



नेपाल सरकार

# खानेपानी मन्त्रालय

नेपाल सरकार  
खानेपानी मन्त्रालय  
सिंहदरबार, काठमाडौं

पत्र संख्या:- ०६६/०६६  
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दर्ता नं.: १२४४  
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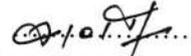
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✓ श्री सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना,  
पानीपोखरी, काठमाडौं ।

**विषय : प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन स्वीकृती सम्बन्धमा ।**

प्रस्तुत विषयमा तहां विभाग मार्फत स्वीकृतिका लागि यस मन्त्रालयमा प्राप्त भएको सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, प्रस्तावक रहेको मिर्चैया सिरहा स्टर्म वाटर ड्रेनेज आयोजना (सिरहा) र देउराली हुप्सीकोट सहरी खानेपानी तथा सरसफाई आयोजना (नवलपुर)को परिमार्जित प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन नेपाल सरकार (सचिवस्तर) को मिति २०६६/११/१५ को निर्णयानुसार स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।

  
(मधुसुधन खनाल )  
इन्जिनियर

**बोधार्थ :**

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,  
पानीपोखरी, काठमाडौं ।

**संलग्न :**

स्वीकृत प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन २ प्रति ।

श्री ड. वि. श्री नारायणजी / श्री वि. वि. वि.  
कोषाध्यक्ष  
११/२०



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
Urban Water Supply & Sanitation (Sector) Project  
Project Management Office  
Panipokhari, Maharajgunj, Kathmandu

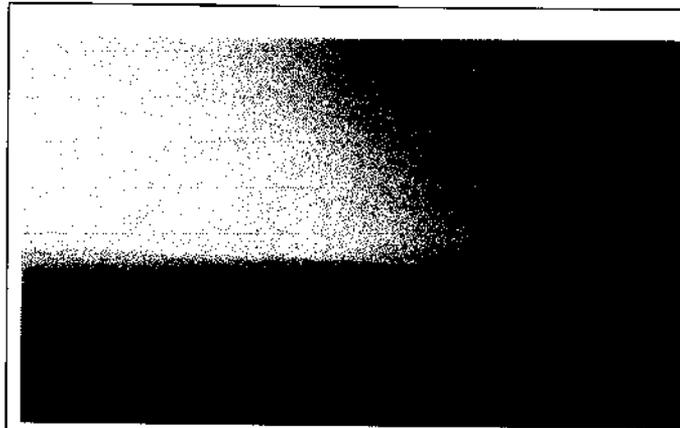
## Initial Environmental Examination (IEE)

Deurali Hupsekor Water Supply and Sanitation Project  
Gandaki Province, Nawalpur, Nepal



Of

27/11/2019  
Engineer



**FEBRUARY, 2020**

**SUBMITTED TO: Ministry of Water Supply, Singhadurbar, Kathmandu**

**SUBMITTED BY: Project Management Office, Urban Water Supply and Sanitation (Sector) Project, Department of Water Supply and Sewerage Management, Panipokhari, Kathmandu**

**Prepared by: TAEC Consult P. Ltd. – Integrated Consultants Nepal (P) Ltd. JV**



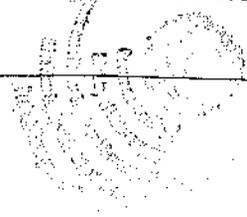
HHs	Households
IBAT	Integrated Biodiversity Assessment Tool
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICG	Implementation Core Group
IEC	Information, Education and Communication
IED	Intelligent Electric Device
IUCN	International Union for Conservation of Nature
IEE	Initial Environmental Examination
LC	Least Concern
MoFE	Ministry of Forest and Environment
MoPE	Ministry of Population & Environment
MoWS	Ministry of Water Supply
MWSS	Manufacturer Waste Scrap Shingles
NAAQS	National Ambient Air Quality Standards
NDWQS	National Drinking Water Quality Standard
NEA	Nepal Electricity Authority
NEPAP	National Environment Policy & Action Plan
no.	Number
NO <sub>2</sub>	Nitrogen Dioxide
NGO	Non-Governmental Organization
NRs	Nepalese Rupees
NTFP	Non-Timber Forest Products
NUDS	Nepal Urban Development Strategy
NVMES	Nepal Vehicles Mass Emission Standards
O&M	Operation and Maintenance
OBA	Output - Based Aid
ODF	Open Defecation Free
PE	Polyethylene
PID	Project Information Datasheet
PID	Proportional Integral Derivative
PLC	Programmable Logic Controller
PM	Particulate Matter
PM <sub>2.5</sub>	Particulate Matter 2.5 micrometers
PM <sub>10</sub>	Particulate Matter 10 micrometers
PMO	Project Management Office
PMQAC	Project Management and Quality Assurance Consultants
PN	Pressure Number
PPHA	Persons Per Hectare
RDSMCs	Regional Design Supervision and Management Consultant
RCC	Reinforced Cement Concrete



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ABBREVIATIONS

A.D.	Anno Domini
ADB	Asian Development Bank
AM	Accountability Mechanism
BoQ	Bill of Quantities
B.S.	Bikram Sambat
CAPP	Community and Public Participation Plan
CBS	Central Bureau of Statistics
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CO	Carbon Monoxide
CRO	Complaint Receiving Officer
CSA	Concerned Sector Agency
DCC	District Coordination Committee
DDR	Due Diligence Report
DEDR	Detailed Engineering Design Report
DHM	Department of Hydrology & Meteorology
DMA	District Metered Area
DMC	Developing Member Countries
DoR	Department of Roads
DRTAC	Design Review and Technical Audit Consultant
DSMC	Design, Supervision and Management Consultant
DWSSM	Department of Water Supply and Sewerage Management
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
EO	Environmental Officer
EPA	Environment Protection Act
EPR	Environment Protection Rules
ERDSMC	Eastern Regional Design Supervision and Management Consultant
ES	Environmental Specialist
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism



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REA	Rapid Environmental Assessment
RPMO	Regional Project Management Office
RTU	Remote Controller Unit
RVT	Reservoir Tank
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goal
SO <sub>2</sub>	Sulphur Dioxide
SPS	Safeguard Policy Statement
SS	Site Specific
SSTWSSSP	Second Small Towns Water Supply and Sanitation Sector Project
STWSSSP	Small Towns' Water Supply and Sanitation Sector Project
TDF	Town Development Fund
ToR	Terms of Reference
TSTWSSSP	Third Small Town Water Supply & Sanitation Sector Project
UWSSP	Urban Water Supply & Sanitation (Sector) Project
VDC	Village Development Committee
VU	Vulnerable
WHO	World Health Organization
WN	Ward Number
WSP	Water Safety Plan
WSSDO	Water Supply and Sanitation Divisional Office
WTP	Water Treatment Plant
WUA	Water Users' Association
WUSC	Water Users' and Sanitation Committee

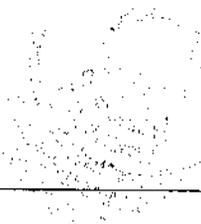


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**WEIGHTS AND MEASURES**

- amsl Above mean sea level
- CFU/100ml Colony Forming Units per 100 millilitre
- dBa decibel audible
- Ha hectare/s
- Kg/sq.cm Kilogram per square centimeter
- km kilometer/s
- Kph kilometer/s per hour
- m meter/s
- Kph kilometer/s per hour
- lps liter per second
- m meter/s
- m<sup>3</sup> cubic meter/s
- mg/l milligram/s per liter
- mm millimeter/s



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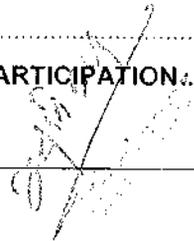
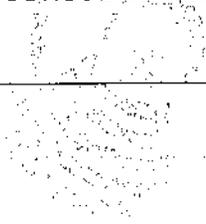
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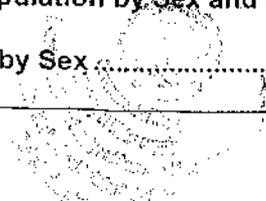
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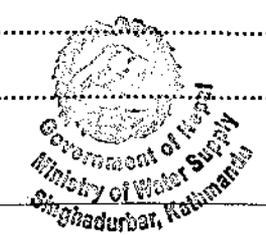
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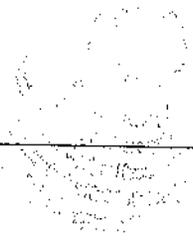
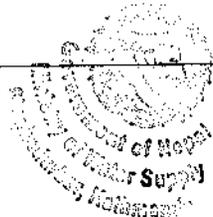


