
15-Yr Development Plan for Small Towns Water Supply & Sanitation Sector(Updated)	2009 (2067 B.S.)	The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes environmental effects and performance monitoring.
Solid Waste Management Act	1011 (2068 B.S.)	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
National EIA Guidelines	1993 (2049 B.S.)	This guidelines aims to assess the environmental impacts likely to be caused by a project, and promote its positive impacts and mitigate or eliminate adverse impacts by undertaking preventive and other effective measures after integrating the environmental impacts in the planning cycle of all the projects to be initiated in Nepal, prior to their initiation, so as to make the economic benefits from development projects sustainable	This has been followed for evaluation of the anticipated environmental impacts.
Environment Friendly Local Governance Framework	2013 (2070 B.S.)	• This has been issued to add value to the environment friendly local development concept encouraging environmental protection through local bodies. • One of its expected results is to bring improvement in the field of environment protection, waste management, climate change adaptation and disaster management throughout the nation.	This needs to be followed during project design, construction and operation period.
Working procedure for the use of national forest for national priority projects, 2074	2017 (2074 B.S.)	It emphasizes on the management regarding the use of national /community forests for the implementation of national priority project.	The project activities/components of works will not cause any impact to the forest area by the this town project

C. International Environmental Agreements

25 Table II-2below lists the relevant international environmental agreements that Nepal is party to, and their relevance to various subprojects under UWSSP.

TableII-2: International Environmental Agreements and standards Relevant to the Subproject

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	The subproject will help the Government of Nepal comply with this agreement. The subproject has been selected ensuring that it will not trigger adverse impact physical cultural resources and natural heritage during and after construction.
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.	The subproject will help the Government of Nepal comply with this agreement. The subproject components are not located in wetlands and other protected areas of the country.
Convention on Biodiversity	1992	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	The subproject will help the Government of Nepal comply with this agreement. The subproject will not 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.	The subproject will help the Government of Nepal comply with this agreement. The subproject will ensure implementation of its EMP as measure to minimize the causes of climate change.
Basel Convention on the Control of Trans boundary 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.	The subproject will help the Government of Nepal comply with this agreement. The subproject will ensure implementation of its EMP as measure to avoid or minimize the generation and disposal of hazardous wastes.

* (Year) - Year last amended.

26 The sub project will continuously support Nepal's commitment to these international agreements. Eventually, the subproject will help the country fulfill its commitment to the 6th Goal of United Nations Sustainable Development Goals, which is to ensure access of all to clean water and sanitation.

D. Environmental Assessment Requirements of the ADB

27 All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that these are environmentally sound, designed to operate in compliance with applicable regulatory requirements, and not to cause significant environmental, health, or safety impacts. The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety

Guidelines[15].

28 Table II-3summarizes the environmental safeguard requirements applicable to the subproject per ADB SPS.

Table II-3: SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken, indicating that the Subproject is NOT: (i) environmentally critical; & (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction will be temporary & local & shall be mitigated accordingly. Hence IEE is sufficient.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health & safety, vulnerable groups and gender issues), and cultural resources in the context of the project's area of influence. Assess potential trans boundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Impacts are discussed in Section VI). No trans boundary & global impacts, including climate change.
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	Analysis of alternatives is presented in Section VII.
Avoid and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts by means of environmental planning & management. Prepare EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development & training, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement (Section IX).
Carry out meaningful consultation with affected people & facilitate informed participation. Involve stakeholders, including affected people, women's participation & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation to address issues related to EA	Key informant & random interviews, FGD, and meetings have been conducted. A grievance redress mechanism for the resolution of subproject-related issues/concerns is presented in Section VIII.
GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance. Disclose a draft EA (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & stakeholders. Disclose the final EA & its updates if any to affected people & stakeholders.	This prepared IEE based on final DEDR and will be disclosed on ADB's website prior to Project appraisal, and will be made available at the offices of the PMO, ICG and WUSC.
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	Implement EMP, reporting and disclosure of monitoring reports in a given standardized format.

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

SPS 2009 - Safeguard Requirements	Remarks
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	The sub-project does not cover the critical habitats and forest area, The major project structures and transmission main and distribution networks are proposed on public land and existing public road RoWs as far as possible. Therefore, no settlements are expected to be adversely affected due to acquisition of small size of public vacant lands at different sites. The public land can be used after getting consent from Municipality.
Apply pollution prevention & control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution/ when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use & manage pesticides based on integrated pest management approaches & reduce reliance on synthetic chemical pesticides.	This requirement is also applicable to the sub- project in the aspect of pollution management, and waste management, e.g., effluent from septic tanks and generated sludge and slurry disposal from water supply and sanitation structures. The sub-project will ensure that the contractor's measures and practices are in line with internationally accepted standards.
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	EMP provides measures to mitigate health and safety hazards during construction and operation phases.
Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The Subproject will not affect any physical cultural resource. The EMP recommends the measures to mitigate any such adverse impacts, and also in case of chance find.

29 During the design, construction, and operation of the subproject the PMO and concerned RPMO shall apply pollution prevention and control technologies and practices consistent with international good practices, as reflected in internationally recognized standards. When the Government of Nepal regulations differ from these levels and measures, PMO shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

E. Relevant Environmental Quality Standards

Table II-4: Relevant Environmental Quality Standards

Particular	National Standard	International Standard
Ambient air quality	- National Ambient Air Quality Standards, for Nepal, 2003 - National Noise Standard Guidelines 2012	WHO Air Quality Guidelines, Global Update, 2005
Emission standard for diesel generator to ambient Air	Emission standard for diesel generator EPR-14, 2020	-
Noise	National Noise Standard	- WHO Guideline Values on Noise

Particular	National Standard	International Standard
	Guidelines, 2012	Level - Guidelines for Community Noise by WHO 1999
Drinking water quality	National Drinking Water Quality Standards, 2006	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2017

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

*

III. APPROACH AND METHODOLOGIES

30 In line with the objectives of the IEE study a systematic and integrated methodology has been followed complying with standard field study practices for IEE and with a continuous public consultation process.

A. Literature review

31 Study team focused on available primary and secondary literature in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps etc. Feasibility studies of the subproject conducted at various times, municipal profile were the key documents collected and reviewed to determine the nature and scope of activities of the subproject that influences the environmental conditions of the proposal area. Similarly, published and unpublished reports pertaining to environmental standards, acts, regulations etc. were collected and reviewed. Published and unpublished literatures of the subproject area pertaining to biological, social, chemical, physical, and cultural environments were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data requirements.

B. Impact Area Delineation

32 Before proceeding to field visit, the area that would be covered by the assessment, the geographical boundary of the influence area is delineated on the topographical map and termed as Impact Area Delineation. The impact areas have been delineated on the basis of proximity of the construction site to the nearby surrounding areas. The impact areas have been delineated as “Core Project Area” and “Surrounding Project Area on the basis of proximity and magnitude of the impacts due to the proposed project activities.

33 **Core Area:** The Core Area indicates the area required permanently as well as temporarily for the proposed project. This area refers to the service area as well the area where the major construction of the project components will be carried out and has the highest magnitude impact from the proposed project activities. Hence, here, regarding this proposed project, this core area includes the service area of the proposed project which comprises partial areas of wards 1, 2, 3 and whole area of ward no 5 of Ramdhuni Municipality.

34 **Surrounding Area:** Surrounding Area of the town project indicates the area within the immediate surroundings of the core area of proposed project. It includes the area of the project town which is closely associated with the core area of the project and has spill-over effects of those effects that occur within the core area. This has low to medium magnitude impact from the proposed project activities. In this proposed project, the surrounding area covers partial areas of wards 1, 2 & 3, that are not covered under the service area and other adjoining wards of the service area that includes wards 4, 6, 7, 8 & 9.

C. Field Study

35 A multidisciplinary team; comprising environmental specialist, biologist, socio-economist, and civil engineer carried several field studies in subproject areas in an extensive manner. During the visits, baseline information on physical and cultural, chemical, biological, and social conditions of the subproject direct and indirect impact areas was collected using checklists (Annex 9). The paragraphs below present briefly the various approaches and methodological

tools used during the field exploration;

Study of Physical Environment

36 During the study, physical environment survey was carried out by delineating the subproject impact area to collect the baseline information on physical environment. Topographic and geomorphic features were observed and documented. Physical features such as topography, climate & meteorology, air quality, erosion and land stability & land use pattern were observed and recorded. Similarly, data on rainfall and other meteorological conditions were collected.

Study of Biological Environment

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

38 Wildlife biodiversity in the indirect impact areas was studied in the field interacting with local people (for habitat continuity) methods to identify linkages between wildlife habitats and proposal activities. The indicator wildlife and threatened or endangered species (as per IUCN Red Book, CITES Appendices, and GoN list) in the area were discussed with the local communities.

Study of Socio-Economic and Cultural Environment

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

40 Frequent consultations were held to interact with local people and stakeholders in order to collect information on demography and socio-economy of the project area. Direct observation (walkover survey) was done to collect information on the cultural sites, and public institutions such as temples, cremation grounds, and festival sites, historical and archaeological sites, school, and health post within the direct subproject affected areas. Consultation with village elites and key person interviews were conducted to assess the current situation of these facilities and the general water/sanitation status of the communities of the subproject area.

D. Stakeholder and Public Consultations

41 Stakeholder and public consultations were conducted by ERDSMC team during Sept, 2020-February 2021. The positive response and interactive presence of local stakeholders made the public consultation more fruitful. Detail issues of the consultation is presented in section VII and corresponding area attached in annexures.

42 The information were also collected through Focused Group discussions (FGD) among the potential stakeholders. Direct observation (Transect Walk Method) was conducted to ascertain the existence of the cultural sites, and public institutions such as temples, cremation grounds, historical & archaeological sites, schools, and health posts within the project core areas and to determine the effect on their existence due to project construction activities. The Consultations with the village key informants, elites, Meetings and Group discussions were done to verify baselines situation of the area under proposed town project.

E. Data Processing and Impact Identification, Prediction & Evaluation Methods

43 With consultation and filed observation, environmental impacts, both beneficial and adverse,

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

F. Scoring of Impacts

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

G. Preparation of IEE report and Team Members for IEE Study

45 Complying with the ADB safeguards policy for conducting IEE, an IEE report is prepared in a standard format satisfied to the requirements of ADB. The following experts were mobilized to complete the IEE study of Jhumka Urban Water Supply & Sanitation Project (Table III-1).

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

SN	Name of Expert	Designation	Expertise field
1	Er. Indra Paudel	Project Team Leader	Senior WASH Engineer
2	Sita Ram Kandel	Environmental Specialist IEE Team Leader	Environmental Safeguard Management
3	Sishir Gautam	Social Safeguards Specialist	Socio-economist
4	Ramesh Adhikari	Sr. Design Engineer	Water supply and drainage design
5	Sushan Basnet	Support Staff	

IV. DESCRIPTION OF THE PROJECT

A. Location of the Project

46 The proposed project of Water Supply and Sanitation is located at Jhumka of Ramdhuni Municipality in Sunsari district of Koshi zone, Province 1 of the Country. The proposed service area of the project covers ward no. 1, 2, 3 (Prartially) and 5 (complete) of Ramdhuni Municipality. The municipality lies in E 26°40'08.6"N 87°11'49.4"E. Jhumka is one of the fast growing cities of Nepal. Ramdhuni municipality located in the Sunsari district, Koshi Zone of Eastern Nepal. It was established in 2014. Ramdhuni-Bhasi was previously known as Jhumka Bazar. East-west highway runs through the municipality and is approximately 18 km far from Itahary. Ramdhuni Municipality is one of the prominently growing town of Sunsari district. Road access, market facilities and electrification are some of the major factors that attract migration of population to this town from outside. All data on the socio-economic conditions of the households gathered during the socioeconomic survey is summarized below. The proposed project area is one of the growing towns of Sunsari District. The major settlements of the town are located on the both sides of East - West Highway. The service area has semi-urban and rural characteristics, and the economy of the town is shifting from rural agro based to business and commercial based. The East-West Highway passes through this town. It is located at a distance of about 11 km west from Itahary.

B. Type, Category and Need of the Sub-Project

47 The proposed "Jhumka Urban Water Supply and Sanitation Project" is a ground water-based water supply system project partially covering ward 1, 2, 3 and fully covering ward 5 of Ramdhunu Municipality. The subproject comprises of two major components - water supply and sanitation. The water supply part comprises of a ground (Deep boring) scheme system. A total of 6 tube wells comprising 3 operating and 3 new to be constructed and RCC overhead reservoir tanks (2 new each 100 cum an 225cum) and Ground Reservoir of 50 cum and a network of distribution lines have been proposed with single premises will be developed.

48 There is one water supply scheme, constructed in 2053 BS (1997 AD) with the financial aid of GoN. This scheme largely supplies water to ward no 1, 3, 5, and 2 (covering partially). It uses source as ground water. The quality of water delivered through the existing systems in the project area is not satisfactory. It was reportedly learnt that treatment units are not functioning properly. It is observed that the system has outreached their design capacity, and are not able to cover more areas. Existing features of the WS system of Jhumka WUSC(2053 BS) comprises; Safe Yield- 12 lps, Reservoirs- 100 cum -1 number (OHT) and 225 Cum-1 number (OHT), Ground Reservoir- RCC reservoir 50 m^3 , House connections- 812 private taps and Operating hours (6 hours) is for 3 hours morning and 3 hours evening. Besides the public and private tap, spring / Kuwa, Tube-well and river / pond are the other sources of water. The finding of socio-economic census survey 2020 is presented in Table-3.2. Of the total surveyed households, hand pump remained the prime source of water supply. It contributes some 73.75 % of the total water demand in either of the rainy and dry seasons. The second largest source is the private tap that contributes 20.14% of the total water demand. Similarly, 4.5% of the population still rely upon Canal. People still are found to rely on dug well though it contributed 0.9%. In terms of quantity and quality of water available 27.7% of the households responded as high satisfactory. Majority (57.4%) of responded has reacted as unsatisfactory. Few households (14.9%) have also expressed satisfactory service in terms of quantity and quality.

C. The Sub-Project

49 The Jhumka Urban Water Supply and Sanitation Project has been designed as an integrated piped water supply system based on ground water source that will provide sufficient quantity and good quality of water to the residents of Jhumka town. The water supply component of the subproject consists of different construction components as presented in section 1 (salient features).

50 The water supply system will be operated by the WUSC, and the WUSC will coordinate with municipality on regular basis for effective service delivery.

1. Salient Features of the Project

51 The salient features of the subproject are given in table below;

Table IV-1: Salient Features of the Project

S.N.	Items	Description
1	**Name of Project**	Jhumka Urban Water supply and Sanitation Project, Sunsari, Province 01
2	**Type**	Semi-Gravity (GW pumping to OHTs and Gravity Flow Water Distribution)
3	**Study Level**	Detail Engineering Design Report
4	**Location Area**	
	Province	Province 01
	District	Sunsari
	Municipality	Ramdhuni Municipality
	Wards	Partial coverage of Ward Nos. 1,2,3 and complete coverage of ward 5

S.N.	Items	Description
5	**Available Facilities**	
	Road	Located at East-West Highway , Jhumka-Chatara road
	Water Supply System	Existing tapped water supply partially covered ,Private Tubewells,
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	**Social Status**	
	Present HHs Numbers (2020): Survey Year	4031
	Present Population (2020): Survey Year	20,337 (including Rented Pop.)
	Base Year Population (2023): Construction Completion Year	22,787
	Design Year Population (2043): 20 Year from Construction Completion	48,652
	Weighted Growth Rate % (WGR)	3.457%
	Projected HHs in Design Year (based on WGR)	9642
7	**Water Demand (MLD)**	
	Design Year (2043)	67.11 lps (average)
8	**Proposed Water Source Characteristics**	
	Source Name	Ground water from Deep Tube wells
	Source Location	Within OHT Area and around OHT location
	Safe Yield (lps)	Adequate
9	**Structures**	
	Reservoirs	Existing OHT 110 Cum Existing OHT 255 Cum Proposed OHT 900 Cum Ground Reservoir 100 Cum
	Pumps	3 Nos. of 25 HP
	Deep Tubewells	6 Nos 3 Existing 3 proposed
	Electricity line	11 kVA HT line shall be stretched to about 900 m
	Transformer	Transformer (2 nos-150 kV)
	Generator	Generator (1-160 kVA)
	OMS	2 Nos
	VTC	4 Nos
	SMS with AMR	6 Nos
	AMS	20 Nos
	Valve Chambers	100
	Office Building	1 No
	Guard house	1 Nos
	Generator House	1 Nos
	Household Connection	4516 Nos, Base Year
	Fire Hydrant	10
	Distribution Network (meter)	203 Km
10	**Total Cost of New WS Components (Inclusive of all)**	**NRs. 595,517,564.37**
11	**Cost Sharing Arrangement for water supply component**	
	GON Component (70 %)	416,862,295.06
	Users Contribution (3%)	17,865,526.93
	Municipality Contribution (2%)	11,910,351.29
	TDF Loan (25%)	148,879,391.09
12	**Tariff**	

S.N.	Items	Description
	Up to 6 m^3/month (NRs/ m^3)	38.00
	6 to 10 m^3/month (NRs/cum)	57.00
	10 to 20 m^3/month (NRs/ m^3)	85.50
	Above 20 m^3/monthly (NPR/ m^3)	128.25
13	**Affordability (% of HH income)**	
	Average Households	0.8 %
	Low-Income households	1.3 %
	Poor households	1.9%
14	**Cost of Sanitation Improvement**	**NRs.** 648,600.05
15	**Environment**	
	ADB Category	Category B- IEE Required
	GoN Status	**IEE not required**

2. Water Source Sustainability Assessment, and Water Quality Assessment

52 Three numbers of 200 mm diameter tube wells are found operating for drinking water supply purpose which are yielding in order of 12 liters per second of water from each tube well. The tube wells are about 110m deep and have 20m mild steel slotted screen. Two tube wells were constructed in 2054 BS (1998 AD) and one recently in 2019 AD. The above experiences depict this terai flood plain bear good aquifer zone. Ground water as source is proposed.

Table IV-2: Deep tube well sizes

S.N	Boring No	Required safe yield from source	Proposed Boring size	Location	Remarks
1	Boring 1	20 lps	250 x 200 mm	Ward No 3 Ramdhuni Municipality	Proposed
2	Boring 2	20 lps	250 x 200 mm	Ward No 5,	proposed
3	Boring 3	20 lps	250 x 200 mm	Ward no 3	proposed
4	Boring 4	15 lps	200 x 200 mm	W.N-3 Adjacent to WUSC office	Existing boring with Mild steel casing and screen
5	Boring 5 and 6	10 lps each	200 x 200	Jhumka WUS premises	Existing boring with Mild steel casing and screen

53 As three numbers of deep tube wells are in operations and thus, samples are used for the tentative treatment design. Iron and Manganese content are found quite high in the tube wells. A big threat to Terai ground water "Arsenic" is not detected. Parameters detected is presented in the hereunder in the Table IV-3 Raw Water Quality. This has been discussed with the stakeholders as well.

54 Water sample test report of three operating deep boring sources existed all in ward no -3, (2 inside the Jhumka WUSC premises and 1 nearby that WUSC office) were collected during October 2020 for conducting laboratory analysis to test for other physical and chemical parameters with respect to the Nepal Drinking Water Quality Standard (NDWQS) guidelines for potable drinking water. Water from deep borings seem slightly acidic in nature as pH value of 6.6 and 6.8 are detected in tube well no1 and 2 respectively. Similarly iron and manganese content are also found not complying in sample from tubewells1 and 2. Other parameters found comply with the NDWQS value. Refer Appendix for water quality assessment report. Water will require treatment for the reasons to satisfy NDWQS. Similarly to make the water safe from bacteria considerations, disinfecting or killing of pathogenic bacteria is required, and therefore chlorination has been done. The table below exhibits findings with respect to NDWQS;

Table IV-3: Water Quality Assessment

S.N.	Parameters	Test Methods	Tube Well No.	Tube Well No. 2	Tube Well No. 3	NDWQS, Nepal
1.	pH	4500 – H+ B, : APHA, 21st EDITION	6.6	6.8	7	6.5 – 8.5*
2.	Electrical Conductivity, (µmhos/cm)	2510 B, APHA, 21ST EDITION	390	375	379	1500
3.	Turbidity, (NTU)	2130 B, APHA, 21ST EDITION	-	-		5 (10)
4.	Total Hardness as $CaCO_3$, (mg/l)	2340 C, APHA, 21ST EDITION	164	152	160	500
5.	Chloride, (mg/l)	4500 - B, APHA 21ST EDITION	<5	<5	-	250
6.	Ammonia, (mg/l)	4500 – NH3C., APHA 17th EDITION	<0.2	-	-	1.5
7.	Magnesium, (mg/l)	-	-	-	-	0.2
8	Iron, (mg/l)	3111 B. APHA 21ST EDITION	7.8	3.5	1.6	0.3(3)
9.	Manganese, (mg/l)		0.6	0.4	<0.1	0.2
10	Arsenic	3114 C, APHA, 21ST EDITION	0.01	<0.01	-	0.05
11.	Total Carbonate Alkalinity, (mg/L)	Titrimetric, 2320 B, APHA	-	-	-	-
12.	Bicarbonate Alkalinity, (mg/L as $CaCO_3$)		-	-	-	-
13.	Total Hardness, (mg/L)	2340 C, APHA, 21ST EDITION	164	152	160	500
14.	*Bicarbonate Hardness, (mg/L)		-	-	-	-
15	Residual Chlorine(mg/L)	COLORIMETRY	<0.1	<0.1	<0.1	0.1-0.2*
16	Faecal coliform E.coli (CFU/100 ml)	9222D., APHA, 21ST EDITION	0	0	04	0
17.	Total Dissolved Solids, (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	-	-	-	-

Source: Laboratory Analysis, October 2020

3. Treatment Process

55 The water treatment process has been selected based on the raw water quality. The proposed treatment process aims to remove the high concentrations of iron, manganese and increase the pH value and make it suitable for drinking purpose. The treatment process consists of aeration cascade, lime dosing, aeration towers, pressure filters and disinfection with associated accessories likes air blowers/compressors, valves and pipes. The schematic diagram of the proposed treatment plant is shown in Figure. However, the number of treatment components and their sizes may vary depending upon the design flow as presented Design of Water Treatment Plant Section. Treatment Plant units of following capacities are proposed in table IV-4 and the treatment process consists of various steps of treatments which are described below;

Table IV-4: Pumping rates/ Treatment plant capacities

S.No	Systems	Pumping Rate (lps)	Remarks
1	Jhumka	67.11	3 sets each capacity of 23 lps are proposed

Fountain Aerator:

56 A fountain aerator of RCC is proposed to precipitate high dissolved iron and manganese. The water thus will be carried out to ground reservoir. Sludge deposited thus created will be pumped regularly from the bottom of the ground reservoir. Water from ground reservoir is further treated from pressure filter.

Creating Alkalinity: Caustic Soda dosing

57 Alkalinity in water is required to precipitate out dissolved iron and manganese present in raw

water. Caustic Soda dosing is thus proposed to increase the alkalinity of water. It will act as a catalytic agent to increase the precipitation of dissolved iron and manganese by breaking bond between the iron and manganese with organic matter. The caustic soda is to be dosed from dosing tank through a doser. The dosing of caustic soda is to be adjusted by doser so that concentration in the raw water is between 1 to 2 mg/l. The solution is dosed at the inlet of the aeration tower.

Aeration Tower

58 Aeration tower made of mild steel is proposed to precipitate out dissolved iron and manganese. The tower is packed with pall rings. The raw water is applied at the top of aeration tower flowing downward while air is blown from the bottom of the aeration tower flowing in upward direction. The intermixing of air and water will increase the dissolved oxygen in water required to precipitate out dissolved iron and manganese. Air blower/compressor is proposed to supply the air. The air to water ratio of 10 is to be maintained for effective precipitation of iron and manganese. The excessive air is released through air valves provided at the top of the tower.

Pressure Filters

59 Pressure filters made of mild steel is proposed to remove precipitated iron and manganese as well as aluminum. The pressure filters is to be packed with MnO_2, 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. Large number of coliforms is also expected to be removed in the pressure filter due to biological action.

Disinfection

60 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. The chlorine dose of 1 mg/l is proposed. Pressure Treatment Plants are proposed to treat water. As the water samples indicate about the acidic nature, lime dosing is suggested. Following schematic diagram illustrates the treatment process.

4. Project Area and Subproject Components

61 Considering the topography, land use, settlement pattern and use of existing facilities, Single water supply systems based on decentralized distribution system are proposed. In order to manage NRW in the proposed system, total system divided primarily into 4 DMAs. Google earth maps showing the locations and immediate vicinities of the project component sites, WUSC office, WTP, OHT, pipelines and other component structures are presented in following figures;

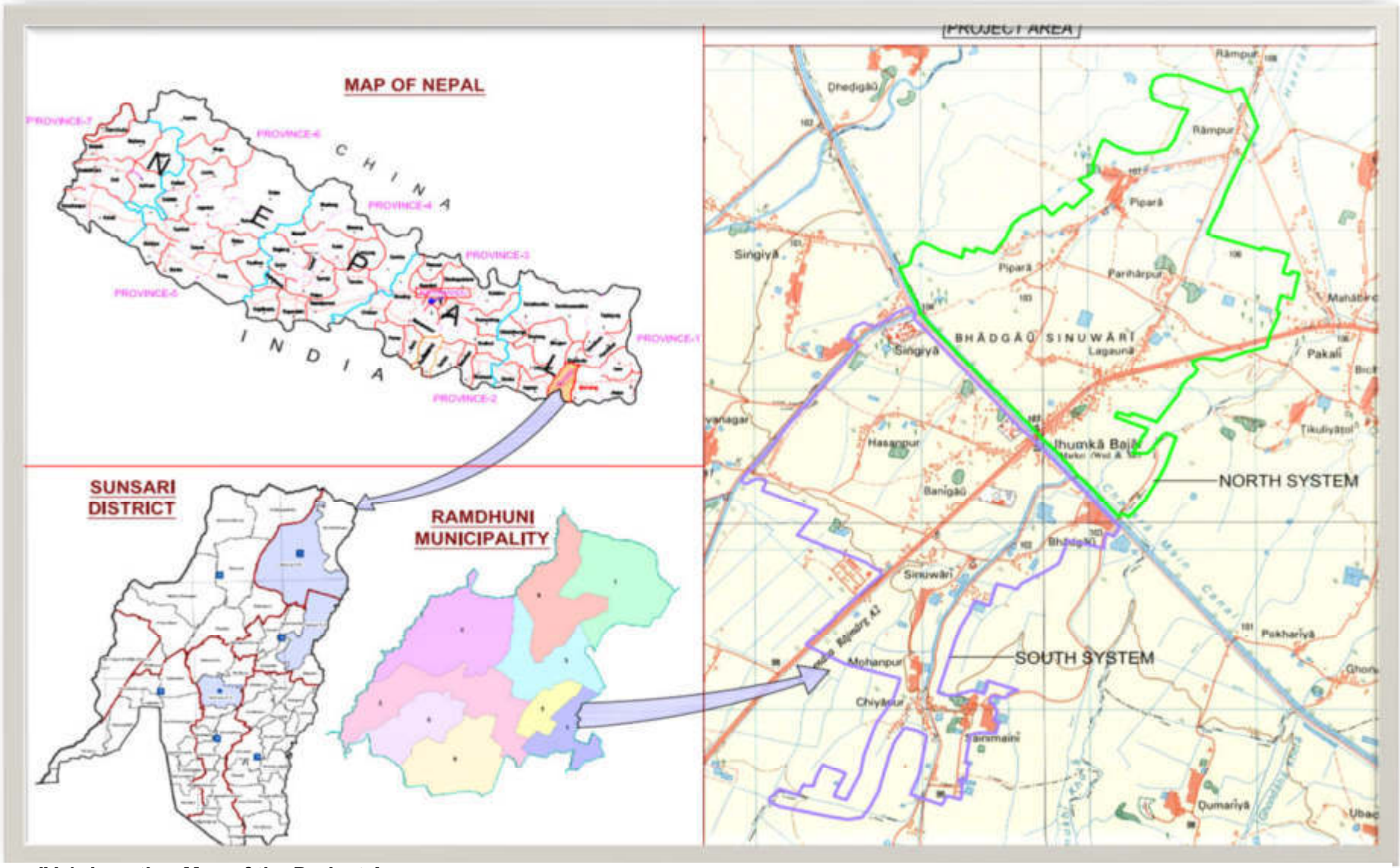


Figure IV-1: Location Map of the Project Area

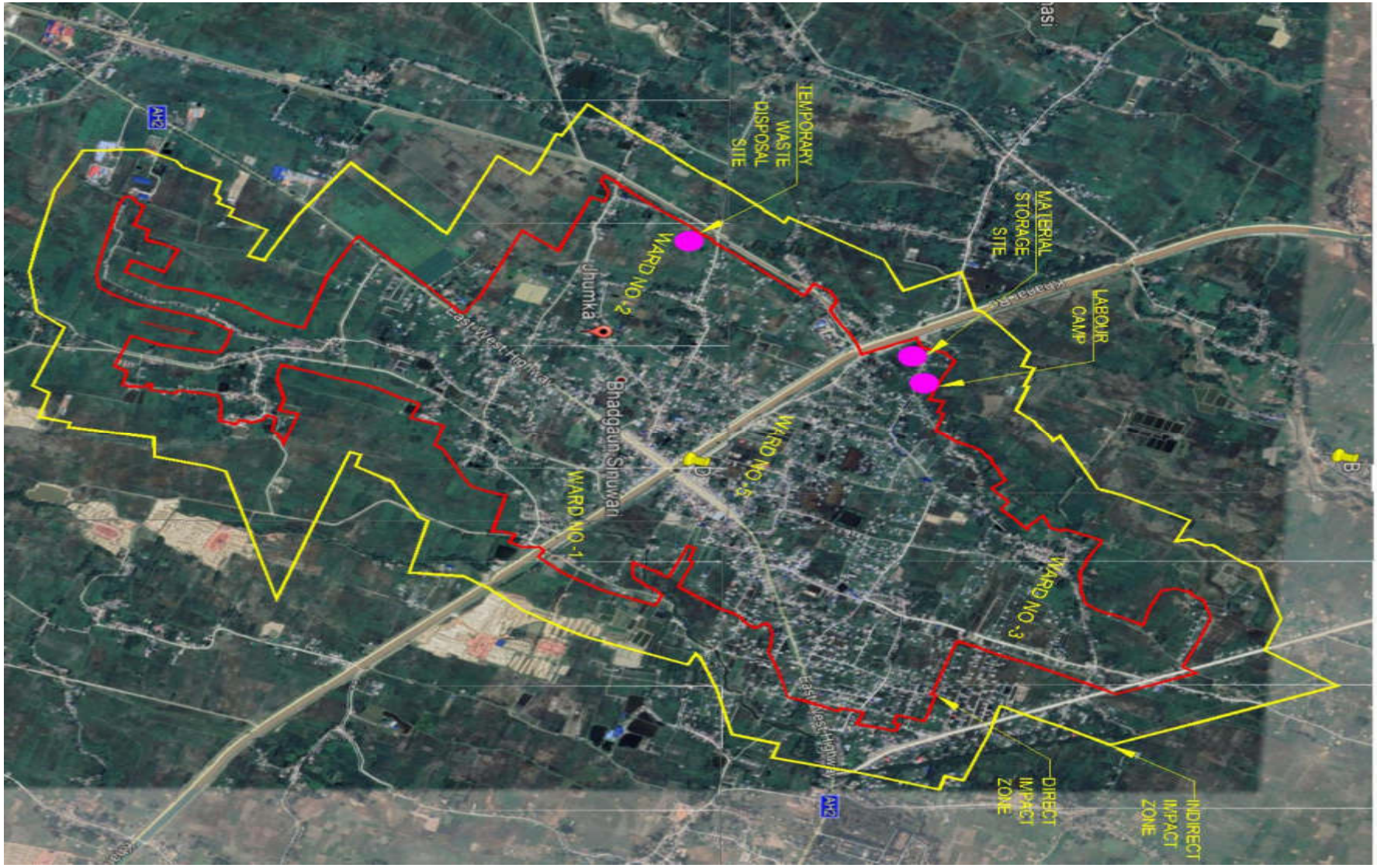


Figure IV-2: Proposed component & sites with Direct and indirect Zone

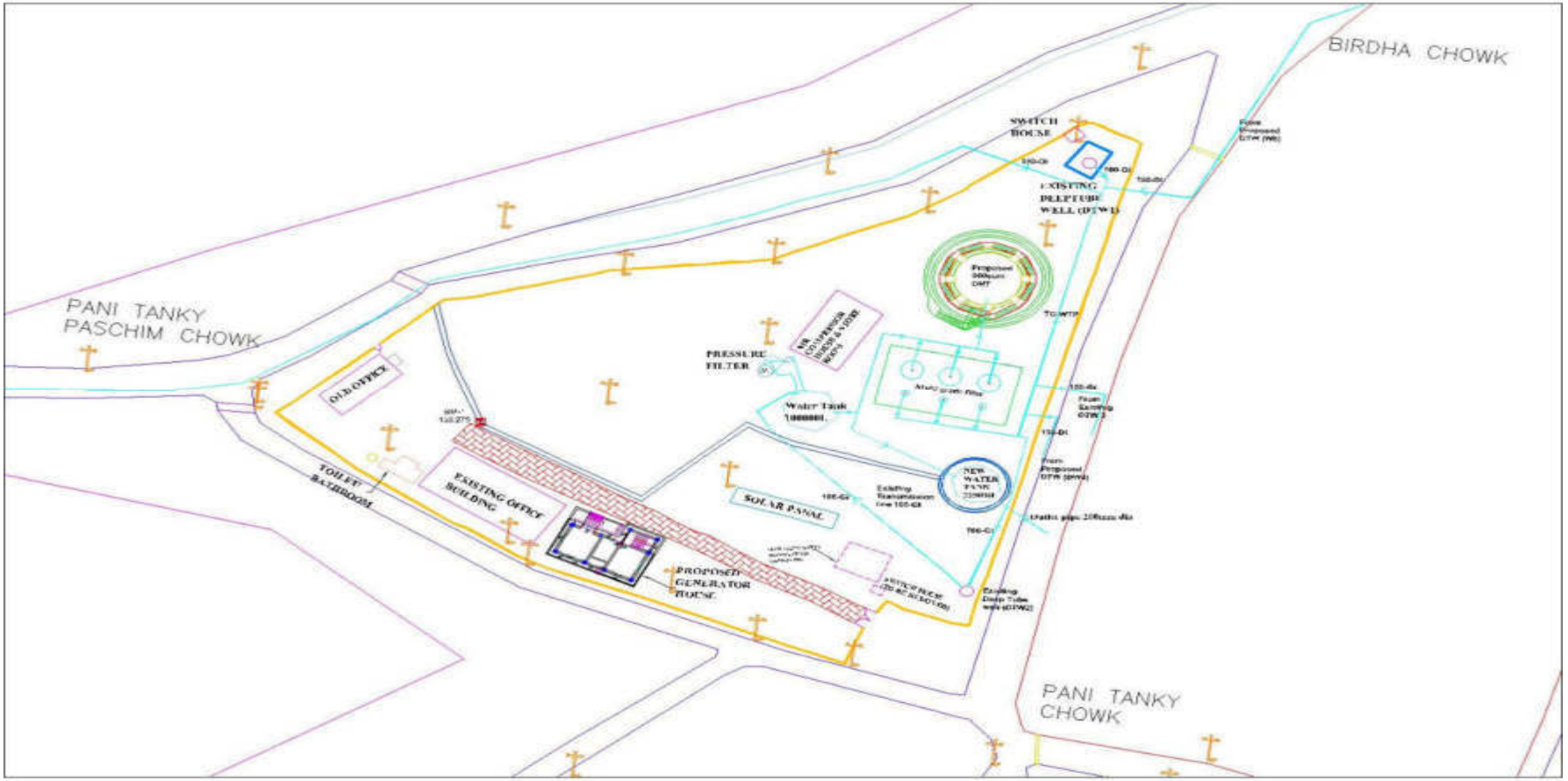


Figure IV-3: Schematic Digram of proposed component structure of the project

Figure IV-4: Topographical map showing proposed componnets of project

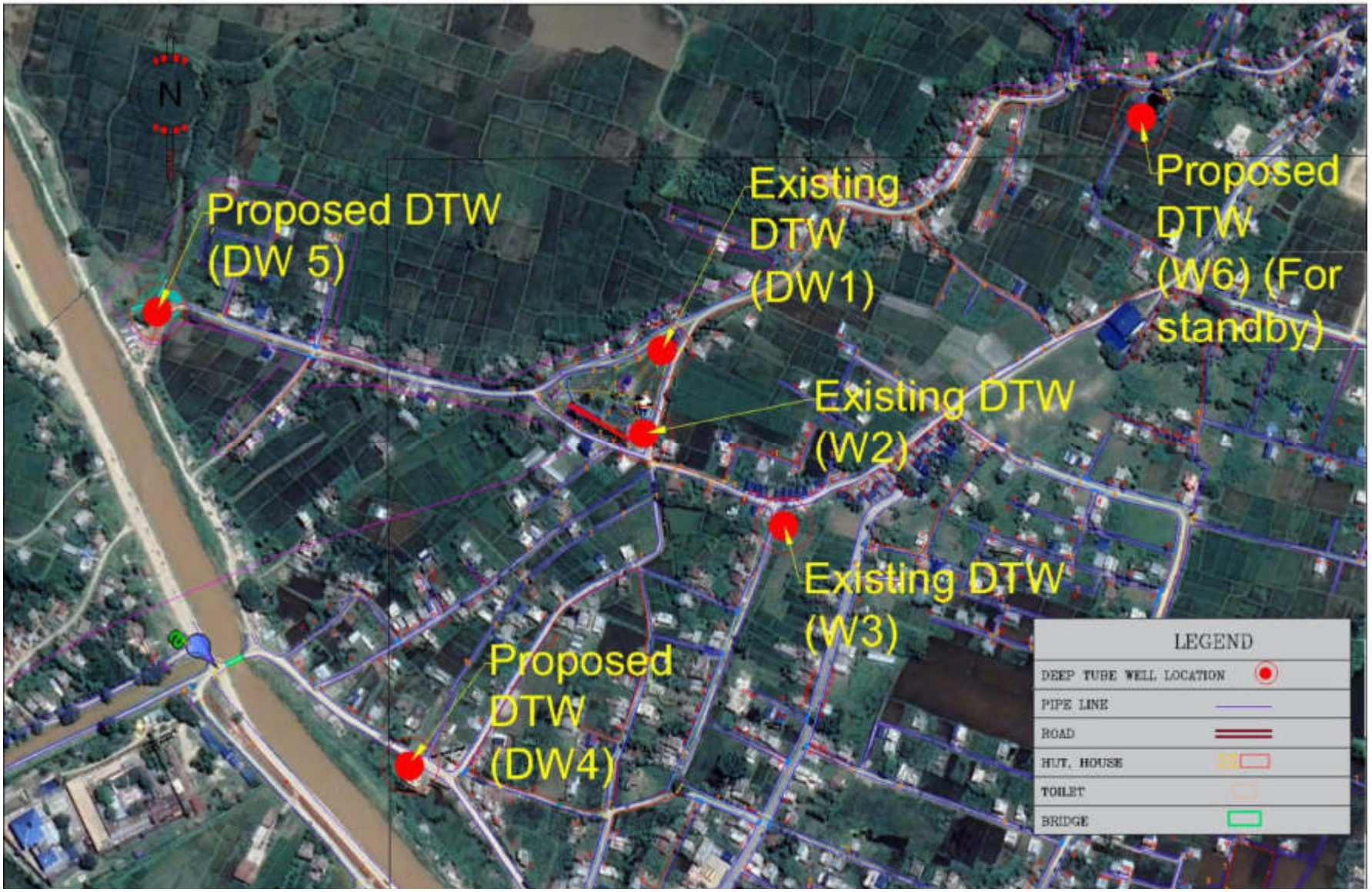


Figure IV-5: Topographical map showing proposed and existing deep tube well

5. Service Reservoirs

62 The total storage requirement for the system at the end of design period i.e. 2038 is calculated as 780 m3. The total storage requirement for the system at the end of design period i.e. 2043 is calculated as 13225m3. The provision of this quantity has been fulfilled by providing additional ground reservoirs. The reservoirs will be constructed of RCC and is designed as OHT the terrain suggests. The following table summarizes the requirement of reservoir tanks subsystem wise;

Table IV-4: Requirement of Reservoir

S.N		Reservoir sizes (m^3)	Remarks
1	Existing OHT,	110	Constructed in 1998, needs some repairs
2	Existing OHT	225	Constructed in 2019. Good condition
3	Proposed OHT	900	
4	Proposed Ground reservoir	100	To be constructed, mainly to precipitate irons
TOTAL		**1325**	

6. Distribution Network

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

64 The total distribution pipe length of the proposed system is about 202 km.

Table V-5: Distribution pipe network

S. No	Pipe type	Length of Pipes (m)
1	DI pipes	2139
2	PE pipes	200,643
TOTAL		**202,782**

7. House Connections

66 The system has been designed, predominantly as house to house connections. The system has been analyzed for a design capacity of providing sufficient water till the design period of 20 years. However, initially during construction phase, 4031 house connections are provided to satisfy the need for the base year population.

Table V-6: Details of House connection

S.N.	System	DMAs	House Connections	Design Connections	Quantity of Water Flow (lps)
1	Jhumka UWSSP	DMA -1 (Top DMA)	755	1861	12.95
2		DMA -2 (Bottom DMA)	1492	3537	18.8
3		DMA -3 (Left DMA)	716	1726	16.23
4		DMA -4 (Right DMA)	1068	2518	19.13
Total			**4031**	**9642**	**67.11**

8. Appurtenances

67 These will primarily comprise of valve chambers or connector boxes to house in flow control valves for controlling flow in the pipeline and to the community taps etc. Appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Altogether 460 valve chambers are expected in the system and are detailed below

Table V-7: Details of Appurtenances

Type 1	Type 2	Type3	Pipe valves	SCADA valves	Air valve Chambers	Wash out chambers
65	45	50	90	5	5	20

9. Electrical

68 11 KV line passes through near by the proposed deep tube wells. Power required for lighting facilities and other uses are also considered. Separate 11/0.4 KV- 50 KVA step down transformers are proposed to cater the need of the proposed project. A three -phase power line shall connect the control panel, which will distribute power to different power load points. Generator facility system is also included. Detailed Design of the electrical system will be done during detail engineering design phase. Following table summarizes the electrical equipment provided in the subsystems.

Table V-8: Subsystem wise transformers and Generator set

Pumping Station		Pumps HP	Standard Diesel Gen Set (KVA)	Standard Voltage Stabilizer (KVA)	Standard transformer (KVA)
Deep tubewells	3	25 HP	150	150	150

10. Office Building/ Laboratory Room

69 One office building already exists and is in good condition including guard house and other facilities. However, structure to accommodate the required facilities like laboratory room, counters, managers room and store room. The site is already been identified inside the WUSC office premises to develop such structures.

11. O&M Equipment and Tools

70 An assessment was done for the needed items. The UWSSP has also some guide lines on it. The list of tools required for the operation and maintenance has been listed in Quantity/ Cost Estimate Volume. Besides the following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out.

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

12. Sanitation Improvement

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

Public Toilet

72 Three public toilets are already in service within the project area. Male and female units are properly separated. However these are not disabled friendly. Thus it is proposed to modify the toilets by introducing disable friendly components viz, ramps, adjusting height of basin, urinals etc. Cost has been incorporated to accompany the same.

Individual Household Toilet Improvement

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

Design of low cost latrine for low income household.

74 There are a few types of latrines that may be adopted for low income household and range from borehole latrines to septic tank latrines. The type of latrines the people will construct depends largely on the financial capacity of the consumers. The other factors as culture, tradition of the people, ground condition, climate and availability of space also play a vital role. There are three distinct income groups in the project area. People with higher income tend to build better sanitation facilities with more contribution, people with medium income like to improve but with little contribution while low income people want to have latrines constructed but do not want to contribute.

13. Magnitude of Operation of the Project

75 The water supply system has been designed for a base year population of **21,633** for the year 2023. The system has been designed to tap ground water source from DTWs for a total design year population of **46,264** in 2043. Six numbers of overhead water reservoir tanks, including 3 existing, have been proposed at different locations considering in mind the elevation difference of the service area. The total capacity of these reservoirs totals to 1225Cum storage capacity of reservoirs as proposed for the storage and distribution of water.

D. Proposed Schedule for Implementation

76 This tentative schedule has been prepared for the feasibility study, for detail study and design and for the construction phase till the handover of the sub-project to WUSC. A total of 12 months for the planning phase and 24 months for the construction phase have been considered. The tentative dates for the major tasks have been earmarked as follows:

Tasks	**Tentative Date**
Feasibility Study Report -	1st week of March 2021.
Workshop presentation (WUSC / PMO/TDF) and appraised by WUSC	-
Collection of Upfront cash	-
Detailed Engineering Design & PMO, WUSC Approval	2nd week of April 2021.
IFB notification	2nd Week of May 2021
Contract on Construction	2nd Week of Aug 2021
Construction completion	2nd Week of Aug 2023

E. Project Requirements

1. Materials required for the project

77 The required materials have been divided into two categories; (1) Local materials and locally manufactured products, and (2) Imported manufacture products. The materials as aggregates, sand, stone, timber, bricks are considered to be local materials and locally manufactured products are considered as GI pipes and fittings, HDPE (PE) Pipes and fittings, cement and reinforcement bars. The materials as DI pipes and fittings, water meters, electrical equipment including generators, mechanical equipment, and all kinds of valves are considered as imported manufactured product.

2. Human Resources

78 The proposed Jhumka Urban Water Supply and Sanitation Project entails both skilled and unskilled laborers for its construction and operation in the proposed site. Around 15200 man-days of unskilled laborers and around 7300 man-days of skilled labours is estimated to be required on the basis of rate analysis. As far as possible they will be hired from the local market and its adjoining area. Priority will be given to local women and family members of the local poor and marginal families. Child labour will be strictly prohibited in the project.

3. Land required for the project components

79 Different public land parcels are identified for the project components. This has been assessed in coordination with the WUSC and has been consulted with the municipality office. About 2689.55 square meters land is required (including existing structures) at four different locations for construction of project structures such as OHT, GRVTs, and Treatment Units, Guard house, Generator house, Compressor house and boring.

80 The consent letters, letters of land use rights, the certificates of WUSC registration, and commitment letter of WUSC have all been incorporated in Annex 10 of this report. Detail of the land required for different component of existing and proposed structures is presented in the table given below.

TABLE IV-4: DETAIL OF LAND REQUIREMENT FOR PROPOSED AND EXISTING WATER SUPPLY COMPONENT

SN	Component/ Sources	Location	Capacity /Dimension	Status	Land ownership	Minimum Land required(Biga/Kattha/dhur)/sq.m	Land Available (Biga/Kattha/dhur)/sq.m	Involuntary resettlement and Indigenous Peoples Impact	Documents Details
1	Overhead Tank,	Ramdhuni Municipality ward no 3	OHT: 900 cum	Proposed	Government	0-4-0-0 (1352 sq. m)	0-16-11- (5594.23 sq. m)	Municipality /Government land. Existing WUSC premises/compound. Vacant barren land. No objection letter received from Municipality. No non-title users and squatters. No involuntary resettlement and indigenous people's impacts impacts anticipated.	Consent letter received from Ramdhuni Municipality **Annex-1a**
2	Overhead Tank,		OHT 225 cum OHT 100 cum	Existing	Government				
3	Office building guard house Generator house	Ramdhuni Municipality ward no 3		Existing	Government	1 Katha (338.89 sq m)	0-16-11- (5594.23 sq. m)		
4	Treatment units	Ramdhuni Municipality ward no 3		one existing two Proposed	Government	15 Dhur(253.95 sq m)	0-16-11- (5594.23 sq. m)		
5	Deep boring no 1	Ramdhuni Municipality ward no 3	250 x 200 mm	Proposed	Government	8 Dhur(135.44 sq m)	12 Dhur(1203 sqm)	Municipality /Government land. Vacant barren land No objection letter received from Municipality.	
6	Deep boring no 2	Ramdhuni Municipality ward no 5	250 x 200 mm	Proposed	Government	8 Dhur(135.44 sq m)	12 Dhur(1203 sqm)	Municipality /Government land. Vacant barren land No objection letter received from Municipality.	
7	Deep boring no 3	Ramdhuni Municipality ward no 3	250 x 200 mm	Proposed	Government	8 Dhur(135.44 sq m)	12 Dhur(1203 sqm)	Municipality /Government land. Vacant barren land No objection letter received from Municipality.	
8	Deep boring no 4	Ramdhuni Municipality W.N-3 adjacent WUSC office	200 x 200 mm	Existing	Government	8 Dhur(135.44 sq m)	15 Dhur(1203 sqm)	Municipality /Government land. Vacant barren land No objection letter received from Municipality.	

SN	Component/ Sources	Location	Capacity /Dimension	Status	Land ownership	Minimum Land required(Biga/Kattha/dhur)/sq.m	Land Available (Biga/Kattha/dhur)/sq.m	Involuntary resettlement and Indigenous Peoples Impact	Documents Details
9	Deep boring no 5 and 6	Ramdhuni Municipality W.N-3 WUSC office Premises	200 x 200 mm	Existing	Government		0-16-11- (5594.23 sq. m)	Municipality /Government land.. Vacant barren land No objection letter received from Municipality.	
9	Transmission Main	Public Road Trail			Public road			Temporary	
10	Distribution line				Public road			Temporary	

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Topography and Geology

81 The municipality lies between 26.36° Latitude and 87.12° Longitude. Altitude ranges from 100m to 110 m above mean sea level and lies in the plain Terai region. The project area has been characterized as fertile cultivated flat land. The northern part of the municipality area is slightly slopy than the other east, west and southern part of the Ramdhuni municipality. Flat ground profile is seen in all part of the project area. The area lies in the north eastern part of the Koshi basin comprising of very fine-grained sediments such as variegated mudstone, siltstone and shale with smaller amounts of fine-grained sandstone. This project area is characterized by coarse sandy cobble material and clayey loamy soil with sandy soil. No rock formation is observed nor expected on shallow depth.

2. Climate and Precipitation

82 The climate of the Ramdhuni municipality area is lower tropical temperate and is humid type of climate with dry in winter and warm in summer. There are several rain gauge stations and climatological station in Saptari district. The nearest climatological station no 1212 at Phattepur, 1223 at Rajbiraj and rainfall station 1226 at Barmajhiya are situated in Saptari district. The required data from this station is used for the project. The maximum temperature varies from 32^0-38^0 C in summer and 4^0 to 18^0 C in the winter.

83 The average annual rainfall is 1100 mm, which is slightly less than 1400 mm, the average precipitation of Nepal. The driest month is December, with 2 mm of rain. The rainy season starts from June and ends in September when the monsoon blows across the Bay of Bengal and delivers about 80 % of the annual rainfall. The most precipitation falls in August.

3. Hydrogeology

84 Chatara Canal (Sunsari Morang Irrigation Project) originates all the way from Koshi River and flows through the cenre of the town from north to south. Sunsari River flows alongside the Ramdhuni Temple area. The northern side is bounded by the stream, while the western part is surrounded by a koshi river. Municipality is covered with number of lakes and ponds covering 1.01 % of total land. The major lakes are; Bhadgaon Pokhari, Dangrahi Pokhari, Rani Pokhari, Prem Taal, Ra sa Taal, Shankarbeli Simshar, Judi Simshar, Shiva Sarobar in different wards of the municipality. The area is also famousd with Shankarbeli Simshar located in ward no 6 of Ramdhuni Municipality. Particular to the project area Bhadgaon Pokhari lies in ward no -1 and Dangrahi Pokhari lies in ward no 5 of the town project. However, Ground water is the main & reliable source of the project area. These rivers play vital role in the groundwater recharge.

B. Biological Environment

4. Flora in the Project Area

85 As the proposed town project has covered flat terai region, scattered tropical forest is present. Sal/Sakhuwa (*Shorea robusta) and Sisau (Dalbergia sissoo) and Mango (Mangifera indica)* area common and dominat species in the town project area. It is been said that mangoes from these mango trees give the smell and taste of Sakhuwa in the area. There are altogether 10 community forests covering 2021 hectors (9.91%) of land. *Ten hectares area of forest under Ramdhuni Temple is proposed for zoo.* Shankarbeli Simshar is located in ward no 6 of Ramdhuni Municipalityfameous for beautiful flowers called "Sirish" and added beautiful scenes around the Simshar area. Other Vegetation species are; Sisau (*Dalbergia sissoo),* Bamboo *(Bambusa vulgaris),* Bastard Teak *(Butea monosperma,)* Coconut *(Cocos nucifera L),* Simal *(Bombax ceiba L.),* Masala (*Eucylaptus),* Khayar *(Senegalia catechu),* Jamun *(Syzygium cumini)*, Teak *(Tectona grandis L.),* Karamkanda *(Oroxylum indicum (L.))*, Kamal *(Nelumbo nucifera),* Pipal (*Ficus religiosa*), Banyan (*Ficus benghalensis*), Amala (*Phyllanthus Emblica*) and Amba (*Psidium guajava*). The fodder requirement is met mainly by Khasru

(Q*uercus semecarpifolia*) and Arkhaulo (*Quercus spicata*). Some of the shrubs and ground vegetation found in this area are Titepati (*Artemisia vularis*), Siru (*Imperata cylindrica*), and Ukhu *(Saccharum sp.)* However, there are no any vegetation covered in the particular area where the structures are located.

5. NTFPs in the Project Area

86 The main NTFP species found in the subproject area are harro (*Termnalia chebula*), barro (*Terminalia bellirica*), amala (*Emblica officinalis*), kurilo (*Asparagus racemosus*), Titepate (*Artemisia Indica*) and Sarpagandha *(Rauwolfia serpentine)* are among the NTFPs found in the sub- project area.

6. Fauna in the Project Area

87 **Mammals:** Based on the Interaction with the local community and IBAT assessment report, the biodiversity nearby the project area is characterized by presence of many species of mammals and birds which are also observed in the project area. White Tailed Deer (*Odocoileus virginiana*), Common Leopard (*Panthera pardus),* Monkey (*Macaca mulatta)*, Golden Jackal (*Canis aureus),* Asian Elephant (*Elephas maximus),* Common Rat (*Rattus rattus)*, bats (*Cynopterus sphinx*) are among the commonly found mammals in and near the sub-project area. About ten hectares area of forest under Ramdhuni Temple is proposed for zoo as the area is famous for wild deer (*Odocoileus virginiana*) and have large population of monkey (*Macacca mulatta)*. The list of major mammals found in the proposed town project is also tabulate as below;

86. Table V-1: Mammals in the Project Area

S. N.	Scientific Name	English Name	Local Name
1	*Odocoileus virginiana*	White Tailed Deer	Mriga
2	*Elephas maximus*	Asian Elephant	Hatti
3	*Canis aureus*	Golden Jackal	Syaal
4	*Axis porcinus*	Hog Deer	Laguna/Pade
5	*Panthera pardus*	Common Leopard	Chituwa
6	*Rattus rattus*	Common Rat	Musa
7	*Herpestes auropunctatus*	Mongoose	Nyauri Musa
8	*Macacca mulatta*	Monkey	Badar
9	*Lutrogale perspicillata*	Smooth – coated Otter	Pani Biralo
10	*Funambulus pennantiii*	Northern Palm Squirrel	Paanch Dharke Lokharke
11	*Sus scrofa*	Wild Boar	Bandel

88 **Avifauna:** Major bird's habitat nearby proposed town project is koshi tapu wild life reserves and is one of the 27 IBA (Important Bird and Biodiversity Area) in Nepal. During winter many winter migratory birds from China, Mongolia, and Siberia can be seen around the reserve. The common birds found in and around the town project area is listed in below table;

87. Table V-2: List of Birds in the Project Area

S.N.	English Name	Local Name	Scientific Name
1	spotted dove	Kurle Dhukur	*Streptopelia chinensis*
2	Abbotts's Babbler	Motothude Bhyakur	*Malacocincla abbotti*
3	Red-vented bulbul	Jureli	*Pycnonotus cafer*
4	Bengal Floricans	Kharamjur	*Houbaropsis bengalens*
5	Black Headed Cuckooshrike	Kalo Tauke Birahi Chari	*Coracina melanoptera*
6	Common Golden-Eye	Swarna Nayan Haans	*Bucephala clangula*
7	Crow	Kaag	*Corvus splendus*
8	Cuckoo	Koili	*Cucuclus micropterus*
9	Dove	Dhukur	*Streptopelia*
10	Dusky Eagleowl	Bhasoluk	*Bubo coromandus*
11	Gull-billed Tern	Gangachilthude Phyalphyale	*Sterna nilotica*

S.N.	English Name	Local Name	Scientific Name
12	Indian Nightjar	Chukchuke Chaite Chara	*Caprimulgus asiaticus*
13	Large Adjutant Stork	Garud	*Leptoptilus dubius*
14	Pallas's Fish Eagle	Boksi Chil	*Haliaeetus leucoryphus*
15	Pigeon	Parewa	*Columba livia*
16	Rufous-vented grass babbler	Kailokanthe Dikurebhyakur	*Laticilla burnesii*
17	Sparrow	Bhangera	*Passer domesticus*
18	Striated Grassbird	Narkat Ghansechari	*Megalurus palustris*
19	Swamp Francolin	Simatitra	*Francolinus gularis*
20	Water Cock	Thulo Jhilli	*Gallicrex cinerea*
21	White Tailed Stonechat	Kase Jhyaapsi	*Saxicola leucurus*
22	Jungle crow	Ban Kag	*Corvus macrorhynchos,*
23	House sparrow	Bhangera	*Passer domesticus*
24	Black Drongo	Kalo hibe	*Dicrurus macrocercus*

Source: IEE Field Study, 2020/2021

89 IBAT tool was applied to check the occurrence of ecologically sensitive species as a source of reference. Since the subproject is of small scale and its Indirect Impact Zone (IIZ) is only 200m, only the species suggested under 1 km periphery of the core project coordinate have been considered (Annex 4). The locals were consulted on the occurrence of these species. There is no rear, endangered or protected plant species in the project area. Common species of mammals, birds and other herpeto-fauna were recorded in the particular project area. No wild animal hunting takes place in the project area.

90 **Herpito-Fauna:** Commonly found Herpito-fauna (reptiles & amphibians) reported in the project area are listed as below table;

Table V-3: List of Herpito-Fauna Found in the Project Area

S.N.	Scientific Name	English Name	Local Name
1	*Rana cyanophylectis*	Stream Frog	Bhyaguto
2	*Atretium Schistosum*	Olive Keelback Water Snake	Pani Sarpa
3	*T. albolabris*	Green Pit Viper	Hariyo Sarpa
4	*Sphaerotheca swani*	Frog	Bhyaguto
5	*Calotes versicular*	Garden lizard	Chheparo
6	*Hemidactylus Flaviviridis*	House Lizard	Mausuli
7	*Ptyas mucosus*	Rat snake	Dhaman
8	*Varanus Bengalensis*	Common Indian Monitor	Bhainse Gohoro

Source: IEE Field Study, 2020/2021

91 **Aquatic Life:** The most common fishes found nearby the project area; Koshi, sunsari river and different streams and lakes are listed below table;

Table V-4: List of Fishes Found in the Project Area

S.N.	Scientific Name	English Name	Local Name
1	*Neolissocheilus hexagonolepis*	Katli	Katle
2	*Glyptothorax* Indicus	Catfish	Mungri/Kavre
3	*Heteropneustes fossilis*	Stinging Catfish	Singhi
4	*Garra* Annandalei	Stone Roller	Chuche Buduna
5	*Mastacembelus Armatus*	Spiny Eel	Bam
6	*Channa Gachua*	Dwarf Sankehead	Hile
7	*Schizothorax Progastus*	Dinnawah Snowtrout	Chuhhe Asala
8	*Psilorhynchus Pseudecheneis*	Stone Carp	Tite

Source: IEE Field Study, 2020/2021

7. Protected Area

92 Review of reports, IBAT result and field visits observation reported that the proposed town project area is not located in ecologically sensitive area, and there are no protected areas within or in close proximity of the sub-project area. Koshi Tapu Wild life reserve is around 10-50 kms far from the sub-project area.

C. Socio economic and Cultural Environment

1. Demography

93 The number of households to be served in the project area is 4,031 with 19,303 permanent populations.This covers 1253 HHs of ward number 1 (with major settlements like Naya Baidar, Purwa Saraswati, Mohanpur, Sainimaini, Naya Bhadgau, Purano Bhadgau, Ekata , Shiv Chok, Sinuwari, Pragati, Badgau, Bhasi etc), 72 households from ward no 2, 764 households from ward no 3 (with major settlements Pariyarpur, Sabhyata, Pipara, Musahari, Shiva, Kadam, Magar Tole, Daraocha, Singada, Shivalaya, Saketa) and 1,924 HHs of ward number 5(Barban,shanty, Indreni, Hasanpur, Saraswati, Sangam, Manakamana, Banigaon, Redcross, Buddha tole, Sirjanshil, Pipara, Kadam, Laligurans, Dakin Rhan, Siddhartha, Shiv Chok, Parijat, Jhumka, Pariyarpur, Bhamari Chok, Ganesh Tole, Janadhyan, Bhanu nagar, Ekata, Narayan tole etc)) of Ramdhuni Municipality. The target HHs & population are presented in table below;

Table V-5: **Service Area, HH and population (Survey year, 2020)**

S.N.	Ward numbers	HH No	Population		
			Permanent	Rental	Total
1	1 (partial)	1,253	6366	448	6,814
2	2 (partial)	72	489	0	489
3	3 (partial)	764	2583	110	2,693
4	5 (complete)	1,942	9865	476	10,341
TOTAL		**4,031**	**19,303**	**1034**	**20,337**

Source: Socio-economic Survey, 2020

94 There are total 4,031 households in the service area of Ramdhuni municipality with an average household size of 4.79. Among the total permanent population (19303) in the service area, 9737 are male and 9566 are female. Male population is slightly higher (50.44%) than the female population (49.56%). Ward wise population composition by gender is also illustrated in table below;

Table V-6: Male/female population and Average HH size (Survey year 2020)

Ward No.	Total No. of HHs	Population			Male Female ratio	Average HH size
		Male	Female	Total		
1	1253	3157	3209	6366	0.496	5.08
2	72	254	235	489	0.519	6.79
3	764	1332	1251	2583	0.516	3.38
5	1942	4994	4871	9865	0.506	5.08
	4,031	**9,737**	**9,566**	**19,303**	**0.504**	**4.79**
TOTAL		**50.44%**	**49.56%**	**100%**	**0.504**	

Source: Field Survey PEA-BN JV, Sept 2020

2. Caste / Ethnicity

95 The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. A high of 46 % of population are found to be Madhesi/ Janajati followed by 42.30 % in Brahmin/ Chhetri. Household and Population of Dalit community are 11.5%. The distribution of population by caste and ethnic group for each ward is outlined in Table V-7 below.