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## EXECUTIVE SUMMARY

### Introduction

1. Deurali Hupsekot Water Supply & Sanitation Project is one of the projects proposed under UWSSSP, which will support Nepal in expanding access to community managed water supply & sanitation in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. This project is currently being prepared to support further GoN's continuing efforts to provide water supply and sanitation services to selected urban municipalities of Nepal. In support of GoN's endeavor, the Asian Development Bank (ADB) funded this Urban Water Supply and Sanitation (Sector) Project (UWSSSP). This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Institutional and Community Capacities.
2. The existing water supply system supplies water for 24 hours from the reservoir, however the supply system to each household is intermittent and is limited to only 1-2 hour in a day. The supply system is such that the downstream household will be able to fetch water only after the upstream household closes the taps. This is mainly due to less discharge from sources, less capacity of storage reservoir, use of small sizes of pipes in the distribution system and lack of design consideration. Hence, the existing water supply system is not able to meet even the current demand of the proposed project town. There is also provision of water treatment plant in the existing water supply system. However, some of its components like Slow Sand Filter needs repair & maintenance.
3. Considering the water demand and condition of the existing system, there is a need of the proposed project to upgrade the existing water supply situation within the proposed service area to make drinking water available to the people of service area throughout the year and to provide easy access to safe & reliable water supply service.
4. The proposed project area lies in Hupsekot Rural Municipality, Nawalpur District, Gandaki Province (Province 4) of Nepal. The service area of the proposed project include Ward 1, 2, 3 & 4 of HUpsekot Rural Municipality.

### Description of the Project

5. The proposed project intends to provide both water supply as well as sanitation service. Hence, it comprises both water supply as well as sanitation components which are as follows:
  - i. Water Supply Components
6. **Sources/ Intakes:** The study shows that the three gravity sources Girubari khola (26lps), Betai khola (5lps) and Pathar khola (8lps) that have combined tapped discharge 39lps and Girubari khola/ sumpwell pumping that have 11lps tapped discharge, shall be extracted for the new watersupply system.
7. **Electrical System:** This system has only one stage pumping system to pump 11lps water for 20hours daily during design year. All others three sources are gravity system and does not require pumping. The sub meter would be enough for electrical works for building and dosing house at each RVT locations.
8. The electrical system are designed as new together with overhead transmission line. The pumping system has been envisaged in such a way that only one pump will run at a time and other will be an additional. Accordingly, the transformer, generator and other components are designed.
9. **Transmission Main & Pumping:** The transmission line passes via road, barren land and public land. The site for intakes and transmission route seems stable. But it is reported by WUSC that the transmission route of Girubari Khola Gravity System may have landslide in some locations occasionally. Hence, to overcome this problem the Girubari sump well has

been provisioned though the Girubari intake enough discharge. Single stage pumping is designed for this Girubari sumpwell. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari sumpwell to Dehidanda and Shivalaya WTP/ RVT site is about 13,453.00m.

10. **Thrust Blocks, Saddle Blocks and Thrust Beam:** Typical thrust blocks have been designed for a pressure of 24 kg/sq cm for both transmission lines and distribution line. Similarly, there is also provision of Thrust Beam & Saddle Blocks for DI pipes that will be laid up in sloppy areas and for the portions where DI pipes are unburied.
11. **Water Treatment Plant & Chlorination:** The existing system has provision of water treatment plants at two locations (Dihidanda & Shivalaya) for each Girubari, Betai and Pathar Khola sources. Each of these treatment plant has about 5lps capacity. These existing treatment plants will be used in the proposed system after necessary rehabilitation works. In addition, the two new components rapid mixture and flocculator have been included in this treatment system. For the remaining discharge 40 lps, new treatment plant has been designed.
12. The proposed water treatment plant comprises the components that includes Small rapid flash mixture (1 unit), Baffle Channel Flocculator (2 units), Sedimentation tanks (4 units), Roughening Filters (4 units) and an emergency feeder line consisting of a solution tank connected with feeding tank for chlorination. As per design, Bleaching powder 9.61 kg/day and 13.56 kg/day is required during base and design year respectively.
13. **Service Reservoir:** This system is designed by using multi reservoir concept. The capacities of the proposed reservoirs are as follows: i) RVT1 - 2 nos each 400cum at Dihidanda and ii) RVT 2-400cum 1 no. at Shivalaya for Jhyalbas area. The service area has been separated due to topography of the town. There are two existing reservoirs each with capacity of 250cum and 150 cum. These reservoirs are very old and not considered in the proposed system. The total storage requirement for the system at the end of the design period shall be about 1200m<sup>3</sup>.
14. **Distribution Main and District Metering Area:** The PE-100 pipes of outer dia 50mm to 200mm and DI 150mm to 300mm dia have been used in the design of the distribution system. The minimum pipe size used in the design is PE100- 50mm, which governs the velocity. All PE pipes will be joined using electrofusion technology. The total length of distribution pipe is 149,964.00m.
15. The distribution system is designed in consideration with District Metering Area (DMA). Each DMA will have bulk meter to determine the flow into respective service area. There are 7 DMAs in total service area to supply water from service reservoir. DMA boundary is fixed depending upon the elevation difference, location and ease for operation and maintenance.
16. **Household Connections:** Each household shall connect the tap to their household directly from main distribution pipe. The average 15m length of 20mm dia. PE 100-PN16 pipe with ferrule, compression joint, joined with GI fittings and valves up to meter is used for each HH connection. There will be 3,664 connections including individual and institutional connections in the system during base year.
17. Two types of tap stands have been designed for the project. At the end of the design period, it is anticipated that about 89.80% of the total 3652 households is fully plumbed and 10.20% of the total households is served through yard connection. The poor households connect tap at free of cost through OBA. There are total 3,280 fully plumbed connections and 372-yard tap connections. In total, there are 3664 tap connections including institutional 12 connections during design year.

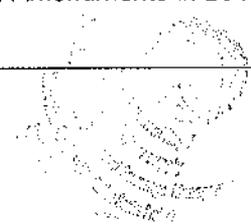
18. **Appurtenances:** This consists of Bulkmeter, Wash out Valves, Air Valves, Control Valves, Pressure Relief Valves, SCAD Valves and Fire Hydrants. There are 26 washout valves, 20 air valves and 129 gate valves proposed in the whole system.
19. **Valve Chambers:** Two type of Chambers have been proposed in the project to control or regulate the flow of the proposed water supply system. The chambers constructed by brick masonry have been provisioned in non-vehicular areas and rural area. In other vehicular carriageway and city area, chambers constructed with RCC has been provided. In total, there are 62nos. pipe valve boxes and 45nos washout/ air release/ control valve chambers designed in the distribution system.
20. **Generator House:** A Generator house is designed at Girubari sump well site. This generator of 50kVA supplies power mainly for pump installed at sump well, when there is no regular power from NEA.
21. **Laboratory Building cum WUSC Office Building, Guard House and Dosing House:** A two storied laboratory building cum WUSC office building has been designed and proposed to be built in Jhyalbas bazaar. WUSC will make the land available for the construction of this building. The Guard house type -2 will be at WTP/ RVT-1 and 2 sites and guard house type-1 will be at sump well site.
22. **Boundary Wall & Retaining Wall:** The retaining wall has been proposed at new WTP site at various locations. In some case, boundary wall will be above retaining wall and some cases boundary wall will be from foundation. Metal post with chain-link fencing above the wall has been proposed to protect the proposed structures as necessary.

ii. Sanitation Components

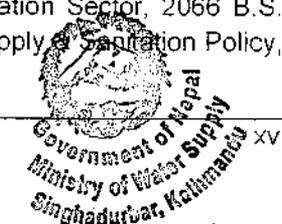
23. The survey revealed that there are not any public toilets or institutional toilets within the project town. Hence, the basic sanitation requirement of the proposed project is the construction of public toilets for institution as well as general public for the betterment of facilities in this area. There is provision of two institutional toilets & two public toilets under the sanitation components of this proposed project. This also involves provision of one tractor for solid waste collection which brings awareness in disposing of solid waste properly and will control haphazard dumping of solid waste. These facilities also inculcate behavior of toilet use as well as of effective solid waste management among students and the general public. Hence, the proposed project also will address basic sanitation issues through the provision of toilets and solid waste management.