Table V-7: Caste / Ethnicity

Ethnicity	Ramdhuni Municipality Ward No				Total	Percent
	1	2	3	5		
Bharmin/Chettri	237	0	276	1192	1705	42.30
Madhesi /Janjati	731	72	401	652	1856	46.00
Dalit	285	0	87	90	462	11.50
Other	0	0	0	8	8	0.20
Total	**1253**	**72**	**764**	**1942**	**4031**	**100.0**

Source: Field Survey, PEA-BNJv 2020

3. Occupation

96 Although, the economy of the area is gradually shifting from rural agricultural economy to business and service based, majority of the households are still dependent on agriculture. As the Figure-2.3 shows, a high of 34.16 percent of the head of households have agriculture as occupation. As in the other parts of Nepal remittance has been playing important role in local economy of the service area, which is the main source of income of11.68 percent households. Business is another main occupation of 11.46 percent head of households, followed by service (9.03 %). Wages labours are also present significantly containing 15.26 %. A small group 5.31% falls under the industry category. The Ward wise households by occupation are presented in Table V-8.

Table V-8 : Distribution of Occupation of Households Main

S.N.	Occupation	Ward No				Total	Percent
		1	2	3	5		
1	Agriculture	353	3	468	553	1377	34.16
2	Business	183	41	44	194	462	11.46
3	Services	102	3	60	199	364	9.03
4	Industry	13	3	46	152	214	5.31
5	Foreign Employment	150	3	70	248	471	11.68
6	Wages	386	4	33	192	615	15.26
7	Others	53	5	34	349	441	10.94
8	Do Nothing	5	10	3	8	26	0.65
9	No Answer	8	0	6	47	61	1.51
Total		**1,253**	**72**	**764**	**1,942**	**4,031**	**100**

Source: Field Survey, PEA-BN Jv Sept 2020

4. Household's Monthly Income Level

97 Economic condition of the families in service area seems satisfactory in terms of their monthly income level. The distribution of households by income range is shown in Table-2.6, which indicates that more than 51.7% of the household surveyed falls in the income slot i.e between Rs 20,001 – 50,000.00 per month followed by 37.0 % in the slot of Rs 13,500.00-20,000.00. Monthly income having less than Rs 13,500.00 is found only 6.9%.

88. Table V-9: Monthly Average Income Range

S.N.	Income Range (NRs.)	Ward No.				Total	Percent (%)
		1	2	3	5		
1	<13,500	67	6	98	108	**279**	**6.9**
2	13,500 - 20,000	469		247	774	**1490**	**37.0**
3	20,001- 50,000	675	27	376	1008	**2086**	**51.7**
4	>50,000	42	39	43	52	**176**	**4.4**
Total		**1253**	**72**	**764**	**1942**	**4031**	**100**

Source: Field Survey, PEA-BNJv Sept 2020

5. Existing Sources of water

98 Besides the public and private tap, spring / Kuwa, Tube-well and river / pond are the other sources of water. The finding of socio-economic census survey 2020 is presented in Table-3.2. Of the total surveyed households, hand pump remained the prime source of water supply. It contributes some 73.75 % of the total water demand in either of the rainy and dry seasons. The second largest source is the private tap that contributes 20.14% of the total water demand. Similarly, 4.5% of the population still rely upon Canal. People still are found to rely on dug well though it contributed 0.9%. The details of other relevant statistics by wards are depicted in Table below.

Table V-10: **Major Sources of Water in the project area**

S.N.	Water Source	Ward No				Total	Percent
		1	2	3	5		
1	Dug well/ Kuwa	0	0	23	12	**35**	0.87%
2	Public hand pump	7	0	17	4	**28**	0.69%
3	Private Tap	235	0	44	533	**812**	20.14%
4	Private Hand Pump	1001	4	575	1393	**2973**	73.75%
5	Mul/River/Canal	10	68	105	0	**183**	4.54%
Total		**1253**	**72**	**764**	**1942**	**4031**	**100.00%**

Source: Field Survey, PEA-BN JV 2020

6. Existing Sanitation Condition

99 The municipality had been declared as Open Defecation Free (ODF) in 14 Jestha 2070 BS. In general the overall sanitation condition of the project area was observed satisfactory. Few solid waste collection bins can be observed in bazaar area. There are altogether 12 human resources consisting of 2 drivers and 10 sweepers have been working on daily basis. Municipality has one tripper and 1 tractor with trolley for collection and disposal of solid waste. The collected waste are disposed of in the bank of Sewti Khola (ward no 3). No any charge from public is taken to collect the waste by municipality. Storm water drainage exists in core market area on both side of the road. However, sewerage system has not been developed so far.

100 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 sludge from the septic tank used to be periodically (5-7 year) withdrawn by using septic tank cleaner (using pumps and tanker) provided by private party and disposed of within in the bank of Seuti River. NRs 6,000.00 per trip is charged to clean the tank. The access of household to toilet facility is presented in Table- below, which reveals that about 98.4 percent (3965 out of 4031) of the households have household toilet.

Table V-11: Access to household latrine

Toilet	Ward No.				Total	Percent
	1	2	3	5		
Yes	1237	65	760	1903	3965	98.4
No	16	7	4	39	66	1.6
Total	**1253**	**72**	**764**	**1942**	**4031**	**100.0**

101 The table below depicts 98.4 % of the households possess toilets. Out of them water seal type of toilet is quite popular in the project area which shares 66.6 %. 25.3 % of the households uses ventilated toilet. Pit latrine which are quite popular in rural areas are also found in the out skirts of the bazaar. 5.0 % of the household have pit latrine. Only 1.4 percent of households use toilet with cistern flushed type refer table below for details. It is to be noted 1.6% still do

not have latrines in their house.

Table-V-12: Type of Household Latrine

S.N.	Toilet Type	Ward No.				Total	Percent
		1	2	3	5		
1	Not Answer	16	7	4	39	66	1.6
2	Pit Latrine	68	11	81	43	203	5.0
3	Ventilated Pit	655	51	151	163	1020	25.3
4	Water Seal	511	3	511	1660	2685	66.6
5	Cistern Flush	3	0	17	37	57	1.4
Total		**1253**	**72**	**764**	**1942**	**4031**	**100.0**

102 Ramdhuni Municipality has 4 public toilets. 3 numbers are located within the project area and 1 at ward no 8 (Dumraha). The three toilets located within the project area; one each at Bazaar area, Ward no. 1, Gudri Line ,Ward no-1, Hitaya Line Ward no.-1. Of them one public toilet was constructed by Jhumka Bazaar Development Committee and other three public toilets were built by municipality. Municipality is operating these public toilets and revenues are collected from service users.

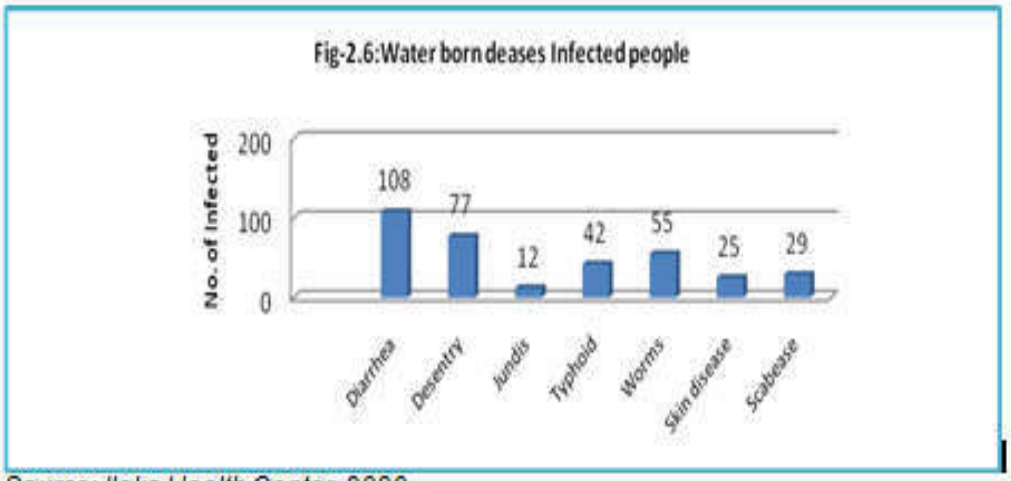
7. Existing Health Situation

103 There is one Health Center located at Jhumka Bazaar (Ilaka Health Post). The Health post has seven beds but the center is even not able to provide basic health care facilities. Most of the people visit Dharan, Biratnagar and even Silguri of India for general health treatment. Total 7 numbers of medical shops are available in this area. Most of people were found aware in health and hygiene. People are aware about hand washing before touching and eating food, and after defecation etc.

8. Waterborne diseases in the project area

104 Available data from Ilaka Health Post shows that water borne disease are occurred in the project area. Waterborne diseases can have a significant impact on the local economy. People who are infected by a waterborne disease are usually confronted with financial burden. This is especially the case in poor households. Total 348 numbers of water born/related diseases infected persons were found treated by the Health Post last year. Out of the total incidents, 108 incidents were diarrheas, 77 and 55 persons were suffered from dysentery and worms respectively. Skin related diseases are also reported in the project area.

105 The health post has recorded water born / related disease data in last year 2076/77 as illustrated in the figure following.



Source: Ilaka Health Center, 2020

9. Willingness to Pay

106 The people of this community seem to be aware that they have to pay some fee for consuming drinking water and not use free water. Data shows that 100 percent of households are willing to pay tariffs. According to the study, 97.2 % of households are interested to pay for connection of private tap in service area and are willing to contribute 5% upfront cash.

107 The survey revealed that community has shown positive response toward the willingness to pay monthly water tariff. As per the findings,13% household prefer to pay monthly water tariff less than Rs 200 whereas about 37% of households prefer to pay in the tariff range from Rs. 300-400. Similarly, 36% of household are willing to pay between NRs. 400-500 per month.

10. Affordability

108 The study has assessed affordability of community in term of monthly income level for expense on water supply and sanitation service. According to the survey, about 6.9% of household fall below poverty level as per the implementation guidelines (Income <13,500 per month). Hence, assessing the income level of households, 93.1 % of household can afford monthly water tariff and contribution of upfront cash. Hence, affordability of the community has been observed as encouraging and positive towards the program.

D. Major Environmental Problems of Project Areas

109 During the IEE study, the study team has observed the following major environmental problems prevalent to the proposed Jhumka urban water supply and sanitation project;

11. Air quality Level

110 Air pollution in the proposed project area is due to fugitive dust from vehicle movements, particularly over unpaved roads and other unpaved grounds, construction activities, and wind action on unpaved exposed surfaces and is normal without major pollution condition. Gas emissions generally comes from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered/spread apart, both in terms of locations and timing. Though there is a lack of secondary information on air quality for the project area, the ambient air quality is expected to be within the National Ambient Air Quality Standards of Nepal as there are no such big industries and the traffic volume.

12. Acoustic Environment

111 As the proposed town project is located in semi urban area of the municipality, the major sources of noise are; construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market places and where the impact is limited to local. Noise levels in the project area are expected to be within permissible standards as prescribed by the Ministry of Environment of the GoN.

13. Water Quality

112 Water quality of the operating deep boring proposed and located in the subproject site was not found to be comply with the NDWQS. Threshold values for Iron, Manganese and lead was beyond the tolerate limit and therefore treatment plant has been installed to purify the water from operating boring. The detail water quality test report of operating boring is presented in annex- 8. Besides, the quality of water in the other tube well and proposed boring may not show exactly the same results as the operating boring well. It is thus advisable to treat the water in order to prevent adverse effect in the public health.

14. Solid Waste Management

113 There is not any systematic Solid waste management practices in the municipality in coordination with local private service providers. Waste of the city area being collected in irregular basis and do not have any proper land fill site for its safe disposal. However some of the private sects are being started to collect the waste in their own initiation. CBOs including

toll Sudhar Samiti are conducting awareness and capacity building in solid waste management in community level. There is a need of systematic approach for solid waste management with collaboration of private sectors in the municipality

15. Wastewater Management

114 There is no sewerage system in the project area. Wastewater from individual households is managed inside their premises. The socio economic survey conducted in 2020 shows that almost all households have their own toilet and septic tank and therefore no any wastewater treatment plant is being operated in the project area. However, the survey shows that 90.6% of the sampled HHs showed an interest in improving the septage management system and are interested to pay for it.

16. Sanitation Services

115 Some of the households have semi-permanent household toilets. The proportion of households with water-sealed latrines is only 66.6 %. Hence containment improvement is one of the areas of need in the sanitation sector of the project area. Awareness campaigns have been successful in the past, and hence this needs to be continued in spirit of Total Sanitation Campaign in coordination with public health and WASH stakeholders.

17. Heritage Sites and Physical Cultural Resources

116 Ramdhuni municipality is rich in physical cultural resources. The municipality is itself called the city of temple and lake and where the name of the municipality is kept in the name of Ramdhuni temple located in ward no-4 of the municipality. There are altogether 12 major temples and 8 lakes in the area. In particular to the sub project location that is partial area of 1, 2, 3 and whole area of 5, there is two lakes namely Dangrahi and Bhadgaun in ward no 5 and 1 of the Ramdhuni municipality and however the resources will not be impacted at all. Detail of the resources is presented in below table;

Table V-13: Heritage Sites and Physical Cultural Resources

S.N.	Name of the PCR	Location
1	Ramdhuni forest and Temple Temple and Park Ramnawami-	*Ward no-4*
2	Harihareshwor Shivalaya Temple –Shivaratri special mela	Ward no-4
3	Durga Temple, Nawaratri special mela	Ward no-4
4	Bhairaveswor Shiva Temple, Bala Chaturdashi mela	Ward no-4
5	Ramjanaki Temple, Various Occasions	Ward no-4
6	Jhumkeshwor Temple, Various Occasions	Ward no-4
7	Darwar Temple	Ward no-4
8	Langot Temple	Ward no-4
9	Radha Krishna Temple	Ward no-4
10	Hanuman Temple	Ward no-4
11	Gramthan Temple	Ward no-4
12	Dinabhadri Temple	Ward no-4
13	Bhadgaon Pokhari	Ward no-1
14	Dangrahi Pokhari	Ward no-5
15	Rani Pokhari	Ward no-7
16	Prem Taal	Ward no-7
17	Ra sa Taal	Ward no-6
18	Shankarbeli Simshar	Ward no-6
19	Judi Simshar	Ward no-6
20	Shiva Sarobar	Ward no-6

E. Climate change and Adaptation

18. General Concept

117 As the climate change is a global issue and significance changes in global temperature, precipitation, wind patterns and other measures of climate that occur one several decades or longer has also been observed in Sunsari district. Jhumka, as a part of Ramdhuni Municipality of the Sunsari district has been facing the effects of climate change. Hence, in the design issues like ground water availability and its quality for drinking purpose, droughts, flooding, ground water recharge and water leakage minimization are given prime importance. Mainly, four seasons namely winter, pre- monsoon, monsoon and post monsoon are noted in the project area. The project area lies in flat terai physiographic reasons of Nepal.

19. Temperature Change

118 The temperature change tendency in the project area is significant as in other parts of the valley. The annual maximum temperature trend is not available of the area however, it is reported that monsoon season has the significantly highest positive trend pre monsoon has the lowest trend. Eastern districts including Sunsari show increasing winter maximum temperature trend, and have significant positive trend at 95% or higher CL.

20. Precipitation Change

119 The rainfall is the part of hydrological cycle and is influenced by temperature variations in the project area. The precipitation trend shows decreasing in all seasons with the highest increasing of 2.21 mm/yr., indicating significant change and in the long run it may affect in the water security in the project area if climate change mitigation measures be ignored. High intensity rainfalls with short duration, shifting of rainfall period and erratic rainfall patterns are reported in the area.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

120 Environmental assessment revealed that there is potential impacts on physical, biological, and socio-cultural during development of the proposed Jumka Urban Water Supply and Sanitation Project. They can occur at various phases of the subproject such as design, preconstruction, construction and operation and maintenance phases. The magnitude of the impacts can be small, moderate, or high depending upon its severity, and can be temporary or long term, reversible or irreversible, local or wide. The impacts need not necessary be limited to adverse ones but can be beneficial as well. The objective of Environment Management is to attempt to augment positive impacts and to minimize negative impacts by sustainable mitigation measures.

F. Beneficial Impacts and Augmentation Measures

1. Construction Phase

121 **Employment Generation and Increase in Income**. Major direct beneficial impacts of the water supply and sanitation subproject during construction stage is the creation of employment opportunity to the local community. As such for this work a total of 7300 man-days of skilled labors and 15200 man-days of unskilled labors person days are required. About 20% of the locals of the project area are involved in daily wage-based labour works. However, priority will be given to the locals whenever possible.

122 **The enhancement measures for this impact include;**

- Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible.
- Ensure equity in provision of wages to both male as well as female labors

123 **Skills Enhancement**. The development of the water supply system and the distribution network is likely to enhance the skills of the locals in plumbing, fittings and other construction works. Furthermore, the subproject will also give on job practical training to the workers which will enhance their technical skills. The skill and knowledge acquired from the subproject during

construction will enhance employment opportunities of local people who can earn livelihoods from similar subprojects in the future.

124 **The enhancement measures for this impact include;**

- Making a proper work plan and code of conduct during the construction period.
- Provision of regular hands on training to the workers during the project construction period for workers especially work on pipe laying on plumbing bathroom fittings, and other construction activities in order to enhance the impact

125 **Enterprise Development and Business Promotion**. The command areas of Jhumka town have mixed urban and semi-urban characteristics - predominant of rural settings. During construction period, different types of commercial activities will come into operation in order to provide the demand and requirement of workers. As money flow begins, they will regularly demand different food items, beverages and other daily needs. To meet these demands, small shops and restaurants around the vicinity of the construction sites are likely to open. The local marketplaces will see increased demand for food supplies. This will attract local agro-enterprises in the project area. Along with the implementation of the project, these avenues will also gain local market, and as economic status of locals will be improved, it will help in further expansion of these agro-businesses.

126 **The enhancement measures for this impact include;**

- Recommend contractor to give priority to the local products during procurement of construction of materials.
- Priority also will be given to local services like grocery stores, tea shops, hotel & restaurants etc. during the entire construction period

2. Operation and Maintenance Phase

127 **Improvement in health and saving of time.** During operation of the water supply and sanitation project, the people living within the project area will benefit from the supply of sufficient quantity and good quality water and improved sanitary conditions. Women and girl child will be directly benefited as they have to spend less time in fetching water and thus have more time for study, other household and income generating activities. The time savings of households is taken as time in collecting households' daily water requirements. It is estimated that every household will save in average of 106 working days of time value after the service from the project has started.

128 **The enhancement measures for this impact include;**

The regular maintenance of the water supply and sanitation system by the users' group (WUSC).Table below shows the annual economic value to time saved based on shadow labour price;

Table VI-1: Economic Benefits from Time Saved in Collecting Water

Time Savings per Household per year (Working Days)	Shadow price of labor per day (NRs)	Economic Value: Benefit/year (NRs)
106	350	36994

Source: Socio-economic Survey 2020

129 **Development of market/commercial center**. Supply of quality drinking water will accelerate the rate of development of Jhumka as a leading market center. The project area is moving ahead with establishment of different types of industries, small and big hotels; and financial institutions and banks and some cooperatives along with some governmental & educational institutions. The implementation of this subproject will attract more of investments. The local agricultural products, human skill and new economic avenues will be promoted in the local markets during the operation of the proposed town project.

130 **The enhancement measures for this impact include;**

- Ensuring regular maintenance of the water supply components
- The local agricultural products, human skill and new economic avenues will be promoted in the local markets during the operation of the proposed town project
- Promoting urbanization through proper land development activities in the area.

131 **Appreciation of Land Value**. Common benefits that is also be expected from the operation of the subproject is increment of land price due to the availability of reliable safe drinking water and sanitation system. The unavailability of good drinking water could be one of the reasons for some persons to opt for conducting their business in the subproject area. Upon completion of the present subproject, migration from nearby hills is expected. In order to promote land development in the area, the local people will be aware that high value lands are acceptable to the banks and microfinance institutions to provide loans for them to start their own economic/social ventures in the area.

132 **Women Empowerment**. Sub project will largely benefits to women, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, time will be saved. As contaminated water can lead to diseases the women of the family also have to spend a good deal of their time to care for the sick family members. With the improvement of water supply, there will be marked reduction in the occurrence of infectious disease in the area. This will provide more time to spend on other economic and social activities leading to empowerment.

133 **The enhancement measures for this impact include;**
The water supply system will be regularly maintained so that it operates smoothly and health and awareness programmes will be given to the local people.

134 **Quality of Life Values**. The subproject is not expected to adversely affect any cultural or recreational resources but will enhance the existing quality of life values due to improvement in personal, household and community hygiene practices and health. It is estimated that, with reference to the National Living Standard Survey (NLSS, 2011), the delivery of clean drinking water through the sub-projects will reduce health expenditures by 25%.

135 **The enhancement measures for this impact include;**
The subproject will help to enhance the quality of life of people in many ways, like by providing opportunities for jobs, providing good quality water, and improved sanitation& hygiene practices.

G. Adverse Impact and Mitigation Measures

1. Pre-construction Phase

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

137 WUSC already has acquired land required for the construction of structures and fenced by rigid structure and no any further private land is required for the proposed sub project. As the works involve review of design, estimate, discussions with concerned stakeholders and bidding processes and no construction activities involved; there will be no adverse impacts.

138 The Rapid Environmental Assessment (REA) Checklists for water supply and sanitation were used to identify potential impacts/issues/concerns of the sub project as per preliminary design (Annex 1). The REA identified the issues and concerns that should be considered during design, impacts that should be mitigated during construction and impacts that should be mitigated or enhanced during operation.

139 Relating to design, the salient concerns would be the inadequate consideration/

incorporation of the REA-identified impacts/issues/concerns that should be considered during design as listed in Table VI-2 and the following:

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

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

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED and IEE to mitigate impacts/issues/concerns
Issues &concerns considered during design	During the detailed engineering design stage, water samples from operating boring were tested. This information has guided design of water treatment and depth of well. However, verification on the yield through bore hole tests need to be carried out and confirmed before award of contract.
Unsatisfactory raw water quality	
Delivery of unsafe water to the distribution system	Design proposes basic treatment using a pressure filter and disinfection and provisions for lab unit and kits. This IEE proposes “hands on” training by a licensed & accredited
	laboratory for the first few years of operation under the Water Safety Plan included in the sub project design & continuing training there-after.
- Inadequate protection of water source	DTW has appropriate casing of tube wells including the installation of screens. Sources are located at least 30m upstream from sanitation facilities. Where this cannot be maintained; (i) septic tanks will need to be sealed (watertight) and emptied as per the design requirements; (ii) tube wells to be cased appropriately and installation of a screen; and (iii) a test pit should be established and water quality monitoring should be conducted regularly (at least once very quarter). Disinfection of the tube well will be conducted prior to commissioning and after repairs.
Health hazards arising from inadequate design of facilities for receiving, storing and handling of Cl & other chemicals	Design has included a “housed” dosing unit.
Delivery of water to distribution system, which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed DI, and HDPE pipes.
Contamination of drinking water source and other environmental receptors from household 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 watertight. Toilets will be established at least 30m down-stream of the drinking water source.

2. Construction Phase

(i) Physical Environment

140 **Erosion and land surface disturbance**. Digging of trenches and excavation works during construction works for structures of water supply and inbuilt SCADA units may lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. Topsoil may be lost, and this needs special care during construction period. Haphazard disposal of the excavated earth can disturb the local land surfaces. Dismantling works at major construction site will also pose the potential of these impacts. These activities will cause nuisance and discomfort to the locals.

141 Public land will be used for construction of project components such as deep boring,

treatment unit, OHT, office building and guard house and is Nearly 2689.55 sq. m. of total land required. The major construction area is already been occupied by the WUSC and land for new proposed 3 deep boring will be acquired as they are barren public land. WUSC has received written permission from the municipality to acquire the land (see annex-10). However, no private land needs to be acquired. All the distribution and transmission pipelines will be placed in 90 cm trench and backfilled.

142 **The mitigation measures for this impact include;**

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. Safe dismantling will be carried out with timely coordination with concerned stakeholders.

143 **Underground water quality and state of water table**. Due to the continual extraction of ground water, there will be fluctuation in ground water level. As the water is proposed to be extracted from the depth of about 150 m or deeper, below the impervious strata, there shall be insignificant effect to the existing shallow tube wells which are generally at the level of 5 to 10m.

144 **The mitigation measures for this impact include;**

Recharge through reinstatement of 3 recharge ponds proposed in the subproject.

145 **Damage to the Existing Facilities**. Market and core settlements of Jhumka bazar located at 1, 3 and 5 wards and some inner settlements with narrower access are likely to face such impacts during the construction time. While excavating the earth, existing water supply distribution pipelines and telecommunication cable may get damaged in few places particularly in the market area in spite of great care.

146 **The mitigation measures for this impact include;**

- A repair team will be on standby for the repair of water supply pipeline for immediate repairs.
- 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.

147 **Air pollution and noise nuisance**. Boring of deep tube wells, laying of transmission & distribution pipes, construction of storage reservoirs, construction of office building along with generator & guard houses, and transport & installation of pumps are the major construction activities of the project. Most of the works do not involve heavy machines except in constructing deep tube well which will produce some extent of noise for a certain period of time. There will be some activities such as transportation, loading/unloading of construction materials viz. sand and aggregates, stockpiling of construction waste and construction materials and earthworks. These will cause effect into air quality due to dust generation and vehicular emission as well as noise pollution. Use of power horns and movement of heavy vehicles can cause a serious disturbance to the community, educational institutes, hospitals/health posts and residences etc.

148 **The mitigation measures for this impact include;**

The air pollution concerns related to the project will be addressed by using the vehicles and equipment with low emissions. Regular water sprinkling will be carried out at places where dust pollution is caused due to plying of construction related vehicles. The vehicles carrying construction materials will be covered, and drop height of the hauling vehicles will be minimized. Burning of waste in the campsites or at construction sites will be restricted. The noise nuisance will be controlled by use of soft horns in vehicles used in construction. The construction activities near core settlements and/or healthcare facilities will be restricted after 7 pm and before 6 am. Construction schedules will be discussed with locals so as to minimize

any disturbance in major community functions or activities.

149 **Impact on water bodies**. The project area is nearby Chatara Cannel in the north east side and different ponds. There will be some impacts on surface water bodies in close proximity to the project area during the construction phase. Possible activities, which may influence the water quality, are listed below;

(i) Washing of vehicles, and other washing activities directly on local surface water bodies,
(ii) Sediment and excavated materials may be transported to the water bodies due to rain, and
(iii) Leakage & disposal of oil and grease from construction equipment.

150 The excavation works will cause turbidity in water up to a certain extent. However the quantity is limited, and the impact will be there for short period of time.

151 **The mitigation measures for this impact include;**

Mitigation measures are avoiding disposal of spoil or waste onto water bodies, and restriction of washing and fishing by workers in local surface water bodies. The slurry from WTPs will be disposed of only in designated areas and regular monitoring of the river or stream water quality should be done.

152 **Waste Management and Disposal**. Generation of spoil from foundation works, pond reinstatement works, and recharge pits may cause problems if not well managed timely. Likewise, if not managed, disposal of solid waste from workers' campsites in the vicinity of surface water and at open spaces could be a concern. Chances of open defecation by outside workers will also be a concern to local environment. Construction waste from campsites and construction sites are also sometimes disturbing the local environment. Expecting that there will be around 50 workers in average each day, the waste generation from campsites could be 10 kgs/day. If not segregated and well disposed, this could pile and pollute the local environment.

153 **The mitigation measures for this impact include;**

Proper waste management and disposal system will be done during the construction period. Proper toilets for the workers will be installed before starting the work. Waste like excess grease, lubricants will be collected in plastic containers and will be sold to scrap dealer. Solid waste and other construction waste will be deposited near by the labour camp and will be cleared after the completion of the construction works. Spoil and dismantling waste will be disposed at designated sites only. The backfill sits along the irrigation dam sites of ward number 4 have been proposed for disposal of spoil generated from construction activities.

154 **Climate change Impact and Mitigation measures**

155 **Impact on fresh water availability**

Fresh water availability water for drinking and other social, cultural and economic activities is vital for the survival of lives. Excessive extraction of ground water than its recharge, negligence in recharge and reuse of ground water, extreme climate events like intense raining in short periods, prolonged droughts and similar other natural as well as anthropogenic activities that pose threats to fresh water availability is also anticipated in the project area. Hence climate change adaptation and mitigation measures is crucial to maintain sustainable use of fresh water in the area.

156 **The mitigation measures for this impact include;**

- Continuation of community awareness to implement appropriate waste management practices (based on 3R principles - reduce, reuse, recycle)
- Aware project beneficiaries to use low flow showerheads rather than baths and less water consuming flushing toilets
- Comply with low water consuming technology at household level consumption

157 **Impacts on floods**

In general, high intensity of rainfall with short duration shall trigger to excessive surface runoff and bursting of anthropogenic dams shall contribute for devastating floods in the area. Road embankment constructed without proper cross drainages in every settlement in the project area are also the additional factors contributing to excess flooding.

158 **The mitigation measures for this impact include;**

- Use ground water from deep aquifers
- Maintain civil structures' height above inundation level

159 **Climate Change Vulnerability and Risks Reduction**

Considering the climate change consequences, the design is carried with due attention extent to which the system is unable to cope with the adverse effects of climate change including climate variability and extremes. Erratic rainfall pattern may cause unusual flooding and droughts resulting depletion of ground water of upper aquifers is the potential risk in the project, which can be treated as climate induced disaster.

160 **The mitigation measures for this impact include;**

Therefore, the issue has been address in the design by extracting ground water from deep aquifers and recharging shallow aquifers. Apart from this, annual temperature rise may increase the mosquito breeding in water ponds and swampy lands. This will lead to the rise of vector borne disease. Therefore, constructing ponds to recharge ground water seems to have some challenges in the area where recharge well is envisioned by the project.

161 **Overall Climate Change adaptation and its Mitigation Measures**

It is utmost and crucial to conduct Community awareness program to limit the magnitude of global warming and its related effects will be conducted in the project area for reducing emission of greenhouse gases, especially carbon dioxide. In the project area the process of adjustment to expected climate and its effects shall be introduced in the design.

The mitigation measures for this impact include;

- Continuation of community awareness to implement appropriate waste management practices (based on 3R principles - reduce, reuse, recycle)
- Aware project beneficiaries to use low flow showerheads rather than baths and less water consuming flushing toilets
- Minimize NRW by using quality construction materials particularly (PE pipes with electro-fusion joints and DI pipes with push on joints
- Minimize NRW by delineating the project area into manageable DMAs/sub-systems
- Plant additional plants in the community forests of the project area
- Use ground water from deep aquifers
- Maintain civil structures' height above inundation level
- Comply with low water consuming technology at household level consumption

162 Town project shall comply a systematic implementation action plan to ensure of the above mitigation measures is depicted the following matrix;

Table VI-3: Implementation Action Plan

SN	Activity	Responsibility	Time Frame
1	Conduct community awareness program to implement appropriate waste management practices (reduce, reuse, recycle)	ERDSMC, WUSC, Ward Committees and Community Activists, Users	Design, Construction and Operation Phases
2	Provide awareness to project beneficiaries for use low flow showerheads rather than baths and less water consuming flushing toilets	ERDSMC, WUSC, Ward Committees and Community Activists, Users	Design, Construction and Operation Phases
3	Ensure Minimal use of NRW by using quality	ERDSMC, WUSC,	Design, Construction

	construction materials particularly (PE pipes with electro- fusion joints and DI pipes with push on joints	Contractor	and Operation Phases
4	Minimize NRW by delineating the project area into manageable DMAs/sub-systems	ERDSMC, WUSC, Contractor	Design, Construction and Operation Phases
5	Ensure finished level of civil structures above inundation level	ERDSMC, Contractor	Design and Construction Phase
6	Construction of 3 recharge pits (as a demo)	Contractor; facilitated by WUSC & supervised by CRDSMC	Design and Construction Phase
7	Greenery promotion activities encouraging to municipality to enforce trough law making	Contractor; facilitated by WUSC & supervised by CRDSMC	Design and Construction Phase

(ii) Biological Environment

163 The service area comprises a mix of built-up areas, scattered plain settlements and some forest patches. Thus, there is risk of degradation of the local vegetation by the indirect encroachment of the work force. However, sites have been selected to avoid any tree cutting activities due to project construction work. All the distribution pipelines pass along the roadside with minimal loses of bushes lies within the transmission pipeline stretches. The impacts to human settlements include effects on cattle sheds, farmlands and small irrigation canals which will be very low and temporary impacts.

164 The potential environmental impacts of the subproject on local flora and fauna during construction and post construction phases will be low. No trees are to be cleared at Deep boring and WTP project components site. Along the distribution line, there will be minimum loss of grazing land, and no loss of agriculture land. Some of the impacts that may likely to occur are described below;

165 IBAT information has been assessed for this project site. The project doesn't directly affect environmentally protected areas, core zones of biosphere reserves, or highly valued cultural property as per the IBAT assessment. Since the subproject is of small scale and its Indirect Impact Zone (IIZ) is only 200m, only the species suggested under 1 km periphery of the core project coordinate have been considered (Annex 4). The subproject components require a very small area of land for implementation and environmental impacts on the vegetation and natural eco-system is not significant. However, greenery promotion will be carried around the WUSC office building area and construction sites and road alignments. Though tree felling will be avoided, and if any such cases occur, prior approval from the local bodies will be received and compensatory plantation @ 1:10 will be carried out Species of local economic significance and values will be planted.

166 **Impact on Fauna**. All the subproject site is within the built-up area including deep boring, reservoir and WTP sites. Biodiversity of Ramdhuni forest area shall be affected including changes in population dynamics of resident and migratory birds at some project sites during the construction period due to various construction activities. But these effects will be of temporary in nature. The condition will be normal after construction is over. The hunting of birds will be prohibited to the workers.

167 **The mitigation measures for this impact include;**

- Replace the excavated top soil to its original position after the completion of pipe laying work
- Re-vegetating disturbed slopes and grounds, as applicable;
- Awareness programs regarding policy related to the conservation of existing flora & fauna, to the workers prior to the construction and the community during various meetings and discussion programs

- Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned earlier
- Regular Monitoring

168 **Impact on aquatic life:** Chatara cannel and various ponds are the major surface water sources that faces risk of pollution due to subproject activities. The construction activities may indirectly disturb the water quality for a certain period of time and may cause adverse impact on aquatic life. The consequences my impact to aquatic ecosystem under different ponds located at and nearby project area may fall on risk. But these effects will be short term in nature and local in scale.

169 As the Ramdhuni municipality is rich in biodiversity having forest at around different temples and ponds. An awareness programs will be conducted in the campsites and in the project communities regarding conservation of the wild lives. Code of conduct will be provided to all the project personnel and workers regarding the activities that may disturb any migratory or local species of fauna. The workforce will be given following instructions;

a. Strictly prohibition from fodder collection in any nearby forest area,
b. Restriction in conducting any activities in streams,
c. Ban of hunting and poaching activities or any activities related to that

170 **The mitigation measures for this impact include;**

- Strict Monitoring on the daily activities of workers and Prohibition on disposal of wastes to the water bodies during construction works at source area.
- Provision of temporary toilets
- Restriction to workers from fishing
- Adopt measures mentioned above for the solid waste management

(iii) Socio-economic Environment

171 **Disturbance to community activities**. Jhumka bazar and some inner settlements with narrower access are the areas where the community activities may be disturbed due to the project's construction activities. Local festivals and social events may be disturbed. 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.

172 **The mitigation measures for this impact include;**

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

173 **Social Dispute and Dissatisfaction.** There is a possibility of influx of outside workforce and with them money from the construction work and unwanted communities can cause problems with the local community. The local population may not get employment benefits from the subproject causing dissatisfaction and conflicts in the area. There is a possibility of social dispute in the community due to irresponsible behavior of the workers such as gambling and drinking. Local people and women above the age of 16 will be given preference for employment.

174 **The mitigation measures for this impact include;**

- Conducting Public Consultation at various stages & locations as per requirement
- Implementation of Grievance Redress Mechanism
- Giving Prior Notice to the public regarding the construction works that possibly hinder

their daily activities and Establishing coordination with them properly

175 **Occupational health and safety (OHS)**. Life and health of workers particularly of those involved in concreting, trench cutting, formwork and rebar fixing in the overhead tank is of prime concern.

176 **The mitigation measures for this impact include;**

To mitigate or minimize the hazards adequate safety instructions should be provided to the contractor and monitored by the subproject.

(i) Health and hygiene in the camp site (against unsafe working conditions, accidents, transmission of communicable diseases etc.) will be given top priority.

(ii) Contractor shall prepare an OHS Management Plan which details the procedures to be adopted to ensure the OHS requirements are met. It shall include safety requirements for all Works activities, with particular attention being given to working in and over water, around machinery, handling hazardous materials, and exposed to the elements.

(iii) Regular health checkups, proper sanitation and hygiene, health care will be provided. Awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS will be conducted during focus group discussions.

(iv) The Contractor shall ensure that all persons including labor on the Site have the necessary PPE of an appropriate standard including but not limited to: Safety foot ware with steel toe, sole and heel, High visibility clothing, Impact resistant safety eyewear, Long sleeves and long pants suitable for operating environment, Safety helmet with provision of sun protection as necessary, Gloves (carried and worn when manual handling) and Hearing protection when working in close proximity to noisy equipment and in all underground environments.

(v) Training on core labor standard (CLS) will be provided to the labors including representatives of contractors, members of WUSC and project team

(vi) Orientation to workers on safety procedure and requirements before initiating work at time to time during implementation.

(vii) The loss of life or any type of injuries will be compensated and insurance to the workers will be provided. First aid kits, standby vehicle, and fire extinguishers will be provided in camp sites.

(viii) In collaboration with local health authorities, the Contractor shall ensure that first aid facilities are available at all times at the Site, including having a Site vehicle available at all times that can be used to transport anyone injured at the Site to medical facilities. The Contractor shall post in clearly accessible places information on how to transport injured persons to medical facilities, including the precise location and contact details of such medical facilities, name and contract details of the Site designated OHS Officer.

(ix) Ensure safeguard related item of work are BOQ item, and safeguard clauses are included in contract in detail.

(x) To avoid risks from accidents on site due to the movement of the public and workers, health and safety measures of the contract will also prohibit entry at construction sites to the public and the area will be barricaded, and warning signs will be placed.

(xi) Contractor will appoint a safeguard and safety officer having subject-matter expertise. The staff shall be responsible to ensure full compliance with EMP, OHS and SOP for COVID prevention measures while implementing work and in orienting the workers.

(xii) The contractor will be supervised on development of SOPs/response plan to minimize the risk of CovID19 infections.

177 **Community health and safety.** Since some of the construction works take place near the settlements, and the construction works of storm water drainage will be through the settlements, there are chances that the local people may face small accidental cases. This is critical primarily for children and old-aged people. Chances of communicable diseases are also a concern. Stock-piles sites, spoil disposal sites and movement of vehicles for

construction activities are some of the aspects of construction works which may pose threat to health and safety of the community. Under the context of recent spread of the SARS-CoV-2 pandemic, the contractor will be required to prepare a Standard Operations Procedures (SOPs) as a response to any viral infection/s, and the workforce will be required to follow the SOPs.

178 **The mitigation measures for this impact include;**

- Establishing coordination with school administration & health center and public community authority by construction team prior to the construction.
- Fixing the material transportation as well as pipe laying works schedule in relevance to the school operation time. Like, generally, the school hour is from 10am to 4pm. Hence, the most suitable time for material transportation is before 8am and after 5pm.
- Provision of temporary access to these institutions through provision of planks
- Hard Barricading around the school area as well as primary health center area during pipe laying works.
- Hard Barricading during the construction of institutional toilet to avoid interference from the school kids.
- Fixing the material unloading schedule during public holidays as far as possible to avoid disturbance to the school kids for the toilet construction

179 **Resettlement, relocation and compensation issue.** The major structures are to be constructed either on public land or on land already belonging to WUSC. The municipality office has provided the needed consent for the use of required land parcels for the project component. Similarly, the distribution system network follows within the RoW of public roads. Therefore, resettlement or relocation is not required.

180 **The mitigation measures for this impact include;**

- Selection of barren and public land only for the construction of project components.
- Avoid the acquisition of private and agricultural land for the construction of project components.
- Monitoring on the haphazard land use & planning by the concerned authority

181 **Generation of solid waste & waste water from construction sites and worker's camp** During construction phase, generation of solid waste & waste water from the construction sites and workers camp are likely to create nuisance in the surroundings. Soil runoff from the construction site may lead to off-site contamination (particularly during rainy season). Similarly, improper disposal of construction debris may lead to off-site contamination of water resources. Unmanaged solid waste & effluent from workers camp may contaminate the surroundings. This will affect the construction workers, people residing in this area and the passersby;

182 The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration

183 **The mitigation measures for this impact include;**

a) Construction Wastes

- Adopt 3R (Reduce, Reuse & Recycle) concept
- Ensure storage areas are secure, safe & weatherproof.
- Management of reusable wastes
- Sale of Recyclable wastes to scrap dealer
- Final Disposal of Bio degradable solid wastes

- Avoid over ordering of construction materials to the extent possible. This will be challenging, as it requires strong coordination with the concerned contractors, as it cannot be made mandatory. However, it is not impossible too to coordinate with the contractors in this regard.

- Use standard size & quantity of construction materials.

- Construct garland drains to reduce the runoff from the stockpiles.

b) Solid Wastes, Wastewater and Sewage from labour camp Management

- Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.
- Manage biodegradable wastes that include food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting & Incineration. If these two processes are not possible then, the wastes shall be managed either by handing over these wastes to the municipality waste collectors who will finally dispose those wastes to the landfill sites of the project town or by disposing those wastes to the burial pits at suitable place.
- Non-biodegradable wastes like glass, plastics & metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them
- Strict Prohibition on open incineration of solid wastes & use of plastic materials to minimize the quantity of plastic wastes
- Construction of the temporary latrines with temporary soak pits & septic tanks within the campsite for proper disposal of sewage
- Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers
- Employ local people from nearby villages to maximum extent possible. It will minimize the number of workers residing at worker's camp. Lesser the number of people, lesser will be the solid waste & effluent generated. However, it cannot be made mandatory because availability of local people with required skills will not be ensured at the time of construction.

184 **Contractor and Workers camps Requirement and Campsite Management**

The land and space is acquired for the establishment of labor camp and camp for contractor will be acquired for the overall construction duration of project period. Space for the establishment of labor camp and contractor's camp will be acquired temporarily for the completion of construction work. Labor camps will be established according to contract of work.

The priority is to locate these near the project area. The contractor will be required to meet the following criteria for the sites:

- Will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems, etc.;
- Residential areas will not be considered so as to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime);
- Disposal will not be allowed near sensitive areas or areas which will inconvenience the community; and
- The construction camp, storage of fuel and lubricants should be avoided at the river bank. The construction camp site/s, including amenities for the workers, should be finalized in consultation with Project.
- Where sites/camps are set up, the contractor will see to it that proper sanitation (toilets, solid waste management) systems are in place; potable drinking water provided; kerosene provided at reduced rates for cooking; and gambling, liquor, and illicit relationships banned.

- Contractor will be required (as per his contract) to ensure clean-up of site back to its original, pre-project condition

185 **The mitigation measures for this impact include;**

Camp for contractor's Staff.

- The contractor shall provide adequate temporary accommodation with all necessary amenities and facilities for his staff and labor. The location and type of accommodation whether pre-fabricated or in-situ buildings or rental is the contractor's choice.
- During the whole period of existence, from setting up through operation to final removal upon completion of the works, the contractor shall be fully responsible for constantly carrying out all measures necessary for safeguarding the natural environment affected by his camp or camps.
- He shall cause the least possible interference with existing amenities, whether man-made or natural. No trees shall be felled except as authorized by the engineer
- Latrine and ablution facilities and first-aid services shall be provided in sufficient type and numbers to the satisfaction of the engineer and shall be maintained in a clean and sanitary condition at all times.
- On completion of the works or as soon as the facilities provided by the contractor are no longer required, the contractor shall remove such facilities and clear away all surface indications of their presence. Each camp area shall be reinstated to the satisfaction of the engineer.

Contractor's Offices, Stores and Services.

- The contractor shall provide, erect, construct, maintain, and subsequently remove proper offices, stores, workshops, laboratories, storage, and parking areas for his own use. Such facilities shall be sufficiently sized and equipped to enable him to manage his operations and those of his Subcontractors in a professional manner and to enable him to carry out all his obligations under the contract.
- Sheds for storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors. No material or equipment shall be placed directly on the ground.
- Within his offices, a meeting room shall be available for site meetings with the engineer and the employer.
- These contractor's facilities shall be subject to the same stipulations regarding sitting, interference with amenities and environmental protection as the contractor's camp.

3. Operation & Maintenance Phase

186 **Chemical hazard.** Exposure to or consumption of high dose of chlorine and bleaching powder are toxic, and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose, and mouth are of extreme hazard to the workers handling chlorine and bleaching powder.

187 **The mitigation measures for this impact include;**

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

188 **Impact on water bodies and aquatic life.** The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the chatara cannel which may be susceptible to project activities like waste disposal. As the backwash water mainly contains suspended solids.

189 **The mitigation measures for this impact include;**

Desilting pond will be constructed for decantation and will be drained of to the river/ stream

course. To avoid the impact to aquatic life, the effluent and sludge should be disposed of only in designated areas as provisioned for sludge management in O&M manual; and periodic monitoring of the river water quality should be done, as and if required.

190 **Impacts of use of diesel generators.** Use of generators is foreseen to be likely. The use of diesel generators will have some noise nuisance, and air pollutant emissions. This will be a nuisance for the locals within the close vicinity. However, this impact has been predicted to be of low significance.

191 **The mitigation measures for this impact include;**
To mitigate the concern, under suitable condition governed by location of water source, the electro-mechanical components will be placed as practicably far as possible from the major settlements, say more than 50 meters far from the major settlement or market area. In addition to this, the specifications of pumps and generators have been worked out so as to meet also low noise and pollution emissions.

192 **Occupational Health and Safety (OHS).** Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards

193 **The mitigation measures for this impact include;**
Provision of proper Personal Protective Equipment (PPEs) during maintenance works, cleaning works and while working in treatment units will be ensured, and monitoring will be carried out. Provision of adequate welfare facilities including clean water, soap, nailbrushes, disposable paper towels and washing facilities will be ensured. First Aid Kits will be provided. Provisions will also include clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings. O&M workers will be required to ensure that employees and line management understand the risks through proper instruction, training and supervision. The WUSC will need to implement SOPs along with safety plan specific to CovID19 infection risk.

194 **Community Health and Safety**. Community health and safety will also be considered. There will be restriction on unauthorized entry of local people in the OHT sites and the treatment plant area.

195 **The mitigation measures for this impact include;**
Awareness in community level will be conducted to ensure that the locals do not face any health risks due to the project O&M activities, especially during maintenance and cleaning works.

H. Evaluation of the Impacts

196 The combined score less than 45 is termed as insignificant impact; 45-75 is termed as Significant and beyond 75 is termed as very significant impact. Following table summarizes the evaluations of the impacts.

Table VI-3: Evaluation of the Environmental Impacts

Impacts	Nature	Magnitude	Extent	Duration	Total score and significance
Beneficial Impacts					
Construction stage					
Employment Opportunity and Increase of Income	Direct	M (20)	Lc (20)	St (5)	Significant (45)
Skill Enhancement	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Enterprise Development and Business Promotion	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Operation Stage					
Improvement in health and saving of time	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Development of Market/commercial Center	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)

Impacts	Nature	Magnitude	Extent	Duration	Total score and significance
Appreciation of land value	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Women Empowerment	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Quality of Life Values	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Adverse Impacts					
Construction stage					
Physical Environment					
Erosion and land surface disturbance	Direct	M (20)	Ss (10)	Lt (20)	Significant (50)
Underground water quality and state of water table	Direct	M (20)	Ss (10)	Lt (20)	Significant (50)
Damage to existing facilities	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Air Pollution and Noise nuisance	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Impacts of water bodies	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Waste management and disposal	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Biological Environment					
Impacts on fauna	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impacts on aquatic lives	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Socio-economic Environment					
Disturbance to community activities	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Social dispute and dissatisfaction	Indirect	M (20)	Ss (10)	St (5)	Insignificant (35)
Occupational health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Community health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Resettlement, relocation and compensation issues	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Operation & Maintenance Stage					
Risk of exposure to chemicals	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Impact on water bodies and aquatic life	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impacts of use diesel generators	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Occupation health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Community health and safety	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)

VII. ANALYSIS OF ALTERNATIVES

A. With- and Without-Subproject Alternatives

197 The subproject area is an established urban settlement with further potential of urban growth. It lies in close connection to the Mdan Bhadari Highway. Though the trend of urbanization is increasing, the town is facing increased problems to water supply. The overall sanitary condition of the subproject area is reasonably satisfactory, but still improvements are required. Doing nothing about these challenges would be allowing the subproject area to further develop as “under-serviced” area, put the health of its residents and the general public at more risks, and worsen its living environment. This would impede: (i) further social and economic development of subproject rural municipality and (ii) Nepal’s delivery of its commitment to SDG 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation. Hence, do-nothing or without-project alternative is not chosen.

198 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 as it serves 22,787 households in the base year 2023. The ultimate outcomes of the project will also add on for the achievement of targets of SDG 5th of achieving gender equality and women empowerment.

B. With subproject’s location alternatives

199 Subproject area is a very needy area in terms of safe water needs. Strategically, the investment in water and sanitation in this belt will upgrade the overall socio-economic aspects

of the district of Sunsari. It covered all the wards of Ramdhuni municipality and is close to the core township of Sunsari. It will support to holistic approach of WASH implementation through a single project covering all urban population of Jhumka.

200 On the other hand, the subproject components are selected at technically safe site where there is no social dispute as well. Minimization of loss of vegetation cover is also considered. Avoiding tree cutting and damage to cultivated land has also been considered in site selection.

C. Alternatives Related to technology, materials and implementation procedure

201 Regarding the source and its technology of water extraction, the proposed deep new tube well as source is more sustainable. The sources may be near at hand or far away, it may be a spring, stream, underground well or a mountain stream. The survey team also observed an irrigation canal (Chatara canal) from Koshi River which passes through project area. It was learnt the canal runs only during the agriculture (planting) season, not throughout the year. Other sources in the mountain (Koshi River, Chatara) are quite a far away from economical distances. As there were no other sources pointed out by the community the only choice left for the project is to explore the underground water source. Thus for Jhumka the only source available is the ground water source which is reliable and is satisfactory from the water quality and economy point of view. Commonly used mild steel slotted screen can provide 8-10 % of open area. Whereas stainless steel screen (helical screen) provides almost 22-25 % of open area of the screen. Later is almost 3-4 times costlier than former. Thus a combination of stainless steel screen and mild steel casing is considered for economy reason.

202 Described in previous chapter two RCC overhead reservoir tanks with following capacities are already existing in the service area: Accordingly all the proposed reservoirs will be constructed in RCC. The character and the degree of treatment depend upon the nature of available water or indirectly in the source. The source of proposed project has been considered to be a deep tube well and alternatives for the treatment plant has been considered as Conventional treatment plant, packaged treatment plant and Pressure treatment plant.

203 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.

204 The working procedures proposed are participatory one and the beneficiaries will be actively participating in all the phases of the subproject. Except from some mechanical equipment for drilling of boreholes, most of the raw materials used will be local in nature. Similarly, as far as possible, local people will be employed for the subproject so that the chances of conflict are minimal.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

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

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

A. Institutional Arrangement

207 Ministry of Water Supply (MoWS) will be the Executing Agency, working through the Department Water Supply and Sewerage Management (DWSSM), which will establish a Project Management Office (PMO) for the project1 headed by a Project Director.

208 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 subproject in accordance with the subproject selection criteria for the project, assisting the municipality in conducting feasibility studies, reporting to and being point of liaison with ADB on the project; quality control of detailed design and construction supervision; procurement of civil works contractor; support for capacity building; and overseeing safeguard compliance. The PMO will liaise with WUSC/municipality to sign the management agreement prior to the award of contract for each subproject. The PMO will also engage all consultants under the project.

209 The RPMO stationed at Itahari will act for Eastern region projects. The PMO/RPMO will manage the detailed design and construction supervision with support from DSMC. The TDF will coordinate with PMO/RPMO, WUSC and the municipality at least on monthly basis.

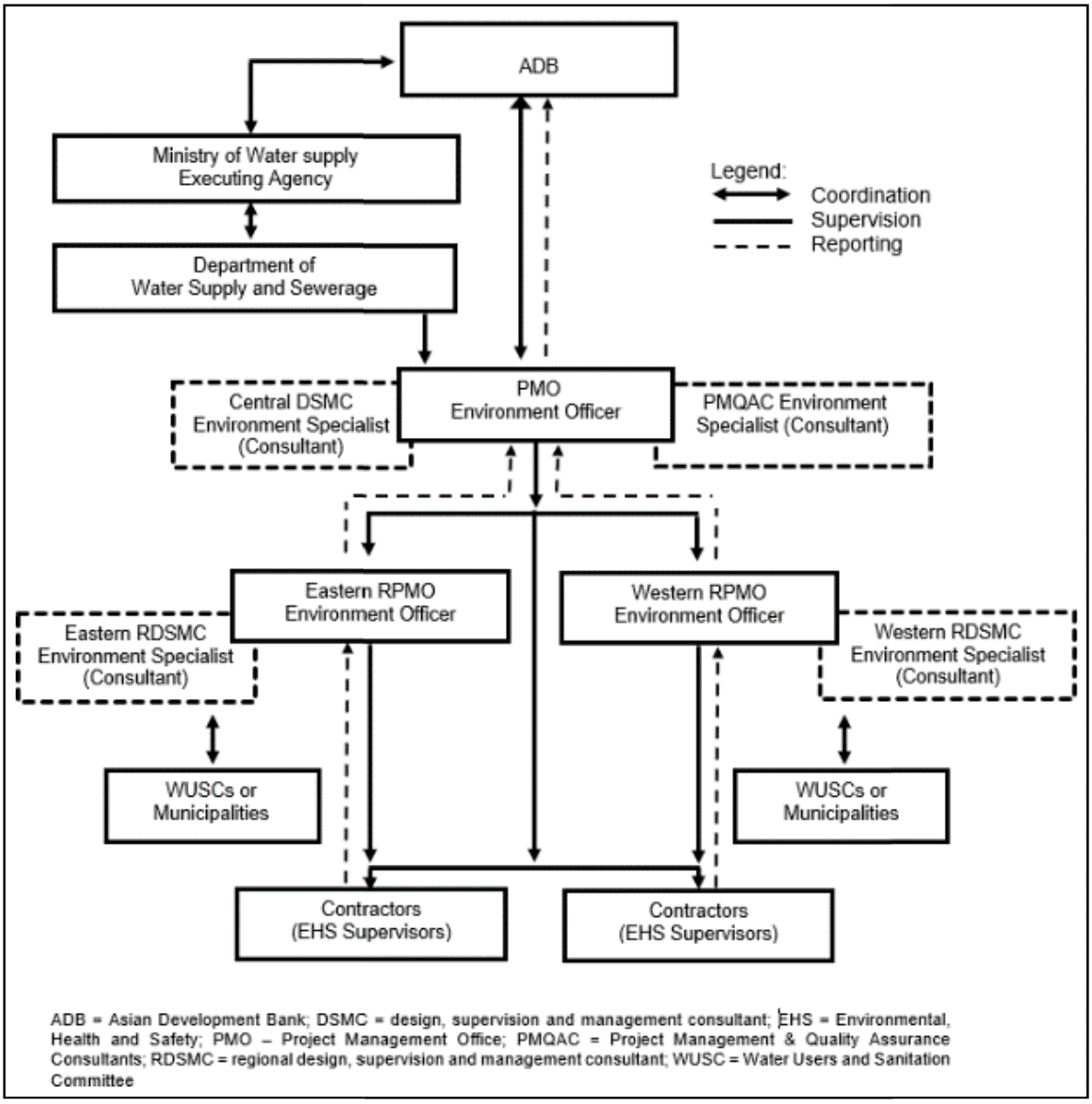
210 The WUSC, on behalf of the WUA16 or the municipality17 will be responsible for operation and maintenance (O&M) of the water supply and sanitation facilities constructed, operating under a management agreement with DWSSM. WUSC consist of nine executive members18, at least three of whom are women. The subproject will fund the WUA's minimum prescribed staffing and other resource requirement, as outlined in the management agreement with DWSSM for sustainable operations of the system during the project period.

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

[17] 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

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

Figure VIII-1: Safeguard Implementation Arrangement



ADB = Asian Development Bank; DSMC = design, supervision and management consultant; EHS = Environmental, Health and Safety; PMO – Project Management Office; PMQAC = Project Management & Quality Assurance Consultants; RDSMC = regional design, supervision and management consultant; WUSC = Water Users and Sanitation Committee

211 **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 IEE and EMP are updated based on detailed designs, that IEE/EMP prepared by DSMC comply to exclusion criteria and project selection guidelines as stipulated in the EARF and government rules; and recommend for approval to PMO;
(ii) approve subproject environmental category;
(iii) ensure that EMP is included in bidding documents and civil works contract;
(iv) provide oversight on environmental management aspects of the subproject and ensure EMP is implemented by PMO/RPMO and contractor;
(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 RPMO to properly carry out the environmental monitoring and assessments as per the EARF;
(viii) review, monitor and evaluate effectiveness with which the EMP is implemented, and recommend necessary corrective actions to be taken;
(ix) consolidate monthly environmental monitoring reports from PMO/RPMO and submit semi-annual monitoring reports to ADB;
(x) ensure timely disclosure of final IEE/EMP 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 IEE;
(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/RPMO, and WUA.

212 **Regional Project Management Office.** The environmental officer assigned by DWSSM to the PMO/RPMO will receive support from (i) the PMO environmental officer, (ii) environmental specialist from PMQAC; and (iii) the environmental specialist and EMP monitors of the ER-DSMC to carry out the following;
(i) prepare new IEE and EMP in accordance with the EARF and government rules;
(ii) include EMP 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 EMP including environmental monitoring by contractor;
(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 IEE.

213 **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.

214 **Design, Supervision and Management Consultant.** The ER-DSMC will provide support to the PMO in the following areas;
(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 PMO 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 Committee (WUSC), respective project municipalities and communities to ensure that the citizens are aware of project benefits and their responsibilities
(v) ensure that poor and vulnerable groups will benefit equally from the project

215 **Civil Works Contractor.** The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. Contractor needs to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be required to submit to PMO/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 and deputation of an EHS focal person by the contractor. The contractor will be required to undertake day to day monitoring and report to the PMO/RPMO and DSMC.

216 A copy of the EMP and 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 IEE document specify responsibilities in EMP implementation during design, construction and O&M phases.

217 The PMO/RPMO 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 subproject sites.

218 **Capacity Building.** The PMQAC 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 the project;
(ii) Review of IEE 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.

219 **Water Users' and Sanitation Committee**. WUSC is the eventual operator of the completed project. The key tasks and responsibilities of WUSC are, but not limited to;

Before Construction.

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

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

220 **Civil Works Contractor.** The contractor will be required to designate an Environment, Health and Safety (EHS) supervisor to ensure implementation of EMP during civil works. Contractor needs to carry out all environmental mitigation and monitoring measures outlined in their contract. The contractor will be required to submit to PMO/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 and deputation of an EHS focal person by the contractor. The contractor will be required to undertake day to day monitoring and report to the PMO/RPMO and DSMC.

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222 The PMO/RPMO 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 subproject sites.

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(i) Introduction to environment and environmental consideration in the project;
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(iv) Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers before deployment to work sites.

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(ii) Provide available data to DSMC-ES during IEE
(iii) Assist in securing tree-cutting permits and/or registration of water source.
(iv) Participate in training programs.

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.
(iii) Facilitate public consultations, as necessary.

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.
(iv) Ensure observance of the grievance redresses mechanism.

225 **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

226 An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

227 The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMO/RPMO consultant and the contractor. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) 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.

228 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 site-specific EMP (S-EMP). The contractor shall allocate budget for compliance with these IEE, EMP and S-EMP measures, requirements and actions. The contractor will be required to submit to ERDSMC, for review and approval, a S- EMP 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. The contractor will need to depute a field based EHS focal person for the sub-project. No works can commence prior to approval of S-EMP.