**Policy, Legal & Administrative Framework**

24. The IEE study requires study of the concerned Policy, Legal & Administrative Framework to analyze their compliance with the project construction activities. The major environmental act, rules, plan, policies, guidelines that are relevant for IEE study of this project includes;
  - a) **Major Law, Acts & Rules:** i) Constitution of Nepal; ii) Environmental Protection Act (EPA), 2053 B.S. (1997 A.D.); iii) Environmental Protection Rules (EPR), 1997 AD, and its fifth amendments in 2017 A.D.
  - b) **Plans, Policies & Strategies:** i) National Environmental Policy & Action Plan (NEPAP), 2050B.S. (1993 A.D.); ii) Water Resources Strategy, 2059 B.S. (2002) A.D.; iii) Rural Water Supply and Sanitation Sectoral Strategic Action Plan (Unofficial Translation), 2060 B.S. (2004 A.D.); iv) Rural Water Supply and Sanitation National Policy and Rural Water Supply and Sanitation National Strategy, 2060 B.S. (2004 A.D.); v) National Water Plan, 2062 B.S. (2005 A.D.); vi) National Urban Policy, 2063 B.S. (2007 A.D.); vii) National Urban Water Supply & Sanitation Sector Policy, 2065 B.S. (2009 A.D.); viii) Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector, 2066 B.S. (2009 A.D. and Amendments in 2015A.D.); ix) National Water Supply and Sanitation Policy,



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- 2071 B.S. (2014 A.D.); x) Land Acquisition, Rehabilitation and Resettlement Policy, 2015 A.D.; xi) Land Use Policy, 2072 B.S. (2015 A.D.); xii) National Urban Development Strategy, 2074 B.S. (2017 A.D.); xiii) National Forest Policy, 2075 B.S. (2019 A.D.); xiv) Fourteen Three Years Plan (2073/74- 2075/76); xv) Fifteenth Plan Approach Paper, 2076/77-2080/81 and xvi) National Environmental Policy, 2076 B.S. (2019 A.D.)
- c) Laws & Acts:** i) Essential Goods Protection Act, 2012 B.S. (1955 A.D.); ii) Aquatic Animal Protection Act, 2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.)); iii) Town Development Act, 2045 B.S. (1988 A.D.); iv) Water Resource Act, 2049 B.S. (1992 A.D.); v) Land Acquisition Act, 2049 B.S. (1993 A.D.); vi) Child Labor Prohibition and Regulation Act, 2056 B.S. (2001 A.D.); vii) Water Supply Management Board Act, 2063 B.S. (2006 A.D.); viii) Solid Waste Management Act, 2068 B.S. (2011 A.D.); ix) Labour Act, 2074 B.S. (2017 A.D.); x) Local Government Operation Act, 2074 B.S. (2017 A.D.); xi) Consumer Protection Act, 2075 B.S. (2018 A.D.); xii) Forest Act, 2076 B.S. (2019 A.D.) and xiii) Land Use Act, 2076 B.S. (2019 A.D.)
- d) Rules & Regulations:** i) Solid Waste (Management & Resource Mobilization) Rules, 2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992 A.D.); ii) Water Resource Regulations, 2050 B.S. (1993 A.D.); iii) Forest Regulations, 2051 B.S. (1995 A.D.); iv) Drinking Water Regulations, 2055 B.S. (1998 A.D.); v) Solid Waste Management Rules, 2070 B.S. (2013 A.D.) and vi) Labor Rules, 2075 B.S. (2018 A.D.)
- e) Directives, Guidelines & Manuals:** i) National EIA Guidelines, 2049 B.S. (1993 A.D.); ii) Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.); iii) WHO Air Quality Guidelines, Global Update, 2061 B.S. (2005 A.D.); iv) National Noise Standard Guidelines, 2068 B.S. (2012 A.D.); and v) WHO Guidelines for Drinking-water Quality, Fourth Edition, 2073 B.S. (2017 A.D.)

### Methodology

25. The IEE study has been carried out in accordance with the requirements of the ADB's Safeguard Policy Statement (SPS 2009) and environmental requirements of GoN i.e., EPA (1997) and EPR (1997 with amendments 1999, 2007 & 2017). The methodology adopted to carry out this IEE study involves;
- a) Literature Review/ Desk Study: Relevant Maps & Reports including Feasibility Report, DEDR & DDR and other related published articles were reviewed to collect secondary information regarding the proposed project.
- b) Impact Area Delineation: This impact area delineation is carried out to identify the possible areas that may have either significant or insignificant impacts from the project implementation activities. The impact areas has 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.
- c) Field Study: The field study was conducted to collect baseline information on physico-chemical, biological, and socio-economic conditions of the core and surroundings areas of the project town.
- d) Public Notice: A public notice of 15 days was published in Arthik Abhiyan Dainik, a national daily newspaper on 2076/08/04 to seek written opinions from the concerned people and institutions regarding the possible impacts that may result from the implementation of the proposed project. Prior to this publication, copies of the Public Notice has been pasted at the concerned authorized office as per EPR, 2017.
- e) Stakeholder & Public Consultation: This has been carried out to acknowledge any kind of suggestions and to acquire the required information regarding the proposed project from

the interested stakeholders. The information acquired was integrated in the identification of anticipated environmental impacts.

- f) Collection of Muchulkas and Recommendation Letter: Deed of Inquiry (Muchulka) from the concerned offices has been collected right after the public notice at the concerned authority offices has been pasted. Similarly, Recommendation Letter from the local authority office (Municipality) has been collected after the completion of 15 days from the date of publication of public notice.
- g) Impact Identification, Prediction & Evaluation Method: This method is carried out through simple checklist & questionnaire method and through professional judgement to determine adversity of the anticipated impacts.

26. The study has followed the procedures outlined in the approved ToR and has covered the issues delineated therein.

### **Description of the Existing Environment**

- 27. This IEE study requires information on the existing environment of the project town to identify the susceptibility of the environmental aspects of the project town towards the anticipated environmental impacts of the proposed project. Regarding this, the secondary information of the existing environment was collected through literature review during desk study. However, the secondary information is not sufficient for IEE study. Hence, the field study was carried out to collect primary information on the existing environmental aspects.
- 28. Regarding this, details on various physical environmental aspects like Landforms & Topography, Geology & Soil, Water Resources, Climate, Air Quality, Acoustic Environment and biological features like Flora, Fauna, Aquatic Life, Protected Areas & Community Forest Areas were collected through simple checklist, REA checklist, professional judgment and interaction with the locals & the concerned bodies during field study. No existence of protected areas within the project area was observed during the field study. However, the study shows that some portion of transmission mains pass through the community forest despite of which there is no requirement of cutting trees except clearance of some bushes.
- 29. Similarly, details on water quality of the water sources to be used for the proposed project were collected through sampling process followed by water quality tests on approved laboratory. The test result shows that the water samples taken from the proposed sources have all the required parameters within the permitted value of NDWQS.
- 30. During field study, details on the socio-economic environment that includes Demographic Features, Caste/Ethnic Groups, Economic Features, Education & Skills and Community Infrastructures were also collected through simple questionnaire method followed by household survey and interaction with the locals. Regarding this, Willingness to Pay for Monthly Tariff, Willingness for Up-front Cash Contribution and Affordability has also been assessed. As per the sampled household survey, 100% of 210 sampled HHs and 98.41% of total 3652 HHs expressed willingness to pay for monthly water tariff and to contribute for up-front cash contribution respectively. This indicates their demand for the proposed project to get rid of the acute water shortage problem they have been facing for years. The survey also shows that 4.52% (165) of 3652 HHs fall under poor category and only 12.60% (460) of total 3652 HHs expend less than Rs. 7,500 per month. Hence, this indicates the affordability of the community in terms of monthly income level and the expenditure level.