TableVIII-2: 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.	PMO, DSMC RPMO,&	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 contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. - Require contractors to prepare spoils management plan (see Annex 2-D for outline).	DSMC, RPMO	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 phase detailed design
Drinking water Supply	Extraction of unsatisfactory raw water Quality	- During the detailed engineering design stage, test water samples from existing tube wells located near proposed tube wells. - Design to include basic treatment using lime dosing, pressure filter and disinfection using $Ca(OCl)_2$ and provisions for lab unit and kits.	PMO, RPMO& DSMC	Incorporated in final design and communicated to Contractors	Prior to award of contract
Sanitation	Contamination of groundwater due to seepage of wastewater from the toilet promoted under OBA.	- Ensure the new toilets are constructed as per the standard designs; and - Provision of water supply to ensure efficient operation of the toilet.	PMO, RPMO & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract
Stockpile areas, Storage areas, Disposal areas, and workers camp (if needed)	Disruption to traffic flow and sensitive receptors	- Determine contracts locations prior to Award of contract.	DSMC, RPMO	List of selected sites for stockpile areas, storage areas, disposal areas, and workers camp (if needed). 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 and other construction waste may cause pollution from work sites and workers camp (if any is established)	- Mechanism of safe disposal will be developed in the subproject site before the actual commencement of work, including provision of waste bins. - Prohibition of unwanted littering and discharge of waste. - Proper management of solid waste will be done using lined pits for waste disposal.	Contractor	Contractor records. visual inspection	During detailed design phase
Training on EMP Implementation	Poor EMP implementation leading to unfavorable impacts to Environment, workers and community.	- Project manager and contractors to undergo training on EMP implementation, including standard operating procedures (SOP), and occupational health & safety (OHS) for construction works. - Timely implementation of the EMP. - Development and execution of measures for any unanticipated impacts.	PMO, RPMO and DSMC. Contractor's Environmental Supervisor	Record of completion (Safeguards Compliance Orientation or Training)	During detailed design phase prior to mobilization of workers to site.
2. During Construction Activities					
A. Physical Characteristics					
Topography, landforms, geology and soils and/or river morphology and hydrology	Surface cutting and excavation and Dismantling works may cause erosions and impact on the local hydrology.	- Soil erosion will be minimized by taking precautionary measures such as: (i) reuse of excavated soil, (ii) immediate and proper backfilling of the trenches, and (iii) the excavated soil temporarily stored properly against erosion by using barriers or silt traps. - Consent will be taken before dismantling of existing structures. All the concerned stakeholders will be coordinated before dismantling. Safe dismantling will be carried out. This will be one of the components of S-EMP of the contractor.	Contractor	Records of sources of materials and records of potential areas of soil erosion; Sites of reservoir construction, treatment plant construction, transmission mains and distribution pipelines.	Daily (or as often as necessary especially during monsoon or rains) by contractor. Monthly visual inspection by RPMO and DSMC-ESE.
Community facilities	Damage to existing facilities like drains, compound walls and pavements.	- 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 informed 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.	Contractor	List of any public or private infrastructure disturbed by the subproject works Minutes of meetings with the locals or affected persons.	As per need, or field-inspection if any such case is foreseen.
Water bodies and water quality	Pollution of water bodies, contamination of water sources due to waste disposal, transport of sediments from worksites and/or construction camps (if any)	- 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 for storage of fuels and lubricants will be away from any drainage leading to water bodies	Contractor	Areas for stockpiles and sites of storage of fuels and lubricants and waste materials; Number of physical measures (like silt traps installed).	Visual inspection by RPMO and DSMC-ES on weekly basis Weekly field monitoring Water quality test at and downstream of the discharge at every month of construction

		- Take all precautions to prevent entering of wastewater 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 of in a manner that may block the flow of water of any watercourse		Visual inspection. Water quality test at and downstream of the discharge at every month of construction period	period
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 excavated portion of roads cannot be done immediately, spread of crushed gravel over backfilled surfaces - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2" free board - Limit speed of construction vehicles in access roads to maximum of 30kph. - Ensure use of equipment and fuel complying with applicable emission standards.	Contractor	Location of stockpiles. Number of complaints from receptors. Heavy equipment and machinery with air pollution control devices. Certification that vehicles are compliant of air quality standards.	Daily monitoring (when there are ongoing works) by contractor. Monthly visual inspection by RPMO& DSMC-ES. Air quality monitoring test in every six months of interval during Jan-June of construction period
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 constructions equipment, and the transportation of materials, and people.	- 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. - Horns should not be used unless it is necessary or unavoidable - 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 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	Contractor	Results of monitoring noise levels (Maintain maximum sound levels not exceeding 70 decibels when measured at a distance of 10m or more from the construction sites) Number of complaints from sensitive receptors	Daily monitoring (when there are ongoing works) by contractor. Monthly inspection by RPMO& DSMC-ESS. Noise level measurement in daily basis where the noise producing construction activities are carried

		- these areas quickly.			
Waste disposal	Pollution of water and land resources, and cases 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 hazardous waste will be carried out - Dismantling waste to be used for backfilling, and needs to be disposed only at designated disposal site identified in SEMP.	Contractor	On-site situation in campsites (if any), work sites and their vicinities	Monthly monitoring by RPMO& DSMC-ES
B. Biological Characteristics					
Vegetation	Loss of vegetation; bushes cover during construction works and laying of the pipelines No trees will be felled for any of the project components construction works	- Greenery promotion around the construction sites and road alignments where possible - Greenery promotion sites are proposed at WUSC building area-Jhumka - Tree felling has been avoided by the project, but if any such cases occur, prior approval from the local bodies will be received and compensatory plantation @ 1:10 will be carried out - Species of local economic significance and values will be planted	Contractor	Area of greenery that has been cleared Complaints or grievances by the locals	Monthly monitoring by RPMO& DSMC-ES
Impacts on Fauna	Disturbances to local and migratory birds, reptiles and mammals	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the nearby area - Horn prohibited sign will be placed in nearby wildlife inhabited area - Prohibit workforce from any wood logging, hunting - Designating stockpiling areas - Providing alternative fuel to workers for cooking. - Conducting environmental awareness activities for the workforce (especially with respect to importance of conservation and protection of wildlife)	Contractor	Vehicles running Nearby wildlife	Monthly visual inspection by RPMO& DSMC-ES
Aquatic system	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 subproject area	- Washing of vehicles on nearby rivers will be restricted - Disposal of waste of any kind on water bodies will be strictly prohibited - Fishing in nearby rivers will be prohibited for workforce	Contractor	Nearby water bodies; chatara cannel, sunsari river and ponds at Ramdhuni area will be monitored with respect to project activities; Any grievances from locals regarding disposal of waste onto water bodies	Monthly visual inspection by RPMO& DSMC-ES

				will be Referred	
C. Socioeconomic Characteristics					
Community activities	The construction related activities that generate dust, noise and impede access will disturb the local residents	- To minimize disturbances, construction work will be conducted at earliest possible. - Disturbances to local activities are foreseen at service areas of Jhumlka 5and 5 and some inner settlements with narrower access - 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.	Construction contractor	Time schedule of construction work; Information related to construction activity to local residents Number of temporary diversions signboards etc.	Daily (or whenever there are construction activities) by contractor Monthly visual inspection by RPMO& DSMC-ES
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	- Include in workers training adherence to proper housekeeping practices at worksites. - Local people should be given priority to work (recommended that more than 60% local workers whenever available) in the subproject which helps to minimize the chances of cultural discrepancy and conflict due to increased outside workers	Construction contractor	Daily entry-sheet of the workforce in the campsites Number of local people versus outside workers in the subproject area will be regularly monitored	Monthly inspection at campsites (if any) by RPMO& DSMC-ES.
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 people and culture	- Mandatory use of safety measures (PPEs) such as mask, helmet, hand gloves and rubber boots, etc. - The laborers will be insured for their health and safety. - Provide safe drinking water for labours - First aid box will be kept at a proper and easily accessible place. - Prohibit child labour in all construction activities. - Health & hygiene practices; precautions will be taken in response to current risk of CovID19 infections	Construction contractor	Availability of personal protective equipment, First-aid facilities, Medical insurance coverage for workers, Housekeeping and condition of sleeping and sanitation facilities at campsite (if any), Roster of workers	Daily (or when there is a construction activity) by contractor. Monthly visual and document inspection by RPMO and DSMC-ES Use of covid-19 response checklist for biweekly reporting
Community Health & Safety	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	- Contractor's will maintain adequate space and adequate lighting, temporary fence, barriers and signage at worksites; - Children will be prohibited from active construction sites - Proper fencing of stockpile areas - Awareness programs on communicable diseases and hygiene practices will be carried out - Disseminate the GRM to communities and affected	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (Annex 2-D); Number of complaints from	Daily by contractor. Monthly visual inspection by RPMO& DSMC-ES

	community by construction workers	stakeholders during consultations - Sensitive localities in terms of risk of this impact are Jhumka bazar of 3 and 5 area and some inner settlements with narrower access		sensitive receptors; Number of walkways, signs, and metal sheets placed at subproject location	
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	Although the subproject area holds no visible above-ground PCRs, potential archaeological relics could be discovered underground and could be damaged due to construction activities.	- If by chance any such findings are spotted or suspected, the contractor will immediately stop work to allow further investigation, in coordination with Department of Archaeology.	Contractor	Records of chance finds	Daily (when there are excavation activities) by contractor. Monthly visual inspection by RPMO and DSMC-ES.
During Operation and Maintenance Phase					
Exposure to chemicals	Excessive exposure to chlorine, hypo-chlorous acid, and hypochlorite ion generally results in irritation of the esophagus, a burning sensation in the mouth and throat, and spontaneous vomiting	- All disinfection chemicals require proper storage and handling practices - Provide safe storage for chemicals - Ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation - Ensure use of PPE while using chemicals - Use of chlorine guideline as per WHO (Annex 8)	Contractor during DLP; WUSC or operator after	Visual inspection	Daily (or as needed) by the operator.
Water bodies	Water pollution due to effluent produced from the periodic backwashing of the filter plant, and septic tank sludge discharge directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when flow will be less.	- A settling tank is proposed for decanting of the slurry from the effluent during backwash - Septic tank sludge shall be used by local manure producer when it is required to be managed	Contractor during DLP; WUSC or operator after DLP	Visual inspection Effluent sampling	For first year, DSMC after that WSUC daily inspection or as needed. Effluent sampling by the operator, only when necessary or practical.
Impact of use of diesel generators	Noise nuisance, disturbance to locals; and possible ambient air pollution	- Under suitable condition governed by location of water source, the electro- mechanical components will be placed as practicably far as possible from the major settlements, say more than 50 meters far from the major settlement or market area. - Regular maintenance of generators - Use of good quality fuel	Contractor during DLP; WUSC or Operator after DLP	Visual inspection Water Quality reports WTP records in the logbook	Daily or as needed visual inspection by the operator. Quarterly or as needed water quality testing by the operator.
Occupational Health and Safety	Risk of physical and biological hazards for the workers in FSTP	- Provision of standard set of PPEs containing masks, face shield/visor, water proof gloves, boots, safety goggles and working suit - Provision of adequate welfare facilities including clean	Contractor during DLP; WUSC or municipality	Records of use of PPEs Inventory of welfare Utilities Medical	Daily records Weekly inventory Every 3 months; or and as per need

		water, soap, nailbrushes, disposable paper towels and washing facilities. - Provision of First Aid Kits. Provisions should include clean water or sterile wipes for cleansing wounds, and a supply of sterile, waterproof, adhesive dressings. - Regular supervision and monitoring of provision and use of PPEs - Under the context of possibility of spread of the viral infections, the workers will be instructed for (a) compulsory use of masks along with other PPEs, (b) adequate supply of water for drinking & washing, (c) screening of health conditions of workers	after DLP	screening records of the workers	
Risk of community hazards	There could be accidents like falling into open/damaged drains with open surface. This also poses risks to animals and vehicles	- Restriction of unauthorized entry of people in the treatment plant area - Installation of warning sign boards in visible locations, and in local languages during maintenance periods and heavy rain periods - Under the context of possible spread of the viral infections, the workers will be instructed to have minimal contact with the community people.	Contractor during DLP; WUSC or municipality after DLP	Visual inspection Records of any accidents, and grievance records	

C. Environmental Monitoring Program

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

230 In addition to regular monitoring onsite (at town level) by the ICG and DSMC-ES on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. Table VIII-3 presents the indicative environmental monitoring plan for the subproject which includes relevant environmental parameters, with a description of the sampling stations, frequency of monitoring, applicable standards, and responsible agencies. This will be updated during detailed design to ensure EMP and monitoring program is commensurate to the impacts of the subproject.

TableVIII-3: Environmental Pollution Monitoring Program

S.N	Field	Stage	Parameters	Location	Frequency	Standards	Responsibility
1.	Air quality	• Prior to construction to establish baseline • Construction phase	TSP, PM_{10}, SO_2, NO_x (only if potential source is due to subproject)	• Work site locations • Along water transmission main 1-km interval from PTWs • Construction campsite locations	• 24-hour monitoring once in every season (Jan-June) for the constructio n period	• National Ambient Air Quality Standard s, 2003	Contractor
2.	Noise and vibration levels	• Prior to construction to establish baseline • Construction phase	Equivalent day and nighttime noise levels	• PTWs location; Reservoir location • Along water distribution mains • Construction campsite locations	• Every day during constructio n work	• National Noise Standard Guideline s, 2012	Contractor
3.	Water quality	• Prior to construction to establish baseline • Construction phase	TSS, pH, fecal coliform (other parameters as required by NDWQS)	• Supplied water and at Adjacent to construction sites (to be identified by the SEMP	• Every month for the entire period of constructio n on	• National Drinking Water Quality Standard s, 2005	Contractor

D. Institutional Capacity Development Program

231 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.

232 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. DWSSM's regional laboratory or a private laboratory can be used for monitoring WQ until the WUSC becomes trained for this. 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 will 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. There will be sufficient fund to include training by the licensed and accredited lab, while monitoring water quality.

233 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 VIII-4. The Environmental Safeguard specialist & EMP Field Monitoring Staffs are responsible for organizing different training program for Environmental Management.

Table VIII-4: Training Program for Environmental Management

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation meeting on SEMP and safeguards policy of project	Orientation program/ workshop for CSE, ICG and contractor team	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and GON and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GON	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Nepal Environmental Laws and Regulations **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 DRTAC or DSMC)
Participants	Executing and implementing agencies, RPMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

E. Staffing Requirement and Budget

234 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.

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

236 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.

237 The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase &the responsibility remains to WUSC. All monitoring during the operation and maintenance phase will be conducted by WUSC as per an O&M Manual. The WSP, included in subproject design, will allocate NPR 500,000 annually for operation and maintenance particularly water quality monitoring. If a licensed laboratory will be engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan.

238 Cost of awareness program & WSP during contract period is NPR 169,345.00. Total Sanitation promotion will also be a core part of awareness programs and this will be conducted in coordination with the social safeguards team of the project. The indicative costs of EMP implementation, safeguards and its monitoring are shown in Tables VIII-5(by source of funds);

Table VIII-5: Indicative Cost of EMP Implementation and It's Monitoring

S.N.	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
A	**Mitigation Measures**						
1	Protection works, slope stabilization works					1000,000	Civil works contract
2	Rehabilitation, and reinstatement works					500,000	Civil works contract
3	Greenery management/ Promotion	Construction phase				575,000	Civil works contract
B	**Monitoring Measures**						
1.	Air quality and noise level monitoring	- Pre- construction - Construction	Per location	4		215000	Civil works contract
2.	Noise levels monitoring	- Pre- construction - Construction	Per location			-	Civil works contract
3.	Water Quality Test	Pre-construction - Construction	Per Location	18		180000	Civil works contract
C	**Capacity Building**						

1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, GoN environmental laws and regulations, and environmental assessment process; (ii) induction course 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 Module 2 – 100,000 Module 3 – 200,000	300,000 800,000 200,000	Covered under PMQAC or DSMC contract
D	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc.	As per requirement	NA	NA	NA	
		IEE preparation	Lump sum	1	500,000	500,000	DSMC contract
E	**Other Costs**						
1.	Public awareness	Focused on Community Health and Safety & Environmental Conservation, Total Sanitation; and Information dissemination	As per requirement	Lump sum		169,345	Civil works contract – contractor's defect liability period
2.	Additional WASH provisions	Focused on hygiene and safety				250,000	Civil works contract – contractor's defect liability period
3.	Water sprinkling	At active sites near settlement/ market areas (as needed)		Lump-sum		200,000	Civil works contract
4.	Social safeguards	Grievances, information disclosure, meetings		Lump sum		53,750	Civil works contract – contractor's defect liability period
5.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising		Lump sum	Contractor 's liability	As per insurance requirement	Civil works contract – contractor's defect liability period
F	**External Monitoring Costs**						
	Environmental Specialist				100,000	100,000	PMO cost
	Sociologist				75,000	75,000	
	Support staff				25,000	50,000	
	Cost of monitoring visit by MoWS/DWSSM					200,000	
	Transportation and logistics					75,000	
TOTAL						**5443095.00**	

239 The EMP will be included in civil work bidding and contract documents. The Total EMP

cost is NRs 5443095.00 where relevant cost will be included in the contract document to ensure implementation of EMP works.

IX. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Information Disclosure, Consultations and Participations

240 During the study field inspection of proposed sub project facility locations and pipeline alignments that had been identified was undertaken dated on June 2020.Due to continuous lockdown in different forms declared by the central and local government considering spread out the effects of CovID-19 in community level, the field work was interrupted for some time. Applying precaution measures site visit and interaction continued at the sub-project area from January and February 2021. Stakeholder consultations and local participation was an essential process in subproject 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 IX-1 lists the persons consulted during the IEE Study.

Table IX-1: Lists of People and Institutions Consulted

SN	Name	Organization/Address
1	Mr Jaya Prakash Chaudhary	Mayor, Ram Dhuni Municipality
2	Mr. Raj Kumar Chjaudhary	Ward Chairman ward no 3 Ram Dhuni Municipality
3	Mr Dev Raj Pokhrel	Ward Member ward no 1 Ram Dhuni Municipality
4	Mr Narayan Shrestha	Ward Member ward no 3 Ram Dhuni Municipality
5	Mr. Manish Kumar Chaudhary	Chairperson of Ward 2, Ram Dhuni Municipality
6	Mr, Deg Raj Phuyal	Chairperson of Ward 5, Ram Dhuni Municipality
7	Mr. Keshi Lal Chaudhary	WUSC Chairperson Jhumka WSSP
8	Mr, Padam Kunwar	Regional Chief RPMO, Itahari
9	Mr Prem Kumar Khadka	WUSC Secretary Jhumka WSSP
10	Mr.Ankit Man Shrestha	Engineer, UWSSSP/ RPMO, Itahari
11	Mrs Deepa Wagle	WUSC Member Jhumka WSSP
12	Mr. Deepak Parajuli	WUSC Voice chairperson
13	Mr .Ram Mani Sigdel	WUSC Treasurer
4	Mrs Sita Khanal	WUSC Joint secretary
15	Mr. Birendra Kumar Sada	Chairperson Mohanpur Tole Developmen committee
16	Mr. Umesh Dahal	Jhumka WSSP Ram Dhuni-5
17	Mr. Bhuwaneshor Mochi	Ram Dhuni-2
18	Mr. Rishikesh Nepal	Chairperson GaneshTole Development committee
19	Mr. Kishori Pd Pokhrel	Chairperson Ratri Tole Developmen committee
20	Mr. Amit Kumar Chaudhary	Chairperson Jurai Dhami Tole Development committee
21	Mr. Guna Raj Kafle	Parijat Tole Development committee
22	Mr .Prakash Karki	User of Ram Dhuni-3
23	Mr .Mohammad Aslam	User of Ram Dhuni-3
24	Mrs,Saraswoti Poudel	User of Ram Dhuni-3
25	Mr. Sursah Chaudhary	User of Ram Dhuni-3

241 During the field visit for the IEE, consultations were undertaken at different locations. Formal and semi-formal public consultations were conducted during the period. Safety aspects, greenery preservation, dust control and choosing of safe construction campsites during construction were raised as among the concerns during the public consultation.

Table IX-2: List of Public Consultations and their Summary

Meeting Date	Participation	Venue & Participation	Recommended Measures
20 February 2021	WUSC and WUSC advisor (Total 13-Male:10, Female:3)	WUSC office	WUSC will work with coordination active participation for project Implementation.
3 February 2021	WUSC and WUSC advisor (Total 14-Male:10, Female:4)	WUSC office	Coordinate with all Tole development committee with briefing about UWSSP and cash collection
25 January, 2021	Mayor, Chief administrative officer, ward chairperson, WUSC Team and ERPMO, ERDSMC Design Engineer (Total 23-Male:20, Female :3)	Ram Dhuni Municipality office	Positive commitment to project implementation. Support for documents of the IEE and DDR required for the project
8 December, 2020	WUSC, ERDSMC and Local user and Tole development committee (Total 29- Male:25, Female:4)	WUSC office	WUSC committed about safeguard and land required document. It is decided to Household number would be change and finalize after verification of all survey work and of all detail discussion with concern user of water supply project.
10 November, 2020	Mayor, Deputy Mayor, ward chairperson ERPMO,WUSC and ERDSMC (Total -21 Male:18, Female :3)	WUSC office	Positive commitment to project implementation. Mayor and Deputy Mayor committed Municipality will support to 3% of total project cost for Project and WUSC will collect 2% amount of total project cost.
24 September, 2020	WUSC, and ERDSMC, Design Engineer (Total: 15- Male:11, Female: 4)	WUSC office	To conduct survey work by ERDSMC team as soon as possible with coordination of WUSC.

242 The concerns raised by the stakeholders during public consultations have been addressed during preparation of this IEE report. The major environmental & social safeguards and sustainability related concerns raised during the consultations are;

(i) Employment opportunities for the locals
(ii) Underground water concerns and water quality
(iii) Safety and dust control during construction
(iv) Need of timely completion of the project construction works as per targeted during the planning phase
(v) Cost sharing and operational aspects of the project

243 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 ICG will maintain good communication and collaboration with WUSC and the Municipality. PMO, ICG, Contractor 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 the construction stage, if there would be a major change in design/alignment/location, the PMO and ICG will hold at least one public consultation meeting early on in the construction period to solicit perceived impacts, issues, concerns and recommendations from affected communities;
(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-

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 Rural Municipality;

(iii) During construction, regular random interviews will be conducted by the ICG- ESA every month to monitor environmental concerns of subproject communities;

(iv) During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;

(v) The public consultations and information disclosure will be continuous throughout the project cycle. Women participation from beneficiary community will be insured. PMO and ICG will be responsible for designing and implementing such aspects on the ground.

244 ADB approved IEE Report, will be made 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 in the ADB's and UWSSP websites.

B. Grievance Redress Mechanism

245 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 channeled through letters, emails, text messages (SMS), verbal narration, grievance boxes and registers. Suggested template for grievance redress form is in Annex 2-B.

246 A common GRM will be in place for social, environmental or any other grievances related to the subproject. 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 PMO will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the RPMO will be the focal person for facilitating the grievance redress at the local level.

247 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 it's 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.

248 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 subproject area as invitee,20 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.

249 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

250 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 5, 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 even use for quicker solution 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 work scan contact UWSSP to file a complaint. The municipal-levelfield office of the RPMO, inWUA's building, will document the complaint within 24 hours of receipt of complaint in the field, and WUA or local bodies will immediate ladders 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.

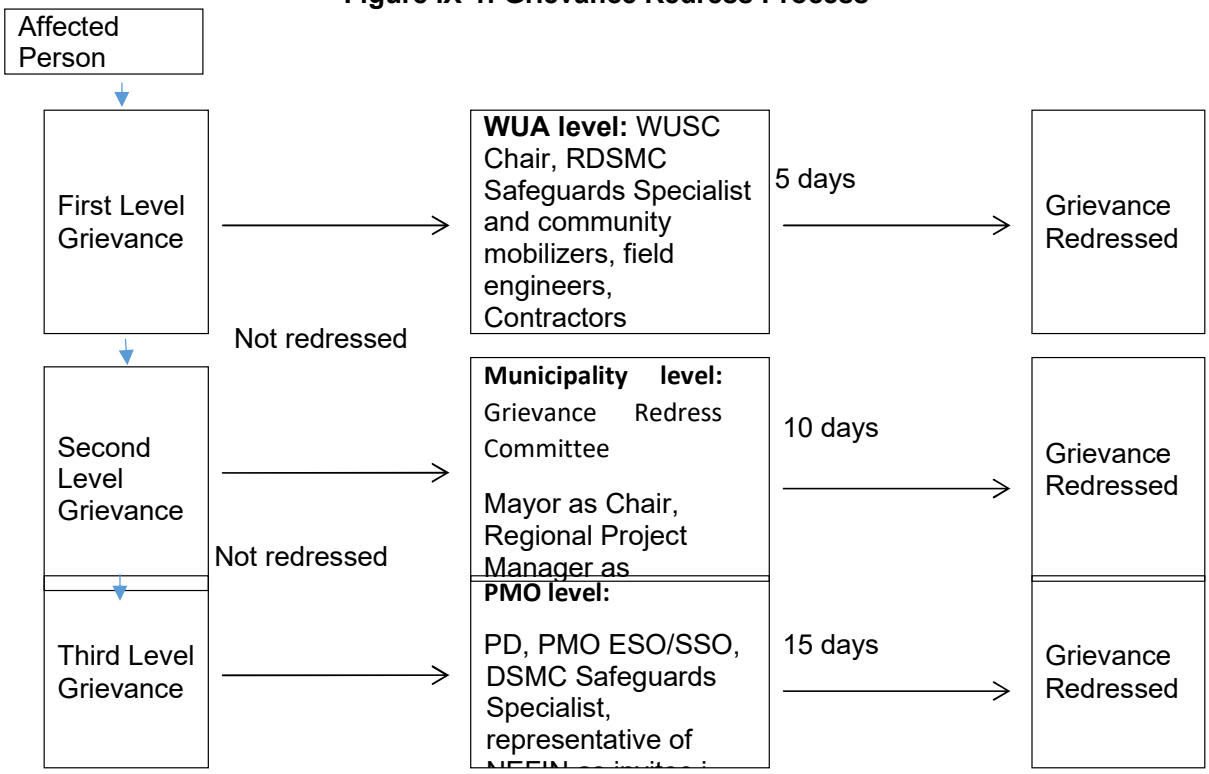
251 All paperwork (details of grievances) needs to be completed by the WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, DWSSM, Mayor and 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.

252 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.

253 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 IX-1: 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.

254 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.

255 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.

256 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 IX-2: Suggested Format for Record Keeping of Grievances

S.N.	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

X. MONITORING AND REPORTING

257 RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will relate to the subproject's impacts that are identified in IEE. PMO, ICGs will compare the works completed and deviations from the original scope. They will also undertake site inspections and review documents to verify that the project complies with the EMP.

258 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. Project budgets will reflect the costs of monitoring and reporting requirements. For projects likely to have significant adverse environmental impacts during operation, reporting will continue on an annual basis. Monitoring reports will be posted in a location accessible to the public.

259 For projects likely to have significant adverse environmental impacts, the PMO will retain 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 PMO-ESS.

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

(i) conduct periodic visits to projects with adverse environmental or social impacts;
(ii) conduct supervision and review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by EAS to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with EAS to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance; 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.

261 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.

262 The contractor will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The contractor needs to conduct regular monitoring of environmental status, compliance and standards in its working sites and campsites. This needs to be included in monthly reporting to the PMO Consultant in the format prescribed by the PMO Consultant. The Contractor shall facilitate for field visits in any and all monitoring activities planned by the PMO consultants, PMO / RPMO personnel and the ADB.

XI. CONCLUSION AND RECOMMENDATIONS

263 The proposed Jhumka urban water supply and sanitation subproject located in Jhumka Town is not an environmentally critical intervention. Here the IEE further concludes that;

(i) The subproject is not within any environmentally sensitive area and hence it is unlikely to cause any significant adverse impacts of flora and fauna of the area;
(ii) Since it is a physical development intervention, there will be some impacts on the local environment. However, the extent of impacts is expected to be local, confined within the subprojects' main areas of influence, and for short period of time, and can be mitigated through appropriate measures; and
(iii) Meticulous activities during construction of reservoirs and building, well managed activity plan for deep tube wells and treatments plants, and proper management of construction campsites, if any, and stockpile areas are seen as major areas to focus with respect to environmental safeguards.

264 Considering the above statement, It is recommended that;

(i) Mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly to be applied at construction sites. Mitigation measures would not be difficult to be implemented but timely implementation and its monitoring is required.
(ii) Effective coordination with the local communities of Jhumka particularly ward 1, 2, 3 and 5 area and some inner settlements with narrower access to minimize disturbances to local activities and damage to public or private properties during laying of pipelines and other construction works.
(iii) 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.

265 The proposed subproject will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes. This subproject will have positive development impact not only in the project area, but also in this belt of Province no 1.

266 Based on the above findings, the classification of Jhumka Urban Water Supply and Sanitation Project as Category B is confirmed. IEE is sufficient for the subproject, and no further special study or EIA needs to be undertaken for safeguarding the environmental aspects of the subproject implementation.

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ANNEXES

ANNEX 1: REA CHECKLIST

ANNEX 1:

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

Instructions

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

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

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

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

Screening Questions	Yes	No	Remarks
A. Project Siting **Is the project area**			
Densely populated?		√	The population density is 34.4 per ha.
Heavy with development activities?		√	The distribution pipeline will partially go through RoW of road in the municipal settlements with moderate population density.
Adjacent to or within any environmentally sensitive areas?		√	
Cultural heritage site		√	
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
B. Potential Environmental Impacts Will the Project cause…			

Screening Questions	Yes	No	Remarks
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?		√	Ensure sustainable pumping and recharge of ground water with recharge pit area
Social conflicts arising from displacement of communities?		√	
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√ (Risk of Chance case)		Basic water treatment is proposed under the subproject. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√ (Risk of Chance case)		Design proposes monitoring kits, a lab room. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives.
Inadequate protection of intake works or wells, leading to pollution of water supply?		√	
Over pumping of ground water, leading to salinization and ground subsidence?		√	High cost involved in pumping will constrain over pumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit.
Excessive algal growth in storage reservoir?		√	EMP provides mitigation measures.
Increase in production of sewage beyond capabilities of community facilities?		√	Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
Inadequate disposal of sludge from water treatment plants?		√	Minimal sludge expected. EMP provides mitigation measures.
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		√	
Impairments associated with transmission lines and access roads?	√		Power transmission lines crossing the proposed water transmission & distribution lines will not be affected. EMP provides measures to mitigate impacts on power supply poles in the bazaar that are immediately adjacent to, or onto, road carriageways.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		$CaOCl_2$, commonly used in basic water treatment, will be used. EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents &/or human error in dosing.

Screening Questions	Yes	No	Remarks
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?		√	$CaOCl_2$, 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.
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. This may couple with local sources like brick factory
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	√		Most of the communities have septic tanks leading to soak pits. EMP provides mitigation measures.
increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	√		There is no wastewater collection & treatment system. EMP provides mitigation measures.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
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. S-EMP development, and deputation of an EHS focal person by the contractor will be supervised
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. S-EMP development, and deputation of an EHS focal person by the contractor will be supervised

Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

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

Options for answers and corresponding scores are given below.

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

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

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

NO MITIGATION SCENARIO (SCOPING CHECKLIST) of Jhumka UWSS Project

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 water bodies, etc)?				
1.1	Permanent or temporary change in land use, land cover or topography including increases in intensity of land use?	Yes	Slight changes in existing land cover status thus adding some built-up units in the existing open land	Not significant because the proposed land is currently unused, and the area is of small scale
1.2	Clearance of existing land, vegetation and buildings?	Yes	Existing land cover could be converted into built up area	Not significant
1.3	Creation of new land uses?	No		
1.4	Pre-construction investigations e.g. boreholes, soil testing?			
1.5	Construction works?	Yes	Surface water bodies; agricultural land could be polluted/disturbed due to haphazard disposal of spoil and waste during construction phase	Not significant because scale of work is small
1.6	Demolition works?	Yes		Not significant because scale of work is small
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Chance of disposal of waste from temporary campsite thus polluting the local surface water bodies.	Not significant because scale of work is small
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations?	Yes	Disturbance to local socio-economic activities during construction phase	Not significant because scale of work is small
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	Stockpile site is needed. This may disturb community safety, especially for children	The site selected for stockpile is not a prime public space.
1.16	Facilities for treatment or disposal of solid wastes or liquid effluents?	Yes	Small compost pits in campsites; Soak pit for sludge trap. These may pollute the surface water bodies	Not significant as these are in-house units, not community scale units.
1.17	Facilities for long term housing of operational workers?	Yes	WUSC building, guard house	Not significant as the land required is small

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?
1.18	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	Community safety if the trenches are not timely back-filled	Not significant as pipelines are small sized
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	Deep underground water sources will be used through deep boring	No, as the design has considered safe yield
1.25	Changes in water bodies or the land surface affecting drainage or run-off?	No		
1.26	Transport of personnel or materials for construction, operation or decommissioning?	Yes	Local construction materials need to be transported from within the project district	Not significant as the transportation needed is intermittent
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	Temporary influx of workforce may cause disturbance to local social activities, harmony	Not significant as they will be coming for short time for specific works only
1.30	Introduction of alien species?	No		
1.31	Loss of native species or genetic diversity?	No		
1.32	Any other actions?	No		
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?	Yes	Undeveloped land will be Used	Not significant as the unused small land parcels are selected

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 sources are used	
2.3	Minerals?	No		
2.4	Aggregates?	Yes	These will be used from authorized local suppliers	
2.5	Forests and timber?	No		
2.6	Energy including electricity and fuels?	Yes	Electricity, Petrol, diesel, and LPG gas will be used. However these are not locally produced energy sources	
2.7	Any other resources?	No		
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 (e.g. insect or water borne diseases)?	Yes	The surroundings of the worker's camp may be affected as they may not have access to safe supply of water and good sanitation practice.	Not significant as the campsites proposed are not within core settlements
3.3	Will the project affect the welfare of people e.g. by changing living conditions?	No		
3.4	Are there especially vulnerable groups of people who could be affected by the project e.g. hospital patients, the elderly?	No		
3.5	Any other causes?	No		
4. Will the Project produce solid wastes during construction or operation or decommissioning?				
4.1	Spoil, overburden or mine wastes?	Yes	Degradation of surface land and pollution of surface water sources	Not significant as scale of works is small
4.2	Municipal waste (household and or commercial wastes)?	Yes	Waste from campsite will increase municipal waste	Not significant as it is short term and small scale
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 sludge from effluent treatment?	Yes	Normal sludge from backwash of water treatment plants	Not significant as it will contain sediments which are not toxic

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?
4.7	Construction or demolition wastes?	Yes	Small volume of construction waste during construction phase, and some waste during decommissioning will be generated	Not significant as these are not hazardous
4.8	Redundant machinery or equipment?	No		
4.9	Contaminated soils or other material?	No		
4.10	Agricultural wastes?	No		
4.11	Any other solid wastes?	No		
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	Ambient air pollution is a Concern	Not significant as GoN standard vehicles and fuel are in use in general
5.2	Emissions from production processes?	No		
5.3	Emissions from materials handling including storage or transport?	Yes	During construction phase, dust generation by the unloading of materials like cement, aggregates, metal bars, etc. During operation phase, spills or leaks from stored chemicals or gases (e.g. chlorine gas) for use in the water treatment and cleaning processes.	Not significant as the scale of works is not large; and these are only site specific activities of short term nature
5.4	Emissions from construction activities including plant and equipment?	Yes	Dust generation due to earthworks and other construction activities.	Not significant as these are short term
5.5	Dust or odours from handling of materials including construction materials, sewage and waste?	Yes	During construction phase, air pollution due to dust generation during unloading of construction materials like aggregates, cements, metal bars, etc. During operation phase, air pollution due to leaks from mishandling of chemicals used in the water treatment (e.g. coagulants, chlorine).	Not significant as the scale of works is not large; and these are only site specific activities of short term nature
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?	No		
6. Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?				