### **Analysis of Alternatives**

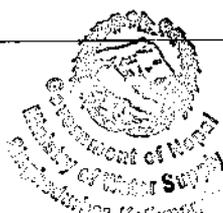
- 31. Analysis on the alternatives of the proposed project is another important process of IEE study that will help to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes "Without Project" or "Do-

nothing" Alternative and "With Project" Alternative. The limitation of "Without Project" Alternatives regarding continuous water supply system, treatment system and susceptibility to water borne diseases leads to opt for "With Project" Alternative. With Project Alternative has been analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed project is designed to provide convenient access to reliable, adequate, safe and potable water supply to 21,601 (including rental 2,254) populations as per base year 2018 A.D.

32. As per Feasibility Study Report, the system design for the proposed town has been done under two scenarios. The optimization of a proposed water supply system can be done on the basis of system layout, alternative technology, alternative materials and alternative source. In case of Deurali Hupsekot WSSP, the alternative analysis has been done on the basis of alternative source and additional service areas.
33. Various alternative sources are available in the vicinity of the proposed town to meet the overall demand for this project. The alternative I uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps and (ii) one pumping source that includes Girubari Khola with 12 lps discharge. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. This alternative covers 3,652 HHs of the service area.
34. The alternative II uses (i) three gravity sources that includes Giruari khola, Betai khola and Pathar khola with combined discharge 39 lps; (ii) one pumping source i.e., Girubari Khola with 12 lps discharge and (iii) two sources that includes Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps ( Kuhi Khola). The total estimated transmission pipeline length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. In addition, other two sources that includes Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola) are added for service area. The added area is scattered and does not match the criteria of UWSSP. The total length of transmission main for Sankhadev settlement is about 17,610.00m. Separate transmission line is provisioned for each source. This alternative covers 4,024 HHs of the service area.
35. Here, Alternative I is recommended for the detailed design because of the reliability of source, transmission line route and safety precaution issues.

#### **Anticipated Environmental Impacts**

36. The analysis on the information collected during field study helps to identify and predict the likely environmental impacts that may result from the proposed project. These predicted impacts are then evaluated using Scoring matrix as per National EIA Guidelines, 1993 to determine the nature, extent and magnitude. This evaluation will further help to propose the appropriate mitigation measure for each impact.
37. The anticipated environmental impacts have been mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This has been further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts has been sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Operation Phase.
38. Here, Beneficial Impacts includes Employment Generation, Skill Enhancement, Local Trade & Business Opportunities, Improved Health & Hygiene, Increased Economic Opportunity and Social Empowerment. Similarly, Adverse Impacts includes Soil Erosion & Land Surface Disturbances, Spoil Disposal & Gully Erosion, Noise Pollution, Impacts on Air Quality, Surface



Water Quality, Generation of Solid Waste & Waste water from the construction site & worker's camp, Accidental Leakage or Spillage of Stored Fuel/Chemicals, Land Use Pattern, Haphazard Disposal of Dismantled Debris, Impacts on Water Bodies, Impacts on Flora & Fauna, Impact on Aquatic Life, Impact on Water Quality of nearby rivers, Workers & Community Health & Safety Hazards, and Damage to the existing Utilities, Traffic Congestion, Public Protests, Disruption to Local Vendor's Business, Mobilization of Child Labour, Occupational Health & Safety Hazards, Delivery of Unsafe Water, Impact on Recipient Water Bodies and Impact of Sustainability of Works.

#### **Mitigation & Augmentation Measures**

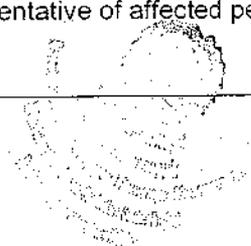
39. The mitigation & augmentation measures for each & every adverse impacts mentioned above have been proposed. These measures primarily includes Slope Protection Measures, Air Quality Monitoring, Noise Quality Monitoring, Waste Management, Prompt Backfilling, Handling of fuel & chemicals, Awareness regarding Workers & Community Health & Safety Hazards, Monitoring of Water Treatment System, Proper Handling of Chlorine etc. This has been described in detail in Chapter 8. If these proposed mitigation measures are effectively implemented, no such significant environmental problems have to be encountered during the construction & operation period of the proposed project. Likewise, various suitable augmentation measures have also been proposed to to maximize the anticipated beneficial impacts.

#### **Information Disclosure, Consultation & Participation**

40. Stakeholder Consultation and Community Participation is an essential process in project preparation. It is the process of engaging stakeholders and affected people. This process involves Key Informant interviews, On-site discussions with WUSC, and Random Field Interviews of stakeholders. Prior to the stakeholder's consultation, stakeholder analysis and mapping of stakeholders were carried out to identify the potential stakeholders and their roles towards the implementation of the project. The potential stakeholders were then involved in consultation to disseminate information related to the project, to collect their views & suggestions and to prioritize their concerns regarding the project. This will continue throughout the implementation of the projects and operation period. To facilitate the stakeholder consultation, PMO & ICG will maintain good communication and collaboration with WUSC and the Municipality.

#### **Grievance Redress Mechanism**

41. The Project-specific grievance redress mechanism (GRM) is also an essential process of the IEE study which is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the projects under STWSSSP. The mechanism, developed in consultation with key stakeholders, will ensure the following mentioned points;
- (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and
  - (ii) their concerns are effectively and timely addressed
42. This GRM involves setting up the Grievance Redress Committee (GRC) at the municipality level. The GRC will comprise of the following mentioned members:
- (1) WUSC Secretary;
  - (2) RPMO Engineer;
  - (3) RPMO social /environmental (as relevant) officer,
  - (4) Representative of affected persons,



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- (5) RDSMC's safeguards specialist (social/environment as relevant),
- (6) Representative of reputable and relevant CBO/SHG/organization working in the project area as invitee<sup>1</sup>, and
- (7) Contractor's representative

#### **Environmental Management Plan**

43. Preparation and Implementation of the environmental management plan (EMP) is another essential process of the IEE study. The main purpose of EMP is to ensure that the activities are undertaken in a responsible and non-detrimental manner. Similarly, the other objectives of EMP are as follows:
- (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site;
  - (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project;
  - (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impacts of the project and in enhancing beneficial impacts; and
  - (iv) ensuring that safety recommendations are complied with.
44. The total estimated local level monitoring and mitigation cost for the project is NRs. 2,000,000.00.

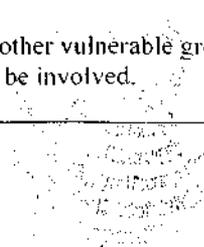
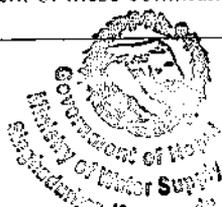
#### **Monitoring & Reporting**

45. PMO & RPMO will be responsible for environmental monitoring & reporting. RPMO will monitor and measure the progress of EMP implementation. RPMO will submit a monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. ADB will review project performance against the MoWS's commitments as agreed in the legal documents. ADB will monitor projects on an ongoing basis until a project completion report is issued. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.

#### **Conclusion**

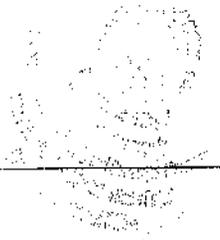
46. In conclusion, the IEE study shows that the proposed project is not an environmentally critical undertaking. The proposed project, its components, are not within or adjacent to environmentally sensitive areas. The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction periods). The proposed project will bring about the following mentioned benefits:
- i) Access to reliable supply of safe and potable water;
  - ii) Promotion of good hygiene and sanitation practices and reduced health and safety risks;
  - iii) Liberation from the hardship for continuous drinking water supply for years and
  - iv) Enhanced community health, improved quality of life and safe communities as outcomes.

<sup>1</sup> If the complaints are related with IP/Dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities shall be involved.

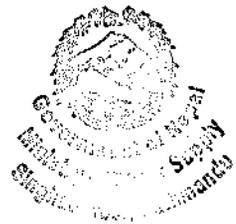


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47. Hence, there are no significant negative impacts of the proposed project, and the classification of the project as Category "B" is confirmed as per ADB and as Schedule -1 is confirmed as per Environment Protection Rules, 2054 (1997) and 2017 (Latest Amendments). No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) and Environment Protection Rules, 2054 (1997) of Nepal.