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?
6.1	From operation of equipment eg engines, ventilation plant, crushers?	Yes	Noise and vibration (limited) may cause community nuisance	Not significant as the scale of work is small, site specific and short term
6.2	From industrial or similar processes?	No		
6.3	From construction or demolition?	Yes	Noise may cause community nuisance	Not significant as the scale of work is small, site specific and short term
6.4	From blasting or piling?	No		
6.5	From construction or operational traffic?	Yes	Construction traffic will cause disturbance to community activities	Not significant as local roads are wide, and the activities are short term
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?	No		
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 untreated) to water or the land?	Yes	During operation, the backwash of treatment units will discharge sludge and grey water that pose risk of pollution of land and surface Water	Not significant as this is done only periodically
7.3	By deposition of pollutants emitted to air, onto the land or into water?	No	The land nearby the workers camp may be polluted by the daily activities of the workers residing there temporarily.	Not significant as campsite is of small size
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?	No		
8.2	From events beyond the	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?
	limits of normal environmental protection e.g. failure of pollution control systems?			
8.3	From any other causes?	No		
8.4	Could the project be affected by natural disasters causing environmental damage (e.g. 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?	Yes	There is chance of in migration due to this project that will affect the existing community, cultural identity, economic conditions etc.	No, the ethnicity of project area is of heterogeneous type.
9.2	By resettlement of people or demolition of homes or communities or community facilities e.g. schools, hospitals, social facilities?	No		
9.3	Through in-migration of new residents or creation of new communities?	Yes	People from the neighboring remote areas may migrate to this project town to achieve improved living standards and this may bring change in demography as the population of the project area may be increased.	Not significant; however, positive aspects of in-migration are expected in the low-lands/flat lands of the project area
9.4	By placing increased demands on local facilities or services eg housing, education, health?	No		
9.5	By creating jobs during construction or operation or causing the loss of jobs with effects on unemployment and the economy?	Yes	Requirement of labour for the construction works prioritize the local people hence, providing employment opportunities to the local people.	Yes, because the skills they learnt during their employment period can be utilized in the future in other similar kind of works.
9.6	Any other causes?			
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?				
9.1	Will the project lead to pressure for consequential development which could have significant impact on the environment e.g. more housing, new roads, new supporting industries or utilities, etc?	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?
9.2	Will the project lead to development of supporting facilities, ancillary development or development stimulated by the project which could have impact on the environment e.g. supporting infrastructure (roads, power supply, waste or waste water treatment, etc) housing development extractive industries supply industries other?	No		
9.3	Will the project lead to after-use of the site which could have an impact on the environment?	No		
9.4	Will the project set a precedent for later developments?	Yes	This is a positive impact. The safe access to water supply and sanitation by this project may create opportunities for other development works	Yes, because it will be the important factor for the sustainable development of the town
9.5	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 water bodies, • 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?	Yes, the part of project area lying along the main road may be susceptible to traffic congestion during distribution pipeline laying works that may provide discomfort to the passer-by and also may disrupt the access to the roadside shops and houses.
Question - Is the Project in a location where it is likely to be highly visible to many people?	Yes. The project area is proposed to serve some market area of Jhumka which includes the ward 3 and 5 area due to which it will be visible to some extent.
Question - Is the Project located in a previously undeveloped area where there will be loss of greenfield land?	No; but some structures like reservoir tank will be in undeveloped open land currently not is any use
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	No

Project? • hospitals, • schools, • places of worship, • community facilities	
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 – e.g. quantities, flows or levels of rivers, lakes, groundwater. Estuaries, coastal waters or the sea? • Soils – e.g. quantities, depths, humidity, stability or erodibility 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 The construction activities may shortly affect local ambient air quality especially during dry season. Noise nuisance in close proximity to construction sites is potential It due to movement of vehicles for transporting materials
Question - Is the Project likely to affect the availability or scarcity of any resources either locally or globally? • Fossil fuels?	No

• 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?	
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?	Yes, Ambient air quality deterioration, noise levels and exposure to risks from stockpiles/trenches have potentiality to affect Community health & safety aspects during the construction phase This project may also result in the occurrence of communicable diseases due to temporary settlement of workers

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 trans boundary 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?	No
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?	
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?	No
16. Will the impact be irreversible?	No
17. Will it be difficult to avoid, or reduce or repair or compensate for the effect?	No

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Date:	20th Jan 2021

ANNEX 2: Environmental Standards, Sample Forms, Formats and Reporting Template

ANNEX 2-A: RELEVANT ENVIRONMENTAL QUALITY STANDARDS

Ambient Air Quality Standards

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

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

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

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

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

Noise Level Standards

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

* Guidelines for Community Noise, WHO, 1999.

Source: Environmental, Health and Safety General Guidelines, 2007.

International Finance Corporation, World Bank Group.

National Drinking Water Quality Standards, 2006

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

* Health-based guideline values

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

^ These standards indicate the maximum and minimum limits.

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

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

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

ANNEX 2-B:

SAMPLE GRIEVANCE REDRESS FORM

(To be available in Nepalese and English)

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

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

FOR OFFICIAL USE ONLY

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

ANNEX 2C: SAMPLE TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

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

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

B. Operating Policies for TMP

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

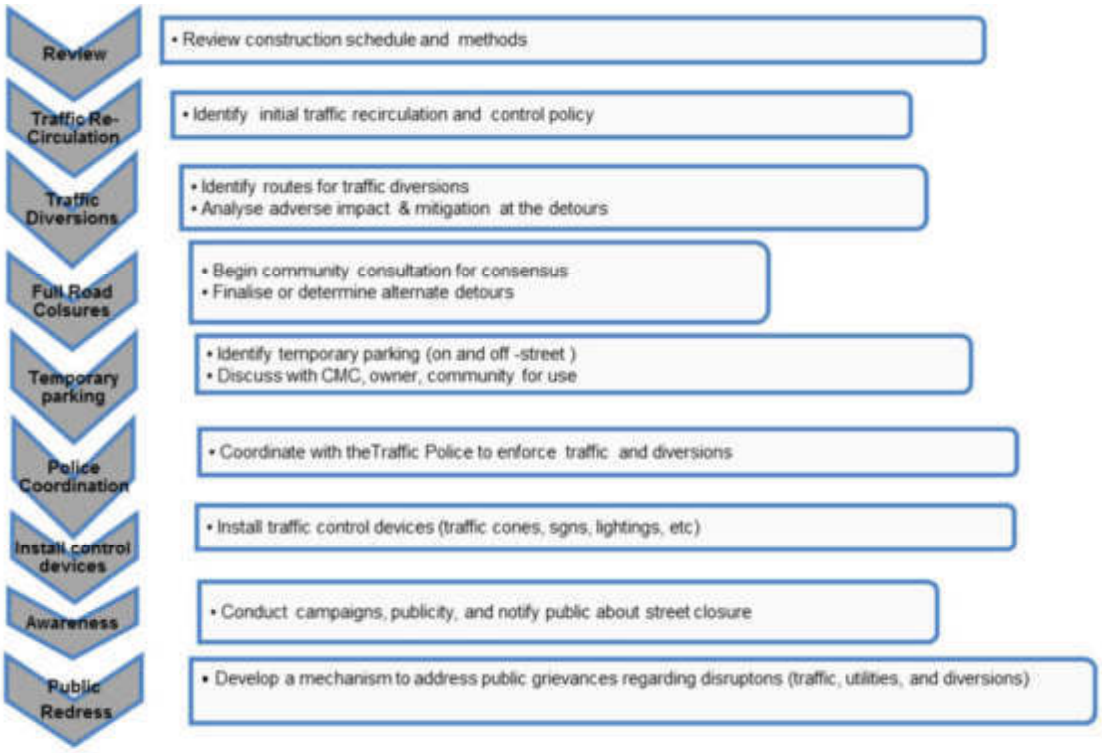
- Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they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

C. Analyze the impact due to street closure

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

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

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



Policy Steps for the TMP

D. Public awareness and notifications

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

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

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

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

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

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

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

E. Vehicle Maintenance and Safety

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

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

Vehicles will be cleaned and maintained in designed places

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

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

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

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

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

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

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

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

ANNEX 2D: SPOIL MANAGEMENT PLAN

Spoil Management Plan (SMP)

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

Objectives of SMP: The objectives of SMP are:

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

Structure of SMP:

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

Aspects and Potential Impacts

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

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

Spoil volumes, Characteristics and Minimization

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

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

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

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

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

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

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

Appendixes

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

ANNEX 2E: SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

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

INTRODUCTION

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

	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		□	□	□	□		
		□	□	□	□		
		□	□	□	□		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

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

- Review of the complaint management system;
- Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

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

Overall Compliance with CEMP/EMP

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

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

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

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

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

Air Quality Results

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

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

Water Quality Results

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

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

Noise Quality Results

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

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

ANNEX 2F: SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name Contract Number

NAME: _____DATE:

TITLE: _____DMA: GROUP:

LOCATION: _____

WEATHER CONDITION:

_____

INITIAL SITE CONDITION:

_____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory___ Unresolved

Incident_____ Resolved _____

_____

INCIDENT:

Nature of incident:

_____

Intervention Steps:

_____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control

Hazardous Substances		Trees and Vegetation		
Site Restored to Original Condition	Yes			
	No			

Signature

_____

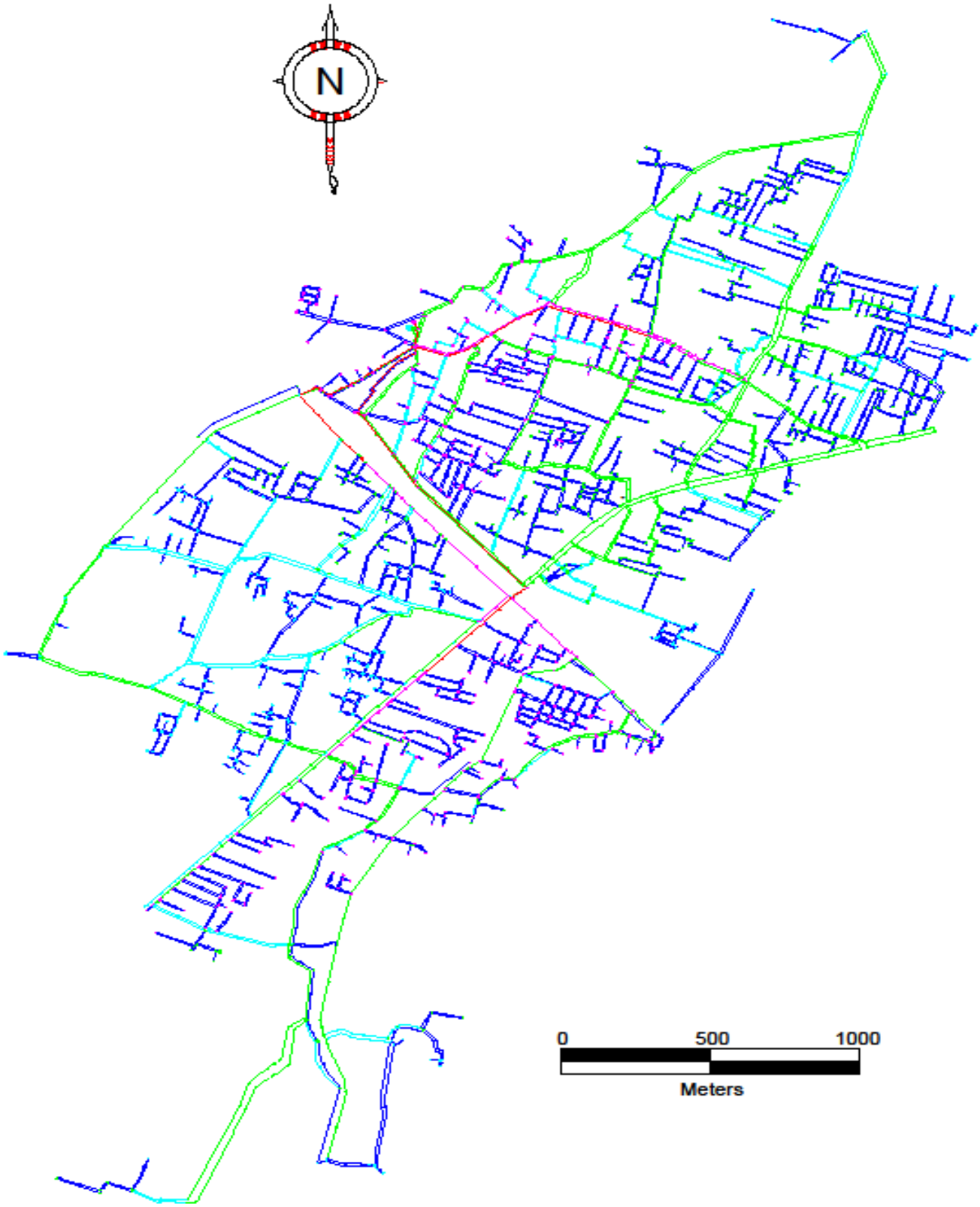
Sign off

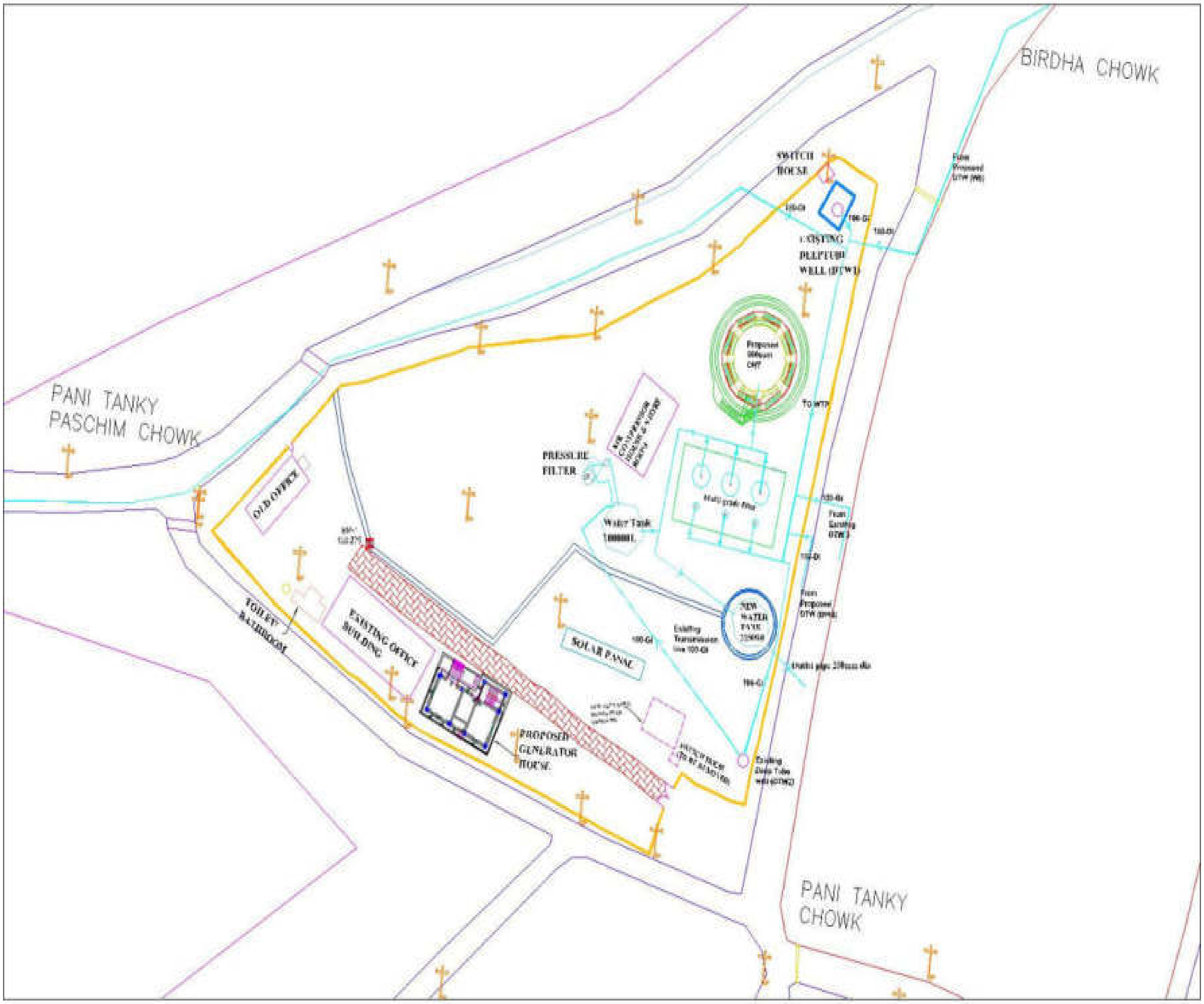
_____

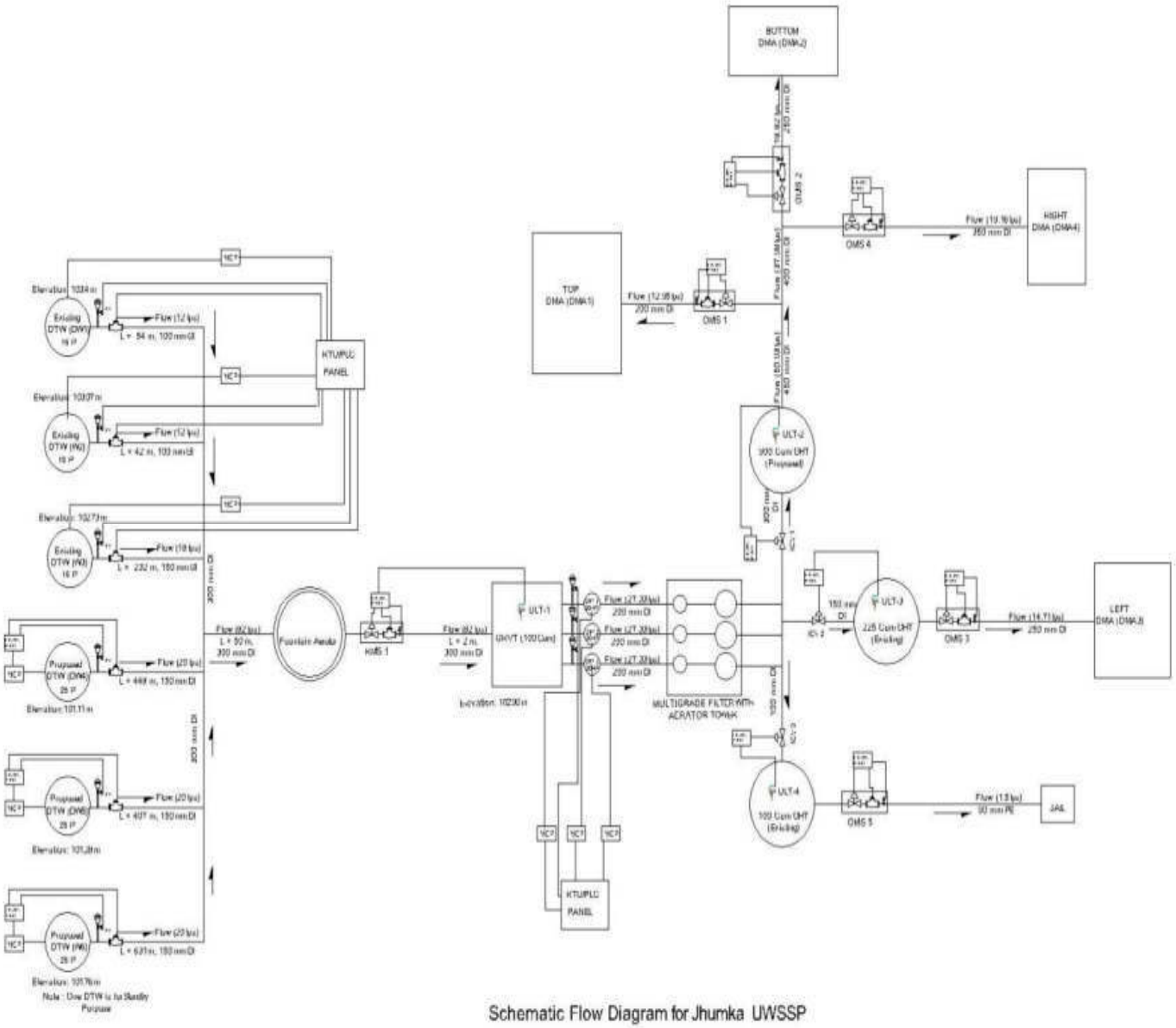
Name **Name**

Position **Position**

ANNEX 3: PROJECT SERVICE AREA & LAYOUT (project components including pipe line networks)


N
0
500
1000
Meters


BIRDHA CHOWK
PANI TANKY
PASCHIM CHOWK
SWITCH
HOUSE
EXISTING
DEEPTUBE
WELL (DTW1)
TO WTP
PRESSURE
FILTER
OLD OFFICE
Water Tank
100000L
SOLAR PANAL
NEW
WATER
TANK
EXISTING OFFICE
BUILDING
TOILET/
BATHROOM
PROPOSED
GENERATOR
HOUSE
PANI TANKY
CHOWK



Schematic Flow Diagram for Jhumka UWSSP

-
-
-

ANNEX 4: IBAT information on Biodiversity Sensitivity in Proximity of Project Area

Integrated Biodiversity Assessment Tool

World Bank Group Biodiversity Risk Screen

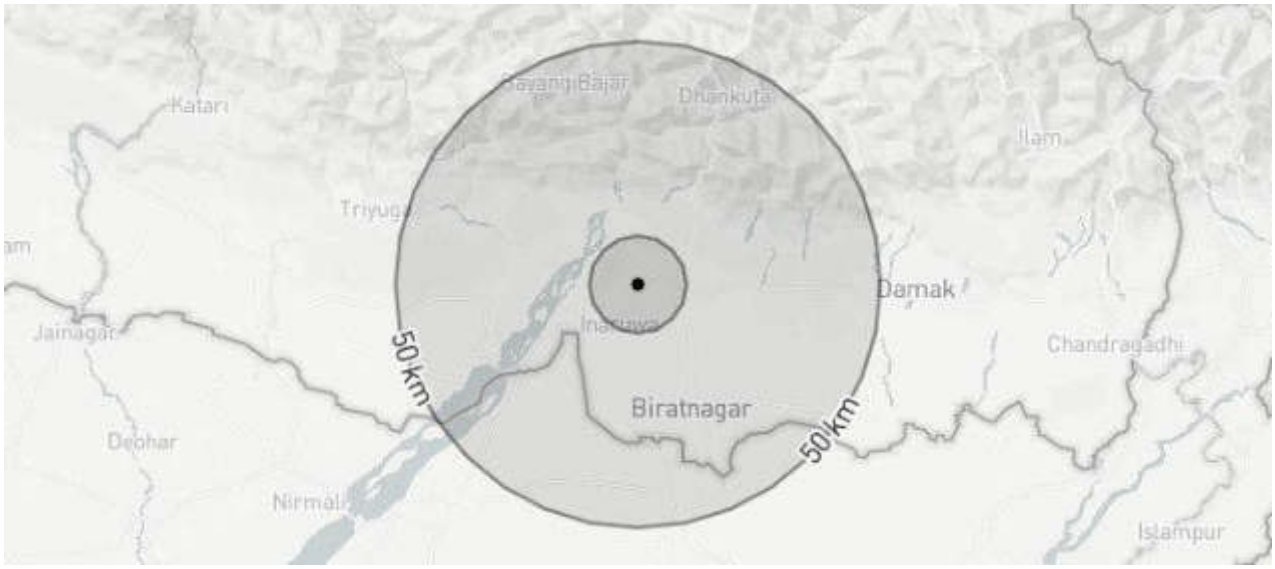
NEP-UWSSP: JHUMKA TOWN SUBPROJECT

Country: Nepal

- Location: [26.7, 87.2]
- Created by: Miguel Diangan

- **Overlaps with:**

Protected Areas	1 km: 0	10 km: 1	50 km: 2	3
World Heritage (WH)	1 km: 0	10 km: 0	50 km: 0	0
Key Biodiversity Areas	1 km: 0	10 km: 2	50 km: 1	3
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0
IUCN Red List				29
Critical Habitat				Likely



Displaying project location and buffers: 1 km, 10 km, 50 km

Priority Species

Habitat of significant importance to priority species will trigger Critical Habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming known or likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest. For the full IUCN Red List please refer to the associated csv in the report folder.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Indotestudo elongate	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Batagur dhongoka	Three-striped Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Manis pentadactyla	Chinese Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Houbaropsis bengalensis	Bengal Florican	AVES	CR	Decreasing	Terrestrial
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Sarcogyps calvus	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
Ailurus fulgens	Red Panda	MAMMALIA	EN	Decreasing	Terrestrial
Bubalus arnee	Wild Water Buffalo	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Caprolagus hispidus	Hispid Hare	MAMMALIA	EN	Decreasing	Terrestrial
Cuon alpinus	Dhole	MAMMALIA	EN	Decreasing	Terrestrial
Elephas maximus	Asian Elephant	MAMMALIA	EN	Decreasing	Terrestrial
Geoclemys hamiltonii	Spotted Pond Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Manis crassicaudata	Indian Pangolin	MAMMALIA	EN	Decreasing	Terrestrial
Melanochelys tricarinata	Tricarinate Hill Turtle	REPTILIA	EN	Decreasing	Terrestrial
Moschus leucogaster	Himalayan Muskdeer	MAMMALIA	EN	Decreasing	Terrestrial
Platanista gangetica	South Asian River Dolphin	MAMMALIA	EN	Unknown	Freshwater
Axis porcinus	Hog Deer	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Amblyceps arunchalensis		ACTINOPTERYGII	EN	Unknown	Freshwater
Sypheotides indicus	Lesser Florican	AVES	EN	Decreasing	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Rynchops albicollis	Indian Skimmer	AVES	EN	Decreasing	Terrestrial, Freshwater
Sterna acuticauda	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater
Haliaeetus leucoryphus	Pallas's Fish- eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
Neophron percnopterus	Egyptian Vulture	AVES	EN	Decreasing	Terrestrial, Freshwater
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Tor putitora		ACTINOPTERYGII	EN	Decreasing	Freshwater

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Bubalus arnee	Wild Water Buffalo	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Rhinoceros unicornis	Greater One- horned Rhino	MAMMALIA	VU	Increasing	Terrestrial, Freshwater
Prinia cinereocapilla	Grey-crowned Prinia	AVES	VU	Decreasing	Terrestrial
Geokichla wardii	Pied Thrush	AVES	LC OR LR/LC	Decreasing	Terrestrial, Freshwater
Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Acanthoptila nipalensis	Spiny Babbler	AVES	LC OR LR/LC	Stable	Terrestrial
Sphaerotheca swani		AMPHIBIA	DD	Unknown	Terrestrial, Freshwater

Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

The following protected areas are found within 1 km and 10 km and 50 km of the area of interest. For further details please refer to the associated csv file in the report folder.

Area name	Distance	IUCN Category	Status	Designation	Recommendation
Koshi Tappu - Buffer Zone	10 km	VI	Designated	Wildlife Reserve - Buffer Zone	Assess for biodiversity risk
Koshi Tappu	50 km	IV	Designated	Wildlife Reserve	Assess for biodiversity risk
Koshi Tappu	50 km	Not Reported	Designated	Ramsar Site, Wetland of International Importance	Assess for biodiversity risk

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km and 10 km and 50 km of the area

of interest. For further details please refer to the associated csv file in the report folder.

Area name	Distance	IBA	AZE	Recommendation
Dharan forests	10 km	Yes	No	Assess for criticalhabitat
Koshi Tappu Wildlife Reserve and KoshiBarrage	10 km	Yes	No	Assess for criticalhabitat
Urlabari forest groves	50 km	Yes	No	Assess for criticalhabitat

Species with potential to occur

Area Taxonomicgroup	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	32	7	2	2	3	0	24	1
MAMMALIA	122	23	1	9	13	9	88	2
AVES	670	28	6	7	15	32	610	0
ACTINOPTERYGII	84	4	0	2	2	6	64	10
MAGNOLIOPSIDA	66	2	0	0	2	0	61	3
INSECTA	105	1	0	0	1	0	101	3
GASTROPODA	53	1	0	0	1	0	45	7
LILIOPSIDA	58	2	0	0	2	0	54	2
AMPHIBIA	35	0	0	0	0	1	32	2
MALACOSTRACA	17	0	0	0	0	0	14	3
BIVALVIA	40	0	0	0	0	0	35	5
POLYPODIOPSIDA	4	0	0	0	0	0	4	0
AGARICOMYCETES	1	0	0	0	0	0	1	0
ARACHNIDA	3	0	0	0	0	0	3	0

Recommended citation

IBAT PS6 & ESS6 Report. Generated under licence 159-14869 from the Integrated Biodiversity Assessment Tool on March 2021 (GMT). www.ibat-alliance.org

Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.

ANNEX-5: MINUTES OF STAKEHOLDER CONSULTATIONS

आज मिती २०६६।१०।२१ गते यस खा०पा० को वैठक यसै खा०पा० का अध्यक्ष श्री केशीलाल चौधरी को अध्यक्षतामा आवश्यक वैठक वसियो।

उपस्थिती:-

१. केशीलाल चौधरी – अध्यक्ष –
२. दिपक पराजुली – उपाध्यक्ष –
३ प्रेम कुमार खड्का – सचिव –
४ रामभणी सिग्देल – कोषाध्यक्ष –
५ सिता खनाल – स – सचिव –
६. उमेश दहाल – सदस्य –
७. होम प्र० पोखरेल – सदस्य –
८. देवान खड्का – सदस्य –
९. लक्ष्मी खड्का – सदस्य –
१०. दिपा चापैत – सदस्य –
११. तिर्थ राई – सदस्य –
१२. प्रभुराम चौधरी – पदेन सदस्य –
१३. गोपाल चौधरी – सल्लाहाकार –
१४ ईश्वर विमिरे – सल्लाहाकार –

प्रस्तावहरु:-

१. साधारण सभा को समिक्षा सम्बन्धमा:-
२. यहरी खा०पा० को २०% सम्बन्धमा :-
३. विविध:- १. तगदी रसिद छपाउने सम्बन्धमा:-

प्रस्ताव नं १ मा छलफल गर्दा यस खा०पा० को २०६६।१०।१४ मा सम्पन्न हुँदो साधारण सभामा सहभागी आम उपभोक्ता हरुवाट प्राप्त गरिएका राय सुझाव हरु लाई सकारात्मक रुपमा ग्रहण गर्दै आगामी दिनमा कार्यन्वयन मा थप पारदर्शिता का साथ समग्रमा हुँदो साधारण सभा सम्पन्न भएको पुर्ण सफलता का साथ सम्पन्न भएको समिक्षा गर्ने निर्णय गरियो।

के. स. प.

प्रस्ताव नं २ मा छलफल गर्दा शहरी स्वा०पा० अन्तरगतको योजना ५% दायीत्व रकम संकलनका लागी २०६८/०७३ देखी समन्वीत कार्यक्षेत्र भित्र का टोल विकास भित्र प्रथम चरणमा टोल विकास पदाधिकारी संग समन्वय गर्ने गरी समिति परिचालन हुने निर्णय गरियो।

विविध १ मा छलफल गर्दा सहरी स्वा०पा० योजना को लागी ५% रकम संकलन का लागी हुँदै तगादी रसिद छपाई सोही रसिद बाट संकलन गर्ने भनी सर्वसहमत बाट निर्णय गरियो।

English Translation for the Minutes of Meeting

Today dated 3 February 2021, the meeting of Jhumka Water Supply & Sanitation Project is conducted under the chairmanship of Mr. Keshi Lal Chaudhary, WUSC chairperson of Jhumka Water Supply & Sanitation committee in the presence of the following mentioned participants.

S.N.	Name of Participants	Designation
1	Mr. Keshi Lal Chaudhary	WUSC Chairperson
2	Mr. Deepak Parajuli	WUSC Voice chairperson
3	Mr. Prem Kumar Khadka	WUSC Secretary
4	Mr .Ram Mani Sigdel	WUSC Treasurer
5	Mrs Sita Khanal	WUSC Joint secretary
6	Mr Dewan Khadka	WUSC Member
7	Mr Umesh Dahal	WUSC Member
8	Mr Thom Prashad Pokhrel	WUSC Member
9	Mrs Deepa Wagle	WUSC Member
10	Mrs Laxmi Khadka	WUSC Member
11	Mrs Niru Rai	WUSC Member
12	Mr Parshuram Chaudhary	WUSC Member (ex-office s)
13	Mr Gopal Chaudhary	Advisor, Water supply sanitation committee
14	Mr.Ishor Ghimire	Advisor, Water supply sanitation committee

Agendas:

1. Review of General Assembly of WUSC
2. About to collection of 5% upfront cash
3. Regard cash voucher printing

Decisions: The following decisions were made concerning to the above-mentioned agendas.

1. Regarding review of last General Assembly of WUSC, It is decided that 6th general assembly was successfully completed on 27 January 2021 and WUSC provides thanks to all user for positive advice and also contribution for successful Implementation of General assembly.
2. Regarding to collect 5% upfront cash, it is decided that 5% amount will be collect by WUSC with coordination of Tole development committee of project area at local level for successful implementation of Jhumka water supply sanitation project.
3. Regarding cash voucher print, the collection of 5% amount for water supply and sanitation project, it is decided that separate voucher will be printed for amount collection

आज मिती २०६६।१०।१२ गते सोमवार प्रमुख अतिथी राम धुनी नं०पा० का स्थानिय सरकार प्रमुख श्री जय प्रकास चौधरी को अतिथ्य मा सुनसरी वा० पा० का ~~मुल~~ सरसफाई मुल कुण्मोल्हा। समिति का अध्यक्ष श्री केशी लाल चौधरी को अध्यक्षतामा सहरी वा०पा० को साझेदारीमा सामाजिक अध्ययन प्रतिवेदन बारेमा छलफल गरी तपसिलका एजेन्डा माथी निर्णय गरियो।

उपस्थिति :-

१. ~~स्था~~ नं०पा० प्रमुख - श्री जयप्रकास चौधरी -
२. वा०पा० अध्यक्ष - श्री केशीलाल चौधरी -
३. सहरी वा०पा० को आ.प्र. श्री पदम कुवर -
४. वा०पा० सचिव - श्री प्रेम कुमार खड्का -
५. ख.पा.स. प्रा. - " टीकाराम चौधरी -
(६) ~~उमेश दहाल~~
सुनसरी वा०पा० सदस्य - उमेश दहाल -
(७) शिशिर गौतम सामाजिक सुरक्षा विज्ञ ERDSMC -
८ दिपक जग्गुलि स्री.पी.भो सुनसरी (उपदस्य) —
९. देवान खड्का ख.पा.यो सदस्य
६, ठोम प्रसाद पोखरेल - - सदस्य -
८. लोकी खड्का. "
९- कालुराम चौधरी - रामधुनी-८
१०. मुरारी लाल चौधरी - रामधुनी-५ ११
११ गोपाल चौधरी रामधुनी ४
१२. नारायण प्रसाद काफ्ले " १
१३. डिगराज फुयाल रामधुनी ५
१४. अंकित कार्की - ईलि. क. मा व.व. इटही
१५ दीपा कार्मले रामधुनी ५
१६. सुदिप अधिकारी रामधुनी ३.
१७ धर्मराज चौधरी " " - ३ प.वि.
१८. रामनाथ घिमिरे - कोषाध्यक्ष/सुनसरी वा०पा०
पुस्पलीन गौतम प्रसम
१९. ओमकार प्र० न्यौपाने, रामधुनी न० पा०, इ०पु०व्य०
२० सीता खनाल स्री.पी. से.सचिव

प्रस्तावहरु :-

१. क्या०पा० आर्थोसनाको संभाव्यता अध्ययन प्रतिवेदन प्रस्तुती गरेको :-

२. क्या०पा० संरचना निर्माण का लागी आवश्यक सरसामान उपलब्ध गराउने बारे।

३ आयोजनाको सामाजिक तथा वातावरणीय सुरक्षण बारे।

४) आयोजना को लागी उपभोक्ता बाट २% उठाउने बारे।

निर्णयहरु :-

प्रस्ताव नं १ मा छलफल गर्दा क्या०पा० आर्थोसनाको संभाव्यता अध्ययन प्रतिवेदन क्या०पा० को सेयर धनी को उपस्थितीमा र क्या०पा० बाट अध्यक्ष ज्यू हरु को उपस्थितीमा छलफल गरी प्रस्तुती गरियो।

प्रस्ताव नं २ मा छलफल गर्दा सामाजिक सुरक्षण प्रतिवेदन तथा पार्क का लागी आवश्यक सरसामान तथा कागजात उपलब्ध गराउने निर्णय गरियो।

प्रस्ताव नं ३ मा छलफल गर्दा आयोजना मा सामुदायीक तथा वातावरणीय सुरक्षण का साथ अगाडी बढाउने निर्णय गरियो।

प्रस्ताव नं ४ मा छलफल गर्दा उपभोक्ता लै उठाउन पर्ने २% रकम यथा सम्भव चाडै उठाउने निर्णय गरियो।

English Translation for the Minutes of Meeting

Today dated 25 January 2021, the Feasibility study presentation meeting of the Jhumka Water Supply & Sanitation Project is held under the chief guest of Local government Chief & Mayor of Ram Dhuni Municipality Mr Jay Prakash Chaudhary and chairmanship of Mr. Keshi Lal Chaudhary WUSC chairperson of Jhumka Water Supply & Sanitation user committee in the presence of the following mentioned participants.

S.N.	Name of Participants	Designation
1	Mr Jaya Prakash Chaudhary	Mayor, Ram Dhuni Municipality
2	Mr. Keshi Lal Chaudhary	WUSC Chairperson Jhumka WSSP
3	Mr,Padam Kunwar	Regional Manager UWSSSP
4	Mr Prem Kumar Khadka	WUSC Secretary Jhumka WSSP
5	Mr Tika Ram Chaudhary	Water supply sanitation Technician
6	Mr .Umesh Dahal	WUSC Member Jhumka WSSP
7	Mr Shisir Gautam	Social Safeguard Specialist
8	Mr Deepak Parajuli	WUSC Voice Chairman Jhumka WSSP
9	Mr Dewan Khadka	WUSC Member Jhumka WSSP
10	Mr, Thom Prashad Pokhrel	WUSC Member Jhumka WSSP
11	Mrs Laxmi Khadka	WUSC Member Jhumka WSSP
12	Mr Kalu Ram Chaudhary	Baraha Chhetra -8
13	Mr. Murari Lal Chaudhary	Ram Dhuni -5
14	Mr,Gopal Chaudhary	Ram Dhuni -5
15	Mr.Narayan Pd Kafle	Ram Dhuni -1
16	Mr. Deg Raj Phunyal	Ram Dhuni -5
17	Mr.Ankit Man Shrestha	Engineer, UWSSSP/ RPMO
18	Mrs Deepa Wagle	WUSC Member Jhumka WSSP
19	Mr Sudeep Adhikari	Ram Dhuni -3
20	Mr Parshu Ram Chaudhary	Ram Dhuni -3
21	Mr. Ram Mani Sigdel	Treasurer Jhumka WSSP
22	Mr Puspa Lal Gautam	
23	Mr. Omkar Prasad Neupane	Chief administrative Officer , Ram Dhuni Municipality

Agendas:

1. In regard to presentation of draft feasibility report of Jhumka WSSP
2. In regard to the land required for the proposed project
3. In regard to the social and environment safeguard
4. In provided if the additional land is required for the proposed project components,
5. The detailed information regarding the Social and environmental Safeguard component and required document for Initial Environmental and Examination and Due Diligence Report (DDR) of purpose Jhumka urban water supply and sanitation project WUSC is committed to provide;
6. It was decided to; collect required amount 5% upfront cash from water users as soon as possible.

Decisions:

The following decisions were made concerning the above-mentioned proposals.

1. The draft feasibility study report of Jhumka WSSP is presented in presence of Mayor and Ward Chairman of Ram Dhuni Municipality and have a discussion for providing feedback on the report.
2. It is decided that the entire related documents of the land where proposed structure will be provided to the project.

बैठक नं - १७

आज मिति २०६८ साल मंसिर २४ गते पन्त खुमाका खानेपानी तथा सरसफाई मूल उपभोक्ता समिति को आवश्यक बैठक पन्त संस्थाका अध्यक्ष श्री केशीलाल चौधरी को अध्यक्षतामा निम्न विषय छलफल छलफल र निर्णय गर्नका लागी बैठक प्रारम्भ गरियो।

उपस्थिती

सि.नं.	पद	नामथर	दस्तखत	फोन नं.
१.	अध्यक्ष खा.पा.खुमा	श्री केशीलाल चौधरी	[illegible]	९८४४०४४९०३
२.	उपाध्यक्ष ,, ,,	श्री दिपक पराजुली	[illegible]	९८४४२३४१२
३.	सचिव ,, ,,	श्री प्रेम कुमार खड्का	[illegible]	९८४४८४३६८०
४.	कोषाध्यक्ष ,, ,,	श्री रामभक्ति खिरेल		
५.	स.सचिव ,, ,,	श्री सिता खनाल		
६.	सदस्य ,, ,,	श्री देवान खड्का	[illegible]	
७.	,, ,, ,,	श्री ऊर्मिला दाहाल	[illegible]	[illegible]
८	,, ,, ,,	श्री लक्ष्मि खड्का		
९.	,, ,, ,,	श्री दिपा बस्नेत		
१०	,, ,, ,,	श्री होम प्रसाद पोखरेल	[illegible]	
११	,, ,, ,,	श्री निरु राई		
१२	पियन ,, ,,	श्री परशुराम चौधरी	[illegible]	९८४४०२६०४८
१३.	सिनियर सर्भेयर	श्री मुकुन्द बहादुर पोखरेल	[illegible]	९८४१२४०३६६ / ०२-५०८२-८
१४	डी.डि.डब्लु.एस.डि. - ४	" नेत्र प्र. गौतम	[illegible]	९८४२१२४०२९
१५	आवधार डे.डे.से.	विप्लव अधिकारी	[illegible]	९८६२८८०४६७
१६	प्रशान्त डा.विकास	बालकृष्ण कुइँकेल	[illegible]	९८४२४०२०२८
१७	वडद ह्युमानिटेरियन कोआर्डिनेटर	उत्तम केसी चौधरी	[illegible]	९८४१६००४९०
१८	नेपसिद्धार्थ डे.रि.इ.सं.	हरि प्रसाद नेपाल	[illegible]	९८६२९२४२०४
१९	~~[illegible]~~	कपिल शाह	[illegible]	९८४२४९६५६६
२०	~~[illegible]~~ [illegible]	[illegible] चौधरी	[illegible]	९८४२०४८९०१
२१	~~विजय ढोलागाई~~			
२१	नमा डे.वि.सं (सचिव)	विजय ढोलागाई	[illegible]	९८४२०४४५१८
२२	कोशी नगर स्थायी	श्री कल्नी डा.वीकि कुसंयम	[illegible]	९८४२४००८४८

क्र.सं	पद	नामथर	दस्तखत	फोन नं.
२३	मुसाई ~~चौधरी~~ अध्यक्ष			
२४		पृथ्वी लाल चौ.	[signature]	९८०४५७३९७८
२५	" "	आदिनारायण चौ.	[signature]	९८०६३९०१९९
२६	अध्यक्ष मोहनपुर टो.वि.	विरेन्द्र कुमार	[signature]	९८०४३१६५४८
२७	गणेश टो. वि. अध्यक्ष	रविन्द्र नेपाल	[signature]	९८४५१६५८२०
२८	किशोरी प्रसाद पोखरेल अध्यक्ष शान्ति टोल	किशोरी प्र. पोखरेल	[signature]	९८४५०८५३९९
२९	~~अमित कु. चौधरी~~ उपाध्यक्ष टो.वि.अ.	अमित कु. चौधरी	[signature]	९८४२०३५९४६
३०	युग राज काफ्ले	पारिजात टो.वि.	[signature]	९८४२०८२९८८

प्रस्तावहरू

१. सामाजिक सुरक्षण बारे।
२. प्राविधिक सर्भेको प्रस्तुती बारे।

निर्णय:

१. प्रस्ताव नं १ माथी छलफल गर्दा यस कुम्भखर्क खानेपानी तथा सरसफाई मूल उपभोक्ता समिति को कार्यक्षेत्र भित्र शहरी खानेपानी तथा सरसफाई (क्षेत्रगत) आयोजनाको सामाजिक सुरक्षा (social safeguard) तथा यसका प्रभावको बारेमा सामाजिक सुरक्षण विज्ञ द्वारा स्पष्ट जानकारी गराई छलफल गरीयो, साथै सामाजिक सुरक्षण प्रतिवेदन (DDR) तयार गर्नका लागी आवश्यक कागजात को बारेमा जानकारी गराइयो। खानेपानी तथा सरसफाई उपभोक्ता समिति द्वारा आवश्यक कागजपत्र उपलब्ध गराउने सर्वसम्मत निर्णय गरियो।

२. प्रस्ताव नं २ माथी छलफल गर्दा प्राविधिक सर्भेबाट प्राप्त भएको घर धुरी संख्यामा हालसम्म दाखिल भएका यस वाई वाटै प्रमाणीकरण तथा छलफल गरी थप घर हुने सम्भै कुरा जानकारी गराइयो / र पुन प्रमाणीकरण गरी स्पष्ट हुने सर्वसम्मत निर्णय गरियो।

English Translation for the Minutes of Meeting

Today dated 8 December 2020, the meeting for the Jhumka Water Supply & Sanitation Project is conducted under the Chairmanship of Mr. Keshi Lal Chaudhary, WUSC chairperson of Jhumka Water Supply & Sanitation committee in the presence of the following mentioned participants.

S.N.	Name of Participants	Designation
1	Mr. Keshi Lal Chaudhary	WUSC Chairperson
2	Mr. Deepak Parajuli	WUSC Voice chairperson
3	Mr. Prem Kumar Khadka	WUSC Secretary
4	Mr .Ram Mani Sigdel	WUSC Treasurer
5	Mrs Sita Khanal	WUSC Joint secretary
6	Mr Dewan Khadka	WUSC Member
7	Mr Umesh Dahal	WUSC Member
8	Mr Thom Prashad Pokhrel	WUSC Member
9	Mrs Deepa Wagle	WUSC Member
10	Mrs Laxmi Khadka	WUSC Member
11	Mrs Niru Rai	WUSC Member
12	Mr Parshuram Chaudhary	WUSC Member (ex-office s)
13	Mr. Mukunda Paudel	Senior surveyor
14	Mr.Netra Gautam	Chairman of Siddartha Tole Development Committee Ward 5,
15	Mr. Biplav Adhikari	Bhan Nagar Tole Development committee
16	Mr, Bal Krishna Phuyal	Prasanna Tole Development committee
17	Mrs Ratna Kala Chaudhary	Buddha Tole Development committee
18	Mr. Hari Prashad Nepal	Treasurer Nava Siddartha Tole Development Committee
19	Mr. Rupesh Shah	
20	Mr. Tham Bahadur Chauhan	Design Engineer
21	Mr.Bijaya Chaulagain	Secretary Namuna Tole Developmen Committee
22	Mr Kashi Nath Gelal	Chairperson Triveni Tole Development Committee
23	Mr. Dukhi Lal Chaudhary	Chairperson
24	Mr. Mahi Narayan Chaudhary	Chairperson
25	Mr. Birendra Kumar Sada	Chairperson Mohanpur Tole Developmen Committee
26	Mr. Rishikesh Nepal	Chairperson GaneshTole Development Committee
27	Mr. Kishori Pd Pokhrel	Chairperson Ratri Tole Developmen Committee
27	Mr. Amit Kumar Chaudhary	Chairperson Jurai Dhami Tole Development Committee
29	Mr. Guna Raj Kafle	Parijat Tole Development committee

Agendas:

1. About Social Safeguard
2. Presentation of Technical survey

Decisions:

The following decisions were made concerning the above-mentioned proposals:

1. As per the discussion on agenda 1, the detailed information regarding the Social Safeguard component and required document for Due Diligence Report (DDR) of purpose Jhumka urban water supply and sanitation project was discussed by the Social safeguard specialist and WUSC committed to provide all required document for DDR.

2. As per the discussion on agenda 2, outcome Household number 3875 from Technical survey, it is decided to Household number would be change and finalize after verification of all survey work and of all detail discussion with concern user of water supply project.

बैठक नं-१३

आज मिती २०६६।६।२४ गते यस सुनसरी खानेपानी तथा सरसफाइ मल उपभोक्ता समिति, जनप्रतिनिधी तथा सहरी खानेपानी को साझम, अन्तर क्रिया कार्यक्रम भयो। यसै खा०पा० अध्यक्ष श्री केशीलाल चौधरी को अध्यक्षतामा आवश्यक छलफल गरियो।

उपस्थिति

१. अध्यक्ष - श्री केशीलाल चौधरी -
२. मेयर - श्री जय प्रकास चौधरी -
३. उपमेयर - श्री सविना चौधरी -
४. वार्ड अध्यक्ष-४ श्री डेगराज कुयाल -
५. वार्ड अध्यक्ष-३ श्री राम कुमार चौधरी -
६. वार्ड सदस्य-१ श्री देवराज पोखरेल -
७. वार्ड सदस्य-३ श्री नारायण श्रेष्ठ -
८. सहकार खा०पा० श्री राम कोईराला -
९. सहरी खा०पा० हे०प्र० - श्री पदम कुँवर -
१०. -״- परामर्शदाता श्री नरेन्द्र पौडेल -
११. सहरी खा पा सं इति - श्री अंकित बाबु श्रेष्ठ -
१२ राष्ट्रिय खा.पा. बो. परामर्शदाता - श्री शिशिर गौतम
१३ सुनसरी खा०पा० सचिव - श्री प्रेम कु० खड्का -
१४ ״ ״ सदस्य - श्री देवान खड्का -
१५ ״ ״ सदस्य - श्री दिपा वाग्ले
१६ ״ ״ सदस्य - श्री लक्ष्मी खड्का -
१७ ״ ״ सदस्य - श्री उमेश दहाल -
१८ सुनसरी खा०पा० कर्मचारी - श्री दिपनारायण चौधरी
१९ ״ ״ ״ श्री रोहित कुमार पाण्डे
२० ״ ״ ״ श्री तुलसी प्र० दहाल
२१. ״ ״ ״ श्री चक्र बा० खड्का

प्रस्तावहरु:

१. ५% उपलब्ध गराउने सम्बन्धमा :-
२. विविध :-
प्रस्ताव नं १ माथी छलफल गर्दा ५% रकम उपलब्ध गराउन मा राम चुकी नं० पालिका २ वटीमा ३% र आम उपभो

वडा बाट २% रकम जम्मा गरी सहरी खा०पा०विकास आयोजना लाई पूर्ण सफलता गराउनको लागी आजको यस अन्तर क्रिया तथा छलफल बाट सर्व सम्मत निर्णय गरियो।।

English Translation for the Minutes of Meeting

Today dated 10 Nov 2020, the meeting is conducted for discussing the Jhumka Water Supply & Sanitation Project under the chairmanship of Mr. Keshi Lal Chaudhary, WUSC chairperson of Jhumka Water Supply & Sanitation committee in the presence of the following mentioned participants.

S.N.	Name of Participants	Designation
1	Mr. Keshi Lal Chaudhary	WUSC Chairperson
2	Mr Jaya Prakash Chaudhary	Mayor Ram Dhuni Municipality
3	Mrs Sabina Chaudhary	Deputy Mayor, Ram Dhuni Municipality
4	Mr Deg Raj Phunyal	Ward Chairman ward no 5 Ram Dhuni Municipality
5	Mr. Raj Kumar Chjaudhary	Ward Chairman ward no 3 Ram Dhuni Municipality
6	Mr Dev Raj Pokhrel	Ward Member ward no 1 Ram Dhuni Municipality
7	Mr Narayan Shrestha	Ward Member ward no 3 Ram Dhuni Municipality
8	Mr. Ram Koirala	Advisor Jhumka WSSP
9	Mr. Padam Kunwar	Regional Manager UWSSSP
10	Mr Indra Paudel	Consultant UWSSSP
11	Mr .Ankit Man Shrestha	Engineer, UWSSSP
12	Mr Shisir Gautam	Consultant , UWSSSP Regional office
13	Mr. Prem Kumar Khadka	WUSC Secretary Jhumka WSSP
14	Mr Dewan Khadka	WUSC Member
15	Mrs Deepa Wagle	WUSC Member
16	Mrs Laxmi Khadka	WUSC Member
17	Mr .Umesh Dahal	WUSC Member
18	Mr. Deep Narayan Chaudhary	Office Manager Jhumka WSSP
19	Mr Rohit Kumar Pandey	Office Staff Jhumka WSSP
20	Mr Tulsi Prashad Dahal	Office Staff Jhumka WSSP
21	Mr Chakra Bahadur Khadka	Office Staff Jhumka WSSP

Agendas:

1. About to collection of 5% upfront cash amount for project

2. Others

Decisions:

The following decisions were made concerning the above-mentioned proposals.

1. Regarding to collect 5% upfront cash, It is decided that 3% amount will provide from Ram Dhuni Municipality and 2% amount will be collect by WUSC at local level for successful implementation of Jhumka water supply sanitation Project

बैठक नं - ६

आज मिति २०६६।६।८ गते बिहिवार का दिन श्रम (कुम्मा) खानेपानी तथा सरसफाइ मूल उपभोक्ता समितिको बैठक यसै खानेपानीका अध्यक्ष श्री केशीलाल चौधरी को अध्यक्षतामा आवश्यक बैठक बसियो।

उपस्थिति :-

१. अध्यक्ष - श्री केशीलाल चौधरी -
२. उपाध्यक्ष - श्री दिपक पराजुली -
३. सचिव - श्री प्रेम कुमार खड्का -
४. कोषाध्यक्ष - श्री रामप्रसाद सिग्देल -
५. स- सचिव - श्री सिता वाग्ले -
६. सदस्य - श्री देवान खड्का -
७. सदस्य - श्री उमेश दहाल -
८. सदस्य - श्री दिपा वाग्ले -
९. सदस्य - श्री लक्ष्मी खड्का -
१०. सदस्य - श्री प्रेम प्र पोखरेल -
११. सदस्य - श्री निरु राई -
१२.प.सदस्य - श्री परशुराम चौधरी -

ERDSMC को तर्फ बाट प्रतिनिधि हरु

१. डिजाईन ईन्जिनियर - रमेश अधिकारी -
२. सामाजिक सुरक्षण - शिशिर गौतम -
३. सिनियर सर्भेयर - मुकुन्द पौडेल -

प्रस्तावहरु :-

१. सर्वेक्षण कार्य शुरु गर्ने सम्बन्धमा :-
२. विविध :-

प्रस्ताव नं १माथी छलफल गर्दा उक्त कार्य गर्न गराउन ERDSMC को तर्फ बाट तोकिएका प्रतिनिधी र यस समितिका प्रतिनिधी बिच उक्त विषय वस्तुमा छलफल गरी सिघ्र भन्दा सिघ्र कार्य गर्ने भनी सर्वसहमत बाट निर्णय गरियो।

English Translation for the Minutes of Meeting

Today dated 24 September 2020, the meeting of the Jhumka Water Supply & Sanitation Project is conducted under the chairmanship of Mr. Keshi Lal Chaudhary, WUSC chairperson of Jhumka Water Supply & Sanitation committee in the presence of the following mentioned participants.

S.No.	Name of Participants	Designation
1	Mr. Keshi Lal Chaudhary	WUSC Chairperson
2	Mr. Deepak Parajuli	WUSC Voice chairperson
3	Mr. Prem Kumar Khadka	WUSC Secretary
4	Mr .Ram Mani Sigdel	WUSC Treasurer
5	Mrs Sita Khanal	JWUSC Joint secretary
6	Mr Dewan Khadka	WUSC Member
7	Mr Umesh Dahal	WUSC Member
8	Mr Thom prashad Pokhrel	WUSC Member
9	Mrs Deepa Wagle	WUSC Member \
10	Mrs Laxmi Khadka	WUSC Member
11	Mrs Niru Rai	WUSC Member
12	Mr Parshuram Chaudhary	WUSC Member (ex-officieo)
13	Mr Ramesh Adhikari	Design Engineer- ERDSMC
14	Mr Shisir Gautam	Social Safeguard Specialist-ERDSMC
13	Mr. Mukunda Poudel	Senior Surveyor (Survey Team leader) - ERDSMC

Proposals:

1. Regarding to start survey work of water supply project

Decisions:

The following decisions were made concerning the above-mentioned proposals:

1. As per the discussion on proposal 1, for starting survey work for all technical, social and environmental aspects of water supply project, it is decided to detail discussion with ERDSMC representatives and urban water supply sanitation committee representatives to conduct survey work by survey team as soon as possible.

ANNEX 6: SURVEY QUESTIONNAIRE

१. परिचय

१.१ अन्तर्वाता दिने ब्यक्तिको नाम ठेगाना:

(क) जिल्ला: (ख) गा.वि.स:

(ग) टोल रस्थान: (घ) वार्ड नं.:

१.२ पारिवारिक विवरण

(क) घरमुलिको नाम: श्रीमान् र श्रीमती

.....

(ख) जाती: (ग) उमेर: (घ) लिङ्ग: □ पुरुष महिला □

(ङ) वैवाहिक स्थिति: (च) धर्म: (छ) व्यवसाय (घरमुलीको):

(ज) बसेको वर्ष: (झ) शिक्षा :

(ञ) कुल परिवार संख्या .....

उमेर समुह	पुरुष	पेशा	महिला	पेशा	जम्मा
०-५ बर्ष					
६-१० बर्ष					
११-१५ बर्ष					
१६-४५ बर्ष					
४५-६० बर्ष					
६० भन्दा माथि					

जम्मा					

१.३ विद्यालय जाने उमेरका बाल बालिका (६-१५ बर्ष)

	विद्यालय गएका		विद्यालय नगएका	
	पुरुष	महिला	पुरुष	महिला
जम्मा				

२. साक्षरता : (तपाईको परिवारमा)

	लेखपढ गर्न सक्ने	एस.एल.सी. उत्तिर्ण	स्नातक	स्नातकोत्तर	जम्मा
महिला					
पुरुष					
जम्मा					

३. कृषि (भु-उपयोग)

३.१ तपाई वा परिवार सदस्यको नाममा गा.वि.स.**र** वडा भित्र जग्गा छ रु

छ □ छैन □

३.२ यदि छ भने कति छ ? रोपनीमा भन्नुहोस :

क.स.	स्वामित्व	खेत	बारी	खरवारी	वन	कैफियत
१	आफ्नै					
२	सगोलको					
३	कमाई आएको					
४	कमाउन दिएको					
५	जम्मा					

३.३ गा.वि.स. वा वडा बाहिर कुन ठाउँमा जग्गा छ रु

कस.	ठाउँको नाम	जग्गा				कैफियत
		खेत	वारी	खरवारी	वन	

३.४ तपाईको जग्गा आयोजना भित्र पर्छ रु ९एभिबकभ ञभलतष्यल तजभ अफउयलभलत या उचयवभअत धजभचभ ज्ज ाबाकि०

घर खेत

- □ लम्बाई (फिटमा)
- □ चौडाई (फिटमा)
- □ छाना
- □ तल्ला
- □ कोष
- □ पाखो बारी
- □ जंगल
- □ अन्य
- □ अन्दाजी मूल्य (चलनचल्तीमा) नेरु.

(क) आयोजना क्षेत्र भित्र तपाईको कतिवटा घर र गोठ छन् ।

घर ☐ गोठ ☐

क.सं.	किसिम	क्षेत्रफल
घर १		
घर २		
घर ३		

(१) कच्ची-खरले छाएको (२) पक्की (ढुङ्गा, ईटाको पर्खाल र ढलान भिगटी वा टिनको छानो)

	संख्या	क्षेत्रफल
गोठ		
अन्य (खुलाउने)		

३.५ (क) तपाईको आयोजना क्षेत्र भित्र पर्ने जमिनमा कुन कुन फसल लगाउनु हुन्छ रु

क्रंसं.	खाद्यान्न वाली	वाली लगाएको क्षेत्रफल	उत्पादन परिणाम
	१. खाद्यान्न बाली		
	धन		
	गहु		
	मकै		
	कोदो		
	दाल गेडागुडी		
	अन्य		
	२. नगदे वाली		
	आलु		
	तोरी		
	तरकारी		
	अन्य		

(ख) उक्त जग्गामा लगाएको फलफूल र अन्य बोट विरुवाको विवरण दिनुहोस रु

क्रंसं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लाएको	फल नलाएको	
१	फलफूल			
२	कागती			
३	सुन्तला			
५	आँप			
६	मेवा			
७	अम्बा			
८	लिच्ची			
९	कटहर			
१०	केरा			

क्रंसं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लाएको	फल नलाएको	
११	आरु			
१२	नास्पाती			
१३	आरुवखडा			
१४	अन्य			
१५	डाले घाँस			
१६	पाखुरी			
१७	काभ्रो			
१८	वडहर			
१९	खनायो			
२०	टाकी			
२१	गिदरी			
२२	अन्य			
२३	इन्धनको लागि प्रयोग गर्ने बोट विरुवा			
२४	काठमा प्रयोग हुने बोटविरुवा			
२५	वाँस निगालो			

३.६ के तपाईको जग्गामा भएको गत बर्षको उत्पादनले तपाईको परिवारलाई खान पर्याप्त भयो रु

☐ भया ☐ भएन

३.७ यदि अप्रर्याप्त भयो भने कति महिनाको लागि पुगेन रु महिना

(क) तिन महिना (ख) छ महिना

(ग) नौ महिना (घ) बाह्र महिना

३.८ आफ्नो उत्पादित खाद्यान्न अप्रर्याप्त भएको बेला आफ्नो परिवारलाई कसरी खुवाउनु हुन्छ ?