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कार्यकारी सारांश

परिचय

१. यस देउराली हुप्सेकोट खानेपानी आपूर्ति तथा सरसफाई आयोजना, शहरी खानेपानी तथा सरसफाई आयोजना अर्न्तगत प्रस्ताव गरिएको परियोजनाहरू मध्ये एक हो । एसियाली विकास बैंकबाट ऋण अनुदान तथा सहयोगमा निर्माण गरिएको विगतका तीन आयोजनाहरूको अनुभव र सफलतालाई आधार मानी बीसवटा आयोजनाहरू विभिन्न शहरहरूमा समुदायद्वारा प्रबन्धित पानी आपूर्ति तथा सरसफाईमा पहुँच विस्तार गर्न नेपाललाई सहयोग पुर्याउने लक्ष्य रहेको छ । नेपालका शहरी नगरपालिकाहरूमा खानेपानी आपूर्ति तथा सरसफाई सेवा वितरणमा सुधार ल्याउने नेपाल सरकारको निरन्तर प्रयासलाई सहायता पुर्याउनको निम्ति एसियाली विकास बैंकले शहरी खानेपानी तथा सरसफाई आयोजनाका निम्ति लगानी गरेको छ । यस आयोजनाका अपेक्षित परिणामहरू निम्न बमोजिम छन् : क) आयोजना कार्यान्वयन गर्ने शहरहरूमा सुधारिएको पानी आपूर्ति र सरसफाईका पूर्वाधार र ख) सुदृढ संस्थागत र सामुदायिक क्षमता अभिवृद्धि
२. स्थलगत अध्ययनको क्रममा विद्यमान पानी आपूर्ति प्रणालीले टैकीबाट २४ घण्टा पानी आपूर्ति गरेतापनि प्रत्येक घरधुरीले दिनमा १-२ घण्टा सम्म मात्रै पानी पाएका छन् । माथिल्लो क्षेत्रका घरधुरीले धारा बन्द गरेपछि मात्र तल्लो क्षेत्रको घरधुरीले पानी उपभोग गर्ने गरेका छन् । विद्यमान आपूर्ति प्रणालीको यस्तो प्रावधान हुनुको पछाडि प्रमुख कारणहरूमा स्रोतबाट कम डिस्चार्ज, पानी टैकीको कम क्षमता र वितरण प्रणालीमा साना आकारको पाइपको प्रयोग पर्दछन् । तसर्थ, विद्यमान खानेपानी प्रणाली प्रस्तावित शहरको वर्तमान माग पूरा गर्न सकेको छैन। विद्यमान खानेपानी प्रणालीमा पानी प्रशोधन केन्द्रको पनि व्यवस्था रहेको छ । यद्यपि स्लो स्यान्ड फिल्टर जस्ता यसका केही संरचनाहरूलाई मर्मतसंभारको आवश्यकता रहेको छ ।
३. खानेपानीको माग र अवस्थित प्रणालीको अवस्थालाई ध्यानमा राख्दै प्रस्तावित सेवा क्षेत्रका जनतालाई वर्षभरि पिउने पानी उपलब्ध गराउन तथा सुरक्षित एवं विश्वसनीय पानी आपूर्ति सेवामा सहज पहुँच पुर्याउन विद्यमान खानेपानी आपूर्तिको अवस्थालाई स्तरोन्नति गर्न प्रस्तावित आयोजनाको आवश्यकता रहेको छ ।
४. प्रस्तावित आयोजना क्षेत्र नेपालको गण्डकी प्रदेश (प्रदेश ४) को नवलपुर जिल्लाको हुप्सेकोट गाउँपालिकामा अवस्थित छ । प्रस्तावित आयोजनाको सेवा क्षेत्रमा हुप्सेकोट गाउँपालिकाको वडा नं १, २, ३ र ४ का आंशिक क्षेत्रहरू समावेश छन् ।

आयोजनाको विवरण

५. प्रस्तावित आयोजनाले पानी आपूर्ति तथा सरसफाई सेवा प्रदान गर्ने अभिप्राय लिएको छ जुन निम्न प्रकारका छन्:  
क) पानी आपूर्तिको संरचनाहरू
६. स्रोतहरू/इन्टेकहरू : तीन ग्रेभिटी स्रोतहरू गीरुवारी खोला ( २६ लिटर प्रति सेकेण्ड), बेताई खोला ( ५ लिटर प्रति सेकेण्ड) र पथर खोला ( ८ लिटर प्रति सेकेण्ड) गरी ३९ लिटर प्रति सेकेण्ड लिइएको छ भने गीरुवारी खोलाको सम्पुर्ण पम्पिंगको ११ लिटर प्रति सेकेण्ड पानी लिइएको छ ।
७. विद्युत प्रणाली : डिजाइन वर्षको बेला दैनिक २० घण्टासम्म ११ लिटर प्रति सेकेण्डको पानी पम्प गर्न केवल एक चरणको पम्पिंग रहेको छ । बाँकी तीन स्रोतहरू ग्रेभिटी प्रणालीका हुन् र यसमा पम्पिंगको आवश्यकता छैन । प्रत्येक टैकीको स्थानहरूमा हुने भवन तथा डोजिंग हाउसको विद्युत प्रणालीका लागि सब मिटर पर्याप्त हुनेछ ।

८. विद्युत प्रणाली, ओभरहेड ट्रान्समिशन लाइनको व्यवस्था गरी एक पटकमा केवल एउटा पम्प चल्ने र अर्को जगेडा हुने गरी पम्पिंग प्रणालीको परिकल्पना गरिएको छ । तदनुसार, ट्रान्सफार्मर, जेनेरेटर र अन्य संरचनाहरू डिजाइन गरिएको छ ।
९. **ट्रान्समिसन मेन्स र पम्पिंग :** ट्रान्समिसन लाइन सडक, बाँझो जमिन र सार्वजनिक जग्गाबाट हुँदै जान्छ । इन्टेक तथा ट्रान्समिसन मार्गका स्थान स्थिर देखिन्छ । तर, गीरुबारी खोला ग्रेभिटि प्रणालीको ट्रान्समिसन मार्गका केही स्थानहरूमा कहिलेकाही पहिरो जान सक्छ भनेर उपभोक्ता समितिद्वारा रिपोर्ट गरिएको छ । तसर्थ, गीरुबारी इन्टेकमा पर्याप्त डिस्चार्ज भएतापनि, यस समस्याको समाधानको लागि गीरुबारी सम्प वेलको व्यवस्था गरिएको छ । यस गीरुबारी सम्प वेलको लागि एकल चरण पम्पिंगको डिजाइन गरिएको छ । गीरुबारी खोला, बेताई खोला, पथर खोला र गीरुबारी सम्प वेलदेखि डिहिडाँडा र शिवालय WTP/RVT को स्थान सम्मको ट्रान्समिसन पाइपलाइनको लम्बाई १३,४५३.०० मी रहेको छ ।
१०. **थ्रस्ट ब्लक, स्याडल ब्लक र थ्रस्ट बीम :** दुबै ट्रान्समिसन लाइन तथा वितरण लाइनका लागि २४ किलोग्राम प्रति वर्ग सेन्टिमिटरको प्रेसरको लागि सामान्य थ्रस्ट ब्लकहरू डिजाइन गरिएको छ । त्यस्तैगरी, भिरालो क्षेत्रहरूमा विछ्याइने DI पाइपहरू र DI पाइपहरू नगाडिएको स्थानहरूमा थ्रस्ट बीम र स्याडल ब्लकको प्रावधान पनि रहेको छ ।
११. **पानी प्रशोधन केन्द्र क्लोरिनेसन :** विद्यमान प्रणालीमा गीरुबारी, बेताई र पथर खोला गरी प्रत्येक स्रोतका लागि दुई स्थानहरू (डिहिडाँडा र शिवालय) मा पानी प्रशोधन केन्द्रको व्यवस्था रहेको छ । यी प्रत्येक प्रशोधन केन्द्रको क्षमता करीब ५ लिटर प्रति सेकेण्ड रहेको छ । यी विद्यमान प्रशोधन केन्द्रहरू आवश्यक पुर्नस्थापनाका कार्यहरू गरी नयाँ प्रस्तावित प्रणालीमा प्रयोग गरिनेछ । साथै, रेपिड मिक्स्चर र फ्लकुलेटर गरी दुई नयाँ संरचनाहरू यस प्रशोधन प्रणालीमा समावेश गरिएको छ । बाँकी ४० लिटर प्रति सेकेण्डको डिस्चार्जको लागि नयाँ प्रशोधन केन्द्रको डिजाइन गरिएको छ ।
१२. **प्रस्तावित प्रशोधन केन्द्रमा सानो रेपिड स्यान्ड मिक्स्चर (१ यूनिट), व्याफल च्यानल फ्लकुलेटर (२ यूनिट), सेडिमेन्टेसन ट्याँक (४ यूनिट), रफिनइङ फिल्टर (४ यूनिट) र क्लोरिनेसनका लागि आवश्यक फिडिङ ट्याँक जोडिएको सोल्युसन ट्याँक रहेको फिडर लाइन जस्ता संरचनाहरू समावेश छन् । डिजाइन अनुसार आधार वर्ष र डिजाइन वर्षको बेला क्रमश ९.६१ किलोग्राम प्रति दिन र १३.५६ किलोग्राम प्रति दिनको ब्लिचिङ पाउडरको आवश्यक रहेको छ ।**
१३. **सर्भिस रिजर्भोयर :** यस प्रणाली. बहु भण्डार अवधारणा प्रयोग गरी डिजाइन गरिएको हो । प्रस्तावित रिजर्भोयरहरूको क्षमताहरू निम्न अनुसार छन् : क) डिहिडाँडामा रहेको RVT १ - २ वटा, प्रत्येक ४०० घ.मि. र ख) भयालवासको लागि शिवालयमा रहेको RVT २ - १ वटा, ४०० घ.मि । शहरको स्थलकृतिको कारण सेवा क्षेत्र अलग गरिएको छ । २५० घ.मि र १५० घ.मि गरी दुई वटा रिजर्भोयरहरू यहाँ विद्यमान छन् । यी रिजर्भोयरहरू धेरै पुराना र यसमा चुहावटको समस्या भएकोले प्रस्तावित प्रणालीमा समावेश गरिएको छैन । डिजाइन अवधिको अन्त्यमा प्रणालीको लागि कुल भण्डारण आवश्यकता १२०० घ.मि हुनेछ ।
१४. **वितरण लाइन र डिस्ट्रीट मिटरीड एरिया :** ५० मि.मि. देखि २०० मि.मि. सम्मको बाहिरी व्यासको PE-100 को पाइप र १५० मि.मि. देखि ३०० मि.मि. व्यासको DI पाइपहरू वितरण प्रणालीको डिजाइनमा प्रयोग भएका छन् । डिजाइनमा प्रयोग गरिएको न्यूनतम पाइप साइज PE-१००-५० मि.मि रहेको छ, जसले वेगलाई नियन्त्रण गर्दछ । सबै PE पाइपहरू इलेक्ट्रोप्युलन प्रविधि प्रयोग गरेर जोडिनेछन् । वितरण पाइपको कुल लम्बाई १४९,९६४.०० मीटर रहेको छ ।

१५. वितरण प्रणाली डिस्ट्रिक्ट मिटरीड एरिया (DMA) लाई ध्यानमा राखी डिजाइन गरिएको हो । सम्बन्धित सेवा क्षेत्रमा प्रवाह निर्धारण गर्न प्रत्येक DMA मा बल्क मीटर हुनेछ । सर्भिस रिजर्भोयरबाट पानी आपूर्ति गर्न सेवा क्षेत्रमा ७ DMA हरु रहेका छन् । उचाई भिन्नता, स्थान र भर्मत संभारका लागि हुने सहजताका आधारमा DMA को सीमा तय गरिएको छ ।
१६. घरधुरीमा जडान : प्रत्येक घरधुरीले मुख्य वितरण पाइपबाट सिधै घरको धारा जडान गर्नेछन् । प्रत्येक घरमा धारा जडानका लागि GI फिटिङ तथा भल्भ सँग जोडिएको फेरुल कम्प्रेसन ज्वाइन्ट सहितको औसत १५ मीटर लम्बाईको २०० मी मी व्यासको PE-१०० PN १६ को पाइप प्रयोग गरिनेछ । आधार वर्षमा व्यक्तिगत र संस्थागतसहित ३६६४ धारा जडानहरु रहनेछन् ।
१७. आयोजनाका लागि दुई प्रकारका धाराहरु डिजाइन गरिएको छ । कुल ३६५२ घरधुरीमा ८९.८०% घर भित्रको धारा र १०.२०% घर बाहिरको धारा जडान मार्फत सेवा दिइने अनुमान गरिएको छ । गरीब परिवारले OBA मार्फत निशुल्क धारा जडान गर्नेछन् । डिजाइन वर्षको बेला कुल ३२८० घर भित्रको धारा तथा ३७२ घर बाहिरको धाराहरु, १२ संस्थागत धारा सहित कुलमा ३६६४ धारा जडान गर्न सकिनेछ ।
१८. पूरक संरचनाहरु : यसमा बल्कमिटर, वाशवाउट भल्भहरु, एयर भल्भहरु, कन्ट्रोल भल्भहरु, प्रेशर रिलिफ भल्भहरु, SCADA भल्भहरु र फायर हाइड्रेन्टहरु समावेश छन् । यस प्रणालीमा २६ वटा वाशवाउट भल्भहरु, २० वटा एयर भल्भहरु र १२९ वटा गेट भल्भहरु प्रस्तावित छन् ।
१९. भल्भ च्याम्बर : प्रस्तावित प्रणालीको बहावलाई नियन्त्रण गर्न दुई किसिमका च्याम्बरहरु प्रस्ताव गरिएको छ । गैर-वाहन क्षेत्र र ग्रामीण क्षेत्रमा ईटाबाट बनेका च्याम्बरहरुको व्यवस्था गरिएको छ । अन्य सवारी वाहन र शहरी क्षेत्रमा ढलान गरिएको च्याम्बरहरुको व्यवस्था गरिएको छ । वितरण प्रणालीमा कुल ६२ वटा पाइप भल्भ बक्स र ४५ वटा वाशवाउट /एयर रिलिज/ कन्ट्रोल भल्भ च्याम्बरहरु डिजाइन गरिएको छ ।
२०. जेनेरेटर हाउस : एउटा जेनेरेटर हाउस, गिरुबारी सम्प वेल भएको स्थानमा डिजाइन गरिएको छ । NEA बाट नियमित विजुली नभएको खण्डमा ५० kVA को क्षमता भएको यस जेनेरेटरले सम्प वेलमा जडान गरिएको पम्पका लागि विद्युत आपूर्ति गर्दछ ।
२१. प्रयोगशाला भवनको साथ उपभोक्ता समितिको भवन, पाले घर र डोजिङ हाउस : दुई तले प्रयोगशाला भवनको साथ उपभोक्ता समितिको भवन डिजाइन गरी भ्यालबास बजारमा रहेको उपभोक्ता समितिले दिएको जग्गामा निर्माण गरिने प्रस्ताव गरिएको छ । पाले घर प्रकार -२ WTP/RVT १ र २ भएको स्थानमा निर्माण हुनेछ भने पाले घर प्रकार -१ सम्प वेल भएको स्थानमा निर्माण हुनेछ ।
२२. सीमा पर्खाल तथा टेवा पर्खाल : नयाँ पानी प्रशोधन केन्द्र भएको ठाउँको विभिन्न स्थानहरुमा टेवा पर्खाल प्रस्ताव गरिएको छ । आवश्यकता अनुसार प्रस्तावित संरचनाहरुको संरक्षणको लागि पर्खाल र सोमाथि चेन लिंक फेन्सिङ सहितको प्रस्ताव गरिएको छ ।

**ख) सरसफाई सम्बन्धि संरचनाहरु**

२३. आयोजना शहर भित्र कुनै सार्वजनिक शौचालय वा संस्थागत शौचालयहरु नभएको सर्वेक्षणले देखाएको छ । तसर्थ, प्रस्तावित आयोजनाको आधारभूत सरसफाईको आवश्यकता भनेको यस क्षेत्रमा सुविधा सुधारका लागि संघ-संस्था एवं सर्वसाधारणलाई लक्षित गरी सार्वजनिक शौचालय निर्माण गर्नु हो । प्रस्तावित