क. ऋण गरेर

ख. नोकरीबाट भएको आम्दानीबाट

ग. व्यापारीको आम्दानीबाट

घ. भारी बोकेर भएको आम्दानीबाट

ड. दैनिक मजदुरबाट भएको

च. अन्य .....

३.९ पशुपालन सम्बन्धी :

तपाईको घरमा कति /कस्ता पशु पक्षीहरु पाल्नु भएको छ रु

क.सं.	पशुपंक्षी	संख्या
१	गाई	
२	गोरु	
३	भैसी	
४	बाछा	
५	बाछि	
६	पाडा	
७	पाडि	
८	राँगो	
९	घोडा	
१०	बाखा	
११	बोका	
१२	खसी	
१३	पाठा/पाठी	
१४	सुँगुर/बंगुर	
१५	हाँस	
१६	कुखुरा	
१८	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरु	

खाद्यान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र भरीया	
फलफुल		निवृतिभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कुखुरा हाँस बिक्री		माछा बिक्री	
बाछा/बाछी/गोरु /बिक्रि		अन्य	
भैसि /राँगो बिक्रि		जम्मा (३)	
बोका/खसी/भेडा/बाखा बिक्रि			
सुगंर/बंगुर बिक्रि			
कुखुरा/हाँस विक्रि			
जम्मा (२)			
जम्मा आय (१+२+३):			

५. घर परिवारको वार्षिक औषत खर्च :

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चामल		ीचया	
द्याल		दाउरा	
मकै		बिजुली	
तरकारी		मट्टितेल	
दुघ/दही		औषधि	
माछा/मासु		शिक्षा	
तेल/ध्यू		कपडा	
मर-मसला		चाडपर्व	
नुन		अन्य	

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चिनी			
		म्मा खर्च	

६.पानीको आपूर्ति

(क) तपाईले यस खोलाको पानी उपयोग गर्नु हुन्छ कि हुदैन रु

गर्छु □ गर्दिन □

(ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ रु

सिंचाई □ नुहाउने, कपडा धुने □

पिउने □ अन्य □

७.स्वास्थ्य सम्बन्धिः

(क) तपाईको परिवारमा कुनै सदस्य विगत वर्षमा विरामी भएका थिए रु

थिए □ थिएनन् □

(ख)यदि थिए भने निम्न विवरण दिनुहोस् रु

क्रसं	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

(रोगको प्रकारः- दिसापखाला, आउं, टाइफाईड, हैजा, मलेरिया, टीवी, जन्डीस, छाला सम्बन्धी, निमोनिया, दम, रक्तचाप, एड्स र यौन रोग, अन्य)

(ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ .....

(घ) त्यहाँ निको नभए कहाँ जानुहुन्छ रु क्रमश उल्लेख गर्नुहोस ।

क्रं.सं	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		
३	हेल्थ सेन्टर		
४	आयुर्वेदिक औषधालय		
५	निजि क्लिनिकरऔषधी पसल		
६	धामी झाक्री		
७	अन्य		

८. महिलाको अवस्थाः

(क) श्रमको वर्गिकरण

क्रं.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजोत		
२	मल राख्ने		
३	जमिन तयारी		
५	रोप्ने		
६	गोडमेल		
७	सिंचाई		
८	काट्ने		
९	बोक्ने र थन्काउने		
१०	अन्न प्रसोधन (कुटाई पिसाई)		
११	घाँस दाउरा		

क्रं.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१२	गोठालो		
१३	मेलापात		
१४	खाना पकाउने		
१५	पानी पधेरो		
१६	बच्चाबच्ची र बुढाबुढी हेरविचार		

(ख) सम्पत्तिमा अधिकार

क्रं.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	घर		
२	जग्गा		
३	पशु		
५	गरगहना		
६	उद्योग धन्दा		
७	अन्य		

(ग) निर्णय प्रक्रियामा अधिकार

क्रं.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	वाली रोज्ने		
२	पशु खरीदविक्री		
३	गरगहना खरीदविक्री		
५	अन्न खरीदविक्री		
६	फलफूल खरीदविक्री		

क्रं.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
७	पशुजन्य पदार्थ खरीदविकी		
८	काठ दाउरा खरीदविकी		
९	विहावारी		
१०	परिवार नियोजन		
११	छोराछोरी पढाई लेखाई		
१२	अन्य		

९. मुआब्जा सम्बन्धीः

(क) तपाईको घर **र** जग्गाको मुआब्जा के मा चाहनु हुन्छ

नगद □ जग्गाको सट्टा जग्गा □ अन्य □

(ख) यदि तपाईले मुआब्जा नगदमा पाउनु भयो भने उक्त मुआब्जा रकम के मा प्रयोग गर्नु हुन्छ

जग्गा किन्ने □ घर वनाउने □ ऋण तिर्ने □

व्यापार गर्ने □ अन्य □

१०. प्रस्ताव कार्यान्वयन गर्दा के कस्तो प्रभाव पर्न सक्दछ सो सम्बन्धी राय सुझाव छ

सकारात्मकः नकारात्मकः

Household Survey

1= Introduction

1=1 Name and Address of Respondent

-1_ District -2_ Municipality.

-3_ Tole -4_ Ward No.

1.2 Family Description/Details

-1_ Houseowner Name Husband or Wife==========

====

-2_ Cast: -3_ Age -4_ Sex☐Male Female☐

-5_ Marital Status -6_ Religion -7_ Business-House owner

-8_ Yearof Stay -9_ Education

-10_ Total Family Number========

Age group	Male	Occupation	Female	Occupation	Total
0-5 Year					
6–10Year					
11-15 Year					
16-45 Year					
45-60 Year					
Above 60					
Total					

1.3 Children going to School -6-15 years_

Total	Going School		Not going School	
	Male	Female	Male	Female

2= Literate(in your house)

	Read & Write	S.L.C. Passed	Bachelor	Master	Total
Female					
Male					
Total					

3= Agricultural land

a. Is there your or other family members land within a premises of Municipailty/Ward?
Yes ☐ No ☐

3.2 If yes? How much (in Ropani)?

S.N.	Ownership	Farm	Orchard	Grassland	Forest	Remarks
1	Own					
2	Sharing land					
3	Land is earned					
4	Land given to earn					
5	Total					

3.3 Is there any land out to Municipality/Ward area?

S.N.	Name of Place	Land				Remarks
		Farm	Orchard	Grassland	Forest	

3.4 Is your land within a project area? (Please mention the component of project where HH falls)

House

☐ Length(ft.)
☐ Breadth –ft
☐ Roof
☐ Storey
☐ Corner
☐ ☐

Farm

☐ Slope farm
☐ Forest
☐ Other

Estimate cost (Present market rate) =

-A_ How many houses and shed are there within a Project area?

House ☐ Shed ☐

S.N.	Types	Area
House1		
House2		
House3		

-1_ Roof with raw straw (2) Concrete (Stone, Bricks wall and roof with zinc sheet)

	Number	Area
Shed		
Others-write_		

3.5 -A_ What type of crops you cultivate on your land that lies within project area?

S.N.	Food Crops	Cultivated Land Area	Production rate
1= Food Crops			

	Paddy		
	Wheat		
	Maize		
	Millet		
	Pulse/grai n or cereal		
	Others		
2= Cash Crops			
	Potato		
	Mustard		
	Vegetables		
	Others		

B_ Give details of fruits and crops you planted on your land within project area?

	Plants	Number of plants		Total
		Plant having fruit	Not having fruit	
1	Fruits			
2	Lemon			
3	Orange			
4	Mango			
5	Papaya			
6	Guava			
7	Litchi			
8	Jackfruit			
9	Banana			
10	Peach			
11	Pear			
12	Aarubukhada (Plum)			
13	Others			
14	Stylo grass			
15	Pakhauri(Ficus glaberrima)			
16	Kavro			
17	Badhar (Monkey fruit)			
18	Khanayo (Ficus camia)			
19	Tanki(Bauhinia purpurea)			

	Plants	Number of plants		Total
		Plant having fruit	Not having fruit	
20	Gidri			
21	Other			
22	Plant use for fuel			
23	Plant use for timber			
24	Bamboo			

3.6 Is previous year production sufficient to you and your family?

Yes ☐ No ☐

3.7 If inadequate then for how many more month is it insufficient?

-a_ 3 Month -b_ 6 Month

-c_ 9 Month (d) 12 Month

3.8 How you manage food for your family when your production is insufficient?

a= Debt b=Job/service income

c= Business income d=Potter

e= Daily labor wages f= Other

3=9Livestock farming M

How many and what types of livestock you are rearing in your house?

S.N.	Livestock	Number
1	Cow	
2	Ox	
3	Buffalo	
4	Malecalf	
5	Female calf	
6	Young male buffalo	
7	Young female buffalo	
8	Male Buffalo	
9	Horse	
10	Goat	
11	Male goat	
12	Castrated goat (Khasi)	
13	Kid goats	
14	Pig	
15	Duck	
16	Hen	
17	Others-write)	

4=Annual income of Household M

Source	Annual Income-rs._	Sources	Annual Income-rs_
Agriculture		Other sources	

Food crops		Job/service	
Cash crops		Daily wages labor/potter	
Fruits		Pension	

Total -1_		Business	
Livestock		Home enterprise	
Milk Production		Occupational services	
EggHen duck selling		Fish selling	
Selling of male and female calf/Ox		Others	
Male &Female Buffalo/selling ÷		Total-3_	
Sheep/Goat/ Male goat/ Castrated goat/selling			
Pig selling			
Hen/Duck selling			
Total -2_			
Total income - 123_			

5=Annual expenses of Household

Particular		**Total amount, Rs**	**Particular**	**Total amount, Rs**
Rice			Tea	
Pulse			Wood/timber collection	
Maize			Electricity	
Vegetables			Kerosene	
Milk/curd			Medicine	
Fish/Meat			Education	
Oil/ghee			Clothing	
Masala			Festival/ celebration	
Salt			Others	
Sugar				
			Total expenses	

6=Utilization of water

-A_ Do you use the water of this river or not? Yes☐ No☐

-B_ If you use the river water then for what purpose do you utilize it?

Irrigation ☐ Bathing and clothes ☐

Drinking ☐ Others ☐

7= Health related

-A_ Any family members were sick on last year?

Yes☐ No☐

-B) If it was then give detail of it

S.N.	Relation	Male	Female	Age	Disease
1					
2					
3					
4					

-Types of disease M– Diarrhea,Dysentery+, Typhoid, Cholera, Malaria,Tuberculosis, Jaundice, Skin disease, Pneumonia, Asthma Pressure, Aids and sexual disease, Other_

-C_ Where you first visit when you are sick

D_ If there is no improvement on your heath by first checkup then where you will go next?

S.N.	Place for health checkup	Location	Distance-k.m._
1	Hospital		
2	Health post		
3	Health care center		
4	Ayurveda hospital		
5	Private clinic/Pharmacy		
6	Witch doctors		
7	Other		

8= Female Condition/Situation

-A_ Categorization of Labor

S.N.	Work description	Part of work (%)	
		Male	Female
1	Ploughing		
2	Manuring		
3	Land preparation		
4	Cultivation		
5	Digging		
6	Irrigation		
7	Cutting		
8	Carrying & Harvesting		

S.N.	Work description	Part of work (%)	
		Male	Female
9	Food proceeding – thrashing/grinding_		
10	Grass/wood collection		
11	Shepard		
12	Melapaat		
13	Cooking food		
14	Water collection/fetching		
15	Child and old care		

-B_ Right to property

S.N.	Work description	Part (in %)	
		Male	Female
1	House		
2	Land		
3	Animal		
4	Jewelry		
5	Enterprise/Industry		
6	Others		

-C_ Right to decision

S.N.	Work Description	Part in %	
		Male	Female
1	Crop choice		
2	Buying and selling of animal		
3	Buying and selling of jewelry		
4	Buying and selling of food		
5	Buying and selling of fruits		
6	Buying and selling of livestock		
7	Buying and selling of timber		
8	Marriage program		
9	Family planning		
10	Children Education		
11	Other		

-A_ Need compensation of your house and land in the form of?

Cash ☐ Land in terms of land ☐ other ☐

-B_ If your receive compensation in the form of cash then where you will utilize it?

Buy land	☐	Built a house	☐	Clear debt	☐
Start business	☐	other	☐		

10= what will be the influence of implementation of propose? Give your suggestion/opinion Positive Negative.

ANNEX 7: CHLORINE USE GUIDELINES

CHLORINE GUIDELINE VALUE

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

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

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

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

Chlorination does not harm aquatic environments

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

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

ANNEX 8: WATER QUALITY TEST REPORTS

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Federal Water Supply & Sewerage Management Project
Biratnagar
Water Quality Testing Laboratory
Itahari, Sunsari

WATER QUALITY TEST REPORT

Name of Client:- Jhumka WUSC
Sampled By:- Jhumka WUSC
Source of Sample:- Deep Boring (Boring-1)
Type of Sample:- Drinking Water
Location:- Ramdhuni-3, Jhumka, Sunsari
GPS:-

Sample Code:- S-73
Date of Collection:- 2077/06/06
Date of Analysis:- 2077/06/06
Date of Completion:- 2077/06/12

S.No.	Category	Parameters	Observed Values	NDWQS, 2062 BS	Methods Used
1	Physical	Turbidity (NTU)	-	5 (10)	2130 B, APHA, 21st EDITION
2		Temp. °c	25	-	2550 B, APHA, 21st EDITION
3		pH	6.6	6.5 - 8.5 *	4500-H+ B, APHA, 21st EDITION
4		Electrical Conductivity (µs/cm)	390	1500	2510 B, APHA, 21st EDITION
5	Chemical	Iron (mg/L)	7.8	0.3 (3)	3111 B, APHA, 21st EDITION
6		Manganese (mg/L)	0.6	0.2	3111 B, APHA, 21st EDITION
7		Arsenic (mg/L)	0.01	0.05	3114 C, APHA, 21st EDITION
8		Ammonia(mg/L)	<0.2	1.5	4500-NH3 C., APHA, 17th EDITION
9		Chloride (mg/L)	<5	250	4500 B,APHA, 21st EDITION
10		Total Hardness (mg/L as $CaCO_3$)	164	500	2340 C, APHA, 21st EDITION

APHA: American Public Health Association, Standard Methods for Examination of Water & Waste Water
** These values show lower and upper limits.*
( ) Values in parentheses refer the acceptable values only when alternative is not available.
The entire test was conducted as per the National Drinking Water Quality Standard Guide Line, 2062BS
Note: 1. The above results refer only to the submitted sample and test performed.
2. This report cannot be used for any publicity or advertisement without the written consent of this lab.
3. Test report shall not be reproduced in full, without written approval of the laboratory.

Analysed by
Shiva Kumar Poudyal
Assistant Chemist

Approved by
Ramesh Kumar Yadav
Chemist

Chemist

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Federal Water Supply & Sewerage Management Project
Biratnagar
Water Quality Testing Laboratory
Itahari, Sunsari

WATER QUALITY TEST REPORT

Name of Client:- Jhumka WUSC
Sampled By:- Jhumka WUSC
Source of Sample:- Deep Boring (Boring-2)
Type of Sample:- Drinking Water
Location:- Ramdhuni-3, Jhumka, Sunsari
GPS:-

Sample Code:- S-83
Date of Collection:- 2077/06/06
Date of Analysis:- 2077/06/06
Date of Completion:- 2077/06/12

S.No.	Category	Parameters	Observed Values	NDWQS, 2062 BS	Methods Used
1	Physical	Turbidity (NTU)	-	5 (10)	2130 B, APHA, 21st EDITION
2		Temp. °c	25	-	2550 B, APHA, 21st EDITION
3		pH	6.8	6.5 - 8.5 *	4500-H+ B, APHA, 21st EDITION
4		Electrical Conductivity (µs/cm)	375	1500	2510 B, APHA, 21st EDITION
5	Chemical	Iron (mg/L)	3.5	0.3 (3)	3111 B. APHA, 21st EDITION
6		Manganese (mg/L)	0.4	0.2	3111 B. APHA, 21st EDITION
7		Arsenic (mg/L)	<0.01	0.05	3114 C, APHA, 21st EDITION
8		Chloride (mg/L)	<5	250	4500 B,APHA, 21st EDITION
9		Total Hardness (mg/L as $CaCO_3$)	152	500	2340 C, APHA, 21st EDITION

APHA: *American Public Health Association, Standard Methods for Examination of Water & Waste Water*
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Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Federal Water Supply & Sewerage Management Project
Biratnagar
Water Quality Testing Laboratory
Itahari, Sunsari

WATER QUALITY TEST REPORT

Name of Client:- Jhumka WUSC
Sampled By:- Jhumka WUSC
Source of Sample:- Deep Boring (After Filter, Boring-2)
Type of Sample:- Drinking Water
Location:- Ramdhuni-3, Jhumka, Sunsari
GPS:-

Sample Code:- S-82
Date of Collection:- 2077/06/06
Date of Analysis:- 2077/06/06
Date of Completion:- 2077/06/12

S.No.	Category	Parameters	Observed Values	NDWQS, 2062 BS	Methods Used
1	Physical	Turbidity (NTU)	-	5 (10)	2130 B, APHA, 21st EDITION
2		Temp. °c	25	-	2550 B, APHA, 21st EDITION
3		pH	7.0	6.5 - 8.5 *	4500-H+ B, APHA, 21st EDITION
4		Electrical Conductivity (µs/cm)	370	1500	2510 B, APHA, 21st EDITION
5	Chemical	Iron (mg/L)	2.4	0.3 (3)	3111 B. APHA, 21st EDITION
6		Manganese (mg/L)	0.3	0.2	3111 B, APHA, 21st EDITION
		Total Hardness (mg/L as $CaCO_3$)	150	500	2340 C, APHA, 21st EDITION
7		Residual Chlorine (mg/L)	<0.1	0.1-0.2*	COLORIMETRY
8	Microbiological	Faecal coliform *E.coli*(CFU/100 ml)	0	0	9222 D., APHA,21st EDITION

APHA: *American Public Health Association, Standard Methods for Examination of Water & Waste Water*
** These values show lower and upper limits.*
( ) Values in parentheses refer the acceptable values only when alternative is not available.
The entire test was conducted as per the National Drinking Water Quality Standard Guide Line, 2062BS
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Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Federal Water Supply & Sewerage Management Project
Biratnagar
Water Quality Testing Laboratory
Itahari, Sunsari

WATER QUALITY TEST REPORT

Name of Client:- Jhumka WUSC
Sampled By:- Jhumka WUSC
Source of Sample:- Deep Boring (RVT)
Type of Sample:- Drinking Water
Location:- Ramdhuni-3, Jhumka, Sunsari
GPS:-

Sample Code:- S-75
Date of Collection:- 2077/06/06
Date of Analysis:- 2077/06/06
Date of Completion:- 2077/06/12

S.No.	Category	Parameters	Observed Values	NDWQS, 2062 BS	Methods Used
1	Physical	Turbidity (NTU)	-	5 (10)	2130 B, APHA, 21st EDITION
2		Temp. °c	25	-	2550 B, APHA, 21st EDITION
3		pH	7.0	6.5 - 8.5 *	4500-H+ B, APHA, 21st EDITION
4		Electrical Conductivity (µs/cm)	379	1500	2510 B, APHA, 21st EDITION
5	Chemical	Iron (mg/L)	1.6	0.3 (3)	3111 B. APHA, 21st EDITION
6		Manganese (mg/L)	<0.1	0.2	3111 B. APHA, 21st EDITION
7		Total Hardness (mg/L as $CaCO_3$)	160	500	2340 C, APHA, 21st EDITION
8		Residual Chlorine (mg/L)	<0.1	0.1-0.2*	COLORIMETRY
9	Microbiological	Faecal coliform *E.coli*(CFU/100 ml)	04	0	9222 D., APHA,21st EDITION

APHA: *American Public Health Association, Standard Methods for Examination of Water & Waste Water*
** These values show lower and upper limits.*
( ) Values in parentheses refer the acceptable values only when alternative is not available.
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Assistant Chemist

Approved by
Ramesh Kumar Yadav
Chemist

Chemist

ANNEX 9: SURVEY CHECKLISTS

A. Physical Environment

Parameter	Description
Topography	
Geology (Rock and Soil Types)	
Erosion and Sedimentation	
Quarry Sites	
Sites for Labour Camp	
Site for Storage and Stockpiling	
Access and Diversion if necessary	
River Training Works	
Land Use	
Air Quality	
Water Quality	
Noise Level	
Spoil disposal sites	
Drainage Network and Ground Water	
Status of Channel Shifting	

B. Vegetation and Wildlife

Vegetation in the project area

SN	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Use	Protection Status		
							GoN	IUCN	CITES

Mammals in the project area

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Local Use	Protection Status		
							GoN	IUCN	CITES

Birds Sighted in the project area

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status		
						IUCN	CITES	GoN

Herpeto-fauna in the Project Area

S.N.	Local Name	Scientific Name	Habitat	Local Status	Status Code			Local Use
					CITIES	IUCN	GoN	

Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location

C. Socio-Economic and Cultural Environment

Parameter	Description
Demography a) Population (Male, Female) b) Caste Ethnicity c) Language d) Religion and Culture e) Literacy	
Occupation	
Migration Patten	
Public Health and Sanitation	
Drinking Water Supply	
Education Facilities	
Communication	
Fuel and Energy	
Road and Transportation	
Land Holding	
Food Sufficiency	
Irrigation	
Health Care System	
Market	
Business and Industries	
Religious and Cultural Sites	
Non governmental activities	
Development Potential	
Detail of Project Affected Structures	

D. Soil Erosion Prone Areas

SN	Locations or (Left/Right)	Nature of erosion	Cause of erosion	Protection Structure

Settlements and Population

SN	Settlement	Ward	HH	Population			Caste/Ethnicity
				Male	Female	Total	

ANNEX 10: CONSENT LETTERS FROM LOCAL STAKEHOLDERS

रामधुनी नगरपालिका

नगरकार्यपालिकाको कार्यालय

झुम्का, सुनसरी

१ नं. प्रदेश, नेपाल

☎ ०२५५६२००५

प.सं. ०७७/०७८

च.नं. १५९०

मिति : २०७८/१/३०

विषय : निर्णय गरि पठाइएको बारे ।

श्री शहरी खानेपानी तथा सरसफाई आयोजना
आयोजना व्यवस्थापन कार्यालय
पानीपोखरी, काठमाण्डौ ।

प्रस्तुत विषयमा रामधुनी नगरपालिका वडा नं. ५ को मिति २०७७/११/१३ र वडा नं. ३ को मिति २०७८/४/११ र मिति २०७७/११/१९ को सहमति पत्रानुसार झुम्का शहरी खानेपानी उपभोक्ता समितिलाई आवश्यक ट्याकी Guard house (कुरुवा घर) अफिस भवन, डिप बोरिङ, जेनेटर हाउस तथा पानी Treatment unit अन्य संरचनाहरु निर्माण गर्न रामधुनी नगरपालिकाका तपसिल बमोजिमका वडा नं. भित्र पर्ने कित्ता नं. का सार्वजनिक जग्गाहरु उपलब्ध गराउने निर्णय भए अनुसार सिफारिस गरिएको व्यहोरा अनुरोध छ ।

तपसिल :

क.स.	अवस्थित (स्थान वडा)	कित्ता नं.	क्षेत्रफल	आवश्यक पर्ने जग्गा	स्वामित्व	प्रयोजन
१	रामधुनी न.पा. ३ पानीटंकी टोल,	साविक भासी गा.वि.स. कि.नं. २५८	०-१६-११ (५५९४.२३ Sqm)	०-४-० (१३५२ Sqm)	सार्वजनिक जग्गा	रामधुनी नगरपालिका वडा नं.३ पानी टंकीटोलमा रहेको जम्मा १६ कठ्ठा ११ धुर जग्गा झुम्का खानेपानी तथा सरसफाई उपभोक्ता समितिले विगत २०५३ साल देखि उपभोग गर्दै आएको । यस अन्तर्गत दुई वटा ओभरहेड ट्यांकी (१०० र २२५ घन मि.) दुईवटा बोरिङबाट पानी तानेर जलश्रोतलाई उपभोग गरिरहेको साथै उपभोक्ता समितीको कार्यालय, Guard house (कुरुवा घर), जेनेटर हाउस रहेको तथा पानी Treatment unit निर्माण गरि प्राप्त जलश्रोतलाई वितरण गर्ने
२	रामधुनी	२५८	०-०-१२	०-०-८	सार्वजनिक	बोरिङ जडान गरि प्राप्त जलश्रोला

(हस्ताक्षर) १/२०

जय प्रकाश चौधरी
नगर प्रमुख
रामधुनी नगरपालिका

	नगरपालिका वडा नं ३ समावेशी टोल		(२०३Sqm)	१३५.४Sqm)	जग्गा	उपभोक्ताहरु माझ वितरण गर्ने ।
३	रामधुनी नगरपालिका वडा नं ३ समावेशी टोल		०-०-१२ (२०३Sqm)	०-०-८ १३५.४Sqm)	सार्वजनिक जग्गा	बोरिङ्ग जडान गरि प्राप्त जलश्रोतलाई उपभोक्ताहरु माझ वितरण गर्ने ।
४	रामधुनी नगरपालिका वडा नं ३ उपभोक्ता समिति अफिस संग नजिक		०-०-१५ (२५३.९५Sqm)	०-०-१० १६९.३Sqm)	सरकारी जग्गा	झुम्का खानेपानी तथा सरसफाई उपभोक्ता समितिले विगत ४ वर्ष अर्थात २०७४ साल देखि बोरिङ्ग गरि प्राप्त जलश्रोतलाई उपभोक्ताहरु माझ वितरण गर्ने ।
५	रामधुनी नगरपालिका वडा नं ५ लालि गुराँस टोल		०-०-१२ (२०३Sqm)	०-०-८ १३५.४Sqm)	सरकारी जग्गा	बोरिङ्ग जडान गरि प्राप्त जलश्रोतलाई उपभोक्ताहरु माझ वितरण गर्ने ।
६	रामधुनी नगरपालिका वडा नं ३ उपभोक्ता समिति अफिस कम्पाउण्ड भित्र)	२५८ (साविक भासी गा.वि.स.)	०-१६-११ (५५९४.२३ Sqm)	०-०-१० १६९.३Sqm)	सार्वजनिक जग्गा	बोरिङ्ग जडान गरि प्राप्त जलश्रोतलाई उपभोक्ताहरु माझ वितरण गर्ने ।
७	मुख्य ट्रान्समिसन पाइपलाईन			१.६ कि.मि.		झुम्का शहरी खानेपानी तथा सरसफाई आयोजनाको मुख्य पाईपलाइन खन्ने तथा पुर्ने कार्यका लागि ।
८	वितरण पाईपलाईन			२००.६४ कि.मि.		झुम्का शहरी खानेपानी तथा सरसफाई आयोजनाको वितरण पाईपलाइन खन्ने तथा पुर्ने कार्यक लागि ।

जय प्रकाश चौधरी
नगर प्रमुख

जय प्रकाश चौधरी
नगर प्रमुख
रामधुनी नगरपालिका

English Translation of Recommendation Letter

Ramdhuni Municipality

Municipal Executive office

Jhumka Sunsari

Province no.1, Nepal

Date: **13 May, 2021**

Letter No.: 077/078

Dispatched No.: 1590

Subject: **In regard to the decision made**

To,

The Urban Water Supply and Sanitation Project

The Project Management Office,

Panipokhari, Kathmandu

Referring to the consent letter received from ward no. 5 dated 25 February 2021 and ward no. 3 dated 27 July 2018 and 3 March 2021 on the subject mentioned above, It is decided that the recommendation from the municipality has been conferred to Jhumka WUSC to provide the public land for the construction of the required Tank, Guardhouse, Office Building and Deep Boring, generator house, water treatment plant and other component structures as per the details of plot number and ward location of Ramdhuni Municipality mentioned below:

Details;

S. No.	Location (ward/tole)	Plot No.	Area	Area of the required land	Land Ownership	Purpose
1.	Ramdhuni municipality–3, Panitanki	258	0-16-11 (5594.23 sqm.)	0-4-0 (1352 sqm.)	GoN	WUSC office area; 5594.23 sqm. Has been using since 2054 by the committee where 2 deep boring, 2 OHT and pressure filter including office building and guards house and generator house is existed. The area is used for additional structures; 1 OHT, Ground RVT and pressure filter for improved water supply.
2.	Ramdhuni municipality–3, Samawesi Tole	258	0-0-12 (203 sqm.)	0-0-8 (135.4 sqm)	GoN	Construction of 2 Deep borings and use those as source of water

S. No.	Location (ward/tole)	Plot No.	Area	Area of the required land	Land Ownership	Purpose
3.	Ramdhuni municipality–3, Samawesi Tole		0-0-12 (203 sqm.)	0-0-8 (135.4 sqm)	GoN	Construction of 2 Deep borings and use those as source of water
4.	Ramdhuni municipality–3, nearby WUSC office area	249	0-0-15 (253.95 sqm.)	0-0-10 (169.3 sqm.)	GoN	The land has been used by WUSC since 2074 for operation of one deep boring and use it as source of water
5.	Ramdhuni municipality–3, laligurans Tole		0-0-12 (203 sqm.)	0-0-8 (135.4 sqm)	GoN	Construction of 2 Deep borings and use those as source of water
6	Ramdhuni municipality–3, WUSC office area	258	0-16-11 (5594.23 sqm.)	0-0-10 (169.3 sqm.)	GoN	Construction of 2 Deep borings and use those as source of water
7	Main Transmission Line	-	-	1.6 Km	-	Use of land for trench cutting and filling for main transmission pipe line
8	Distribution Pipe Line	-	-	200.64 km	-	Use of land for trench cutting and filling for distribbution pipe line

(Sign and Stamp)

……

Mr Jaya Prakash Chaudhary

Mayor, Ramdhuni Municipality

ANNEX 11: SOME PHOTOGRAPHS

Photo 1: Existing OHT,(100 Cum) in WUSC compound at Pani tankey Ramdhuni Municipality ward no 3.

Photo 2: Existing OHT, (225 Cum) in WUSC compound at Pani tankey Ramdhuni Municipality ward no 3.

Photo 3: Existing deep boring sites adjacent WUSC compound Pani tankey tole Ramdhuni ward no 3.

Photo 4: Existing WUSC compound and proposed two deep boring sites at Pani tankey tole Ramdhuni ward no 3.

Photo 5: Proposed deep Boring no 6 site at Pipara tole in Ramdhuni Municipality ward no 3.

Photo 6: Proposed deep Boring no 4 site at Laligurnas tole in Ramdhuni Municipality ward no 5.

Photo 7: Proposed deep Boring no 5 site at North of Pani tankey tole Ramdhuni Municipality ward no 3. Field inspections by Environmental Specialist.

Photo 8: Propose treatment plant site at Ramdhuni Municipality ward no 3 WUSC compound.

Photo 9: Proposed OHT 900cum & boring site at Ramdhuni Municipality W.N. 3, WUSC compound.

Photo 10: Meeting & Consultation at WUSC office with Mayor & Deputy Mayor in 10 November 2020.

Photo no. 15: Meeting & Consultation at WUSC office with Mayor & D. Mayor in 10 November 2020.

Photo no. 16: With WUSC Secretary, Design engineer, Environmental and Social Safeguard Specialist after field inspection at WUSC office.

	
Photo 17: Road along which Pipe line traversed for the distribution networks	**Photo 18:** Road along which Pipe line traversed for the main and distribution networks