आयोजनाको सरसफाई सम्बन्धि संरचनाहरू अर्न्तगत दुई वटा संस्थागत शौचालयहरू तथा दुई वटा सार्वजनिक शौचालयहरूको व्यवस्था गरिएको छ । यसमा फोहोर मैला संकलनका लागि एउटा ट्र्याक्टरको प्रावधान पनि समावेश छ जसले फोहोर मैलालाई सही ढंगले डिस्पोज गर्ने कार्यमा चेतना ल्याउँदछ र अनियमित ढंगले फोहोर मैला फालिने कार्यलाई नियन्त्रण गर्दछ । यी सुविधाहरूले विद्यार्थी एवं सर्वसाधारण माझ शौचालयको प्रयोग तथा प्रभावकारी फोहोर मैला व्यवस्थापनको बानी बसाल्नेछ ।

### नीति, कानूनी र प्रशासनिक रूपरेखां

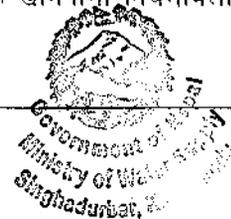
२४. प्रारम्भिक वातावरणीय अध्ययनको अवधिमा प्रस्तावित आयोजना निर्माणका गतिविधिहरूले सम्बन्धित नीति तथा कानूनको पालना गरेको छ, कि छैन भनेर मुल्यांकन गर्नका निम्ति ती सम्बन्धित नीति, कानूनी र प्रशासनिक रूपरेखाको अध्ययनको आवश्यकता पर्दछ । यस आयोजनाको प्रारम्भिक वातावरणीय परीक्षणसँग सम्बन्धित मुख्य वातावरणीय ऐन, नियमहरू, योजना, नीतिहरू, दिशानिर्देशहरू निम्न उल्लिखित छन् :

क) प्रमुख कानून, ऐन तथा नियमहरू: १)नेपालको संविधान; २)वातावरणीय संरक्षण ऐन, वि.सं २०५३ (ई.स. १९९७); ३) वातावरणीय संरक्षण नियमावली वि.सं २०५४ (ई.स. १९९७) र पाचौं संशोधन वि.सं २०७३ (ई.स. २०१७)

ख) योजना, नीति तथा रणनीतिहरू : १) राष्ट्रिय वातावरणीय नीति तथा कार्य योजना, वि.सं २०५० (ई.स. १९९३); २) जलस्रोत रणनीति, वि.सं २०५९ (ई.स. २००२); ३) ग्रामीण खानेपानी तथा सरसफाई नीति, तथा ग्रामीण खानेपानी तथा सरसफाई रणनीति, वि.सं २०६० (ई.स. २००४); ४) ग्रामीण खानेपानी तथा सरसफाई क्षेत्रीय रणनीतिक नीति, वि.सं २०६० (ई.स. २००४); ५) राष्ट्रिय जल योजना, वि.सं २०६२ (ई.स. २००५); ६) राष्ट्रिय शहरी नीति, वि.सं २०६३ (ई.स. २००७) ; ७) राष्ट्रिय शहरी खानेपानी तथा सरसफाई क्षेत्रगत नीति, वि.सं २०६५ (ई.स. २००९); ८) साना शहर खानेपानी तथा सरसफाई क्षेत्रका लागि परिमार्जित पन्ध्र वर्षे विकास योजना, वि.सं २०६६ (ई.स. २००९ तथा २०१५ मा गरिएको संशोधन ); ९) राष्ट्रिय खानेपानी आपूर्ति तथा सरसफाई नीति , वि.सं २०७१ (ई.स. २०१४); १०) भूमि अधिग्रहण, पुर्नस्थापना र पुर्नवास नीति, ई.स. २०१५; ११) भू-उपयोग नीति, वि.सं २०७२ (ई.स. २०१५); १२) राष्ट्रिय शहरी विकास रणनीति, वि.सं २०७४ (ई.स. २०१७); १३) राष्ट्रिय वन नीति, वि.सं २०७५ (ई.स. २०१९); १४) चौथो तीन वर्षे, (२०७३/७४-२०७५/७६), १५) पन्ध्रौं योजना आधार पत्र (२०७६/७७-२०८०/८१) र १६) राष्ट्रिय वातावरण नीति, (वि.सं २०७६ (ई.स. २०१९);

ग) कानून तथा ऐनहरू : १) आवश्यक वस्तु संरक्षण ऐन, वि.सं २०१२ (ई.स. १९५५); २) जलचर संरक्षण ऐन, वि.सं २०१७ (ई.स. १९६१) तथा संशोधन वि.सं २०५५ (ई.स. १९९७); ३) शहरी विकास ऐन, वि.सं २०४५ (ई.स. १९९८); ४) जल स्रोत ऐन, वि.सं २०४९ (ई.स. १९९२); ५) भू-अतिक्रमण ऐन, वि.सं २०४९ (ई.स. १९९३); ६) बालश्रम निषेध तथा विनियमन ऐन, वि.सं २०५६ (ई.स. २००१); ७) खानेपानी व्यवस्थापन बोर्ड ऐन, वि.सं २०६३ (ई.स. २००६); ८) फोहोर मैला व्यवस्थापन ऐन, वि.सं २०६८ (ई.स. २०११); ९) श्रम ऐन, वि.सं २०७४ (ई.स. २०१७) ; १०) स्थानिय सरकार सञ्चालन ऐन, वि.सं २०७४ (ई.स. २०१७); ११) उपभोक्ता संरक्षण ऐन, वि.सं २०७५ (ई.स. २०१८); १२) वन ऐन, वि.सं २०७६ (ई.स. २०१९); र १३) भूमि प्रयोग ऐन, वि.सं २०७६ (ई.स. २०१९)

घ) नियम तथा नियमावलीहरू : १) फोहोर मैला (व्यवस्थापन तथा स्रोत परिचालन) नियम, वि.सं २०४४ (ई.स. १९८७) तथा संशोधन वि.सं २०४९ (ई.स. १९९२); २) जलस्रोत नियमावली, वि.सं २०५० (ई.स. १९९३); ३) वन नियमावली, वि.सं २०५१ (ई.स. १९९५); ४) खानेपानी नियमावली, वि.सं



२०५५ (ई.स. १९९८); ५) फोहोरमैला व्यवस्थापन नियमावली, वि.सं २०७० (ई.स. २०१३) र ६) श्रम नियमावली, वि.सं २०७५ (ई.स. २०१८)

ड) निर्देशिका तथा पुस्तिका : १) राष्ट्रिय वातावरणीय प्रभाव मूल्यांकन दिशानिर्देश, वि.सं २०४९ (ई.स. १९९३); २) सामुदायिक ध्वनिका लागि विश्व स्वास्थ्य संस्थाको दिशानिर्देश, वि.सं २०५५ (ई.स. १९९९) ; ३) विश्व स्वास्थ्य संस्थाको वायु गुणस्तर दिशानिर्देश, वि.सं २०६१ (ई.स. २००५); ४) राष्ट्रिय ध्वनि मानक दिशानिर्देश, वि.सं २०६८ (ई.स. २०१२); र ५) खानेपानी गुणस्तरका लागि विश्व स्वास्थ्य संस्थाको दिशानिर्देश, चौथो संस्करण, वि.सं २०७३ (ई.स. २०१७)

### पद्धति

२५. एडीवीको सुरक्षा नीति बिबरण (SPS 2009) र नेपाल सरकारको वातावरणीय आवश्यकताहरु EPA (१९९७) र EPR (१९९७, सन् १९९९, २००७ र २०१७ मा गरिएको संशोधन सहित) को आधारमा यस प्रारम्भिक वातावरणीय परीक्षणको अध्ययन गरिएको छ। यस अध्ययन गर्नको लागि अपनाइएको पद्धतिमा निम्न समावेश छन् ;

क) लेख-रचनाहरुको समीक्षा : प्रस्तावित आयोजनाको बारे दोस्रो तहको जानकारी संकलन गर्न प्रासंगिक नक्शा, सम्भाव्यता प्रतिवेदन, डिटेल् इन्जिनियरिङ डिजाइन प्रतिवेदन र ड्यु डेलिजेन्स प्रतिवेदन सहितका प्रतिवेदनहरु र अन्य सम्बन्धित प्रकाशित लेखहरुको समीक्षा गरियो।

ख) प्रभावित क्षेत्रको चित्रण : आयोजना कार्यान्वयनका गतिविधिहरुबाट हुने महत्वपूर्ण वा नगण्य प्रभावहरुको असर पर्न सक्ने सम्भावित क्षेत्रहरुको पहिचान गर्नका लागि प्रभावित क्षेत्रको चित्रण गरियो। प्रस्तावित आयोजनाको गतिविधिका कारण पूर्वानुमानित प्रभावहरुको निकटता र परिमाणको आधारमा "मूल आयोजना क्षेत्र" (Core Project Area) र "आयोजना क्षेत्रको सेरोफेरो" (Surrounding Project Area) को रूपमा प्रभावित क्षेत्रहरुको चित्रण गरिएको छ।

ग) स्थलगत अध्ययन : आयोजना शहरको मूल र वरपरका क्षेत्रहरुको भौतिक-रासायनिक, जैविक र सामाजिक-आर्थिक अवस्थाको बारेमा आधारभूत जानकारी संकलन गर्न स्थलगत अध्ययन गरिएको थियो।

घ) सार्वजनिक सूचना : प्रस्तावित आयोजनाको कार्यान्वयनबाट हुने सम्भावित असरहरु सम्बन्धित व्यक्ति र संस्थाहरुबाट लिखित राय लिनको लागि मिति २०७६/०८/०४ मा राष्ट्रिय दैनिक पत्रिका-आर्थिक अभियान दैनिकमा पन्ध्र दिने सार्वजनिक सूचना प्रकाशित गरियो। यस प्रकाशन अघि, सार्वजनिक सूचनाका प्रतिलिपिहरु वातावरणीय सुरक्षा नियमावली, २०१७ अनुसार सम्बन्धित आधिकारिक कार्यालयहरुमा टाँस गरिएको छ।

ड) सार्वजनिक परामर्श : यो सार्वजनिक सूचनाको सम्बन्धमा इच्छुक सरोकारवालाहरुबाट कुनै पनि सुझावहरुको पहिचान गर्नको लागि सार्वजनिक परामर्श गरियो।

च) मुचुल्का र सिफारिस पत्रको संकलन : सम्बन्धित आधिकारिक कार्यालयहरुमा सार्वजनिक सूचना टाँस गरे लगत्तै सम्बन्धित कार्यालयहरुबाट मुचुल्का संकलन गरिएको छ। त्यस्तैगरी, सार्वजनिक सूचनाको प्रकाशन मितिबाट १५ दिन पछि स्थानीय आधिकारिक कार्यालय (नगरपालिका) बाट सिफारिस पत्र संकलन गरिएको छ।

छ) प्रभाव पहिचान, पूर्वानुमान र मूल्यांकन : यो पद्धति अपेक्षित प्रभावको प्रतिकूलता निर्धारण गर्न सरल चेकलिस्ट र प्रश्नावली तथा विशेषज्ञको निर्णयको माध्यमबाट गरिएको छ।

२६. यस अध्ययनले अनुमोदित ToR मा उल्लिखित कार्यविधिको अनुसरण गरेको छ र यसमा छलफल गरिएका मुद्दाहरूलाई समेटेको छ।

### वर्तमान वातावरण

२७. प्रस्तावित आयोजनाका पूर्वानुमानित वातावरणीय प्रभावहरूप्रति यस आयोजना शहरका वातावरणीय पक्षहरूको संवेदनशीलताको पहिचान गर्न शहरको वर्तमान वातावरणबारे जानकारी लिन आवश्यक पर्दछ। यसै सन्दर्भमा, डेस्क अध्ययनको क्रममा साहित्य समीक्षाको माध्यममार्फत वर्तमान वातावरणको द्वितीयक जानकारी प्राप्त गरिएको छ। यद्यपि, प्रारम्भिक वातावरणीय परीक्षणका लागि यी माध्यमिक तहको जानकारी पर्याप्त भने छैन। तसर्थ, वर्तमान वातावरणीय अवस्थाबारे प्राथमिक जानकारी एकत्रित गर्न स्थलगत अध्ययन गरियो।

२८. यसै सन्दर्भमा स्थलगत अध्ययनको समयमा क) भौतिक वातावरणीय पक्ष अर्न्तगत स्थलकृति, भूमि जमिन प्रयोगको वर्गीकरण, भूविज्ञान, जलस्रोतहरू, जलवायु, वायुको गुणस्तर, ध्वनिक वातावरण, भुक्षय संवेदनशीलता; ख) जैविक वातावरण अर्न्तगत वनस्पति, वन्यजन्तु संरक्षित क्षेत्र, सामुदायिक वन क्षेत्र, जस्ता बारे आवश्यक विवरणहरू साधारण चेकलिस्ट, REA चेकलिस्ट, विशेषज्ञ निर्णय तथा स्थानिय एवं सम्बन्धित निकाय सँगको अर्न्तक्रिया मार्फत संकलन गरियो। आयोजना क्षेत्रभित्र कुनै पनि संरक्षित क्षेत्र तथा सामुदायिक वन क्षेत्रहरू अवस्थित नरहेको स्थलगत अध्ययनको क्रममा देखाएको छ।

२९. त्यस्तैगरी, प्रस्तावित आयोजनामा प्रयोग हुने जलस्रोतहरूको पानीको गुणस्तरबारे विवरण संकलन गर्न पानीको नमुना संकलन गरी स्वीकृति प्राप्त प्रयोगशालामा परीक्षण गरियो। यस परीक्षणले प्रस्तावित खोला बाट संकलित पानीको नमुनामा सबै आवश्यक प्यारामिटरहरू राष्ट्रिय खानेपानी गुणस्तरको मापदण्ड भित्र रहेको देखाएको छ।

३०. स्थलगत अध्ययनको क्रममा, सामाजिक आर्थिक वातावरण अर्न्तगत जनसांख्यिक विशेषताहरू, जाति/जातिय समूह, आर्थिक विशेषताहरू, शिक्षा तथा सीप, सामुदायिक पूर्वाधारहरू इत्यादि सम्बन्धि विवरणहरू साधारण प्रश्नावली प्रक्रिया हुँदै घरधुरी सर्वेक्षण र स्थानिय सँगको अर्न्तक्रिया मार्फत संकलन गरियो। यसै सन्दर्भमा पानीको मासिक महसुल तिर्ने सम्बन्धि चाहना, अग्रिम नगद योगदानका लागि चाहना र तिर्ने सक्ने क्षमता बारे मुल्यांकन गरियो। नमुना घरधुरी सर्वेक्षण अनुसार २१० नमुना घरधुरी मध्ये १००% ले नै र ३६५२ घरधुरी मध्ये ९८.४१% ले कमशः पानीको मासिक पानीमहसुल तिर्ने सम्बन्धि र अग्रिम नगद योगदान सम्बन्धि इच्छुकता व्यक्त गरेका छन्। यसले यस आयोजना शहरका बासिन्दाहरूको विद्यमान पानीको गंभीर समस्याबाट मुक्त हुन प्रस्तावित आयोजनाको चाहनालाई संकेत गर्दछ। त्यस्तैगरी, सर्वेक्षणले ३६५२ घरधुरी मध्ये ४.५२% (१६५) घरधुरीहरू विपन्न वर्ग अर्न्तगत रहेको देखाएको छ भने १२.६०% (४६०) घरधुरीले प्रति महिना रु.७,५००.०० भन्दा कम खर्चिने गरेको देखाएको छ। तसर्थ, मासिक आय र व्यय स्तरको आधारमा प्रस्तावित आयोजनाको लागि समुदायको सामर्थ्यताको संकेत गर्दछ।

### वैकल्पिक विश्लेषण

३१. प्रस्तावित आयोजनाको वैकल्पिक विश्लेषण, यस प्रारम्भिक वातावरणीय परीक्षणको अर्को मुख्य प्रक्रिया हो जसले प्राविधिक, वातावरणीय तथा सामाजिक पक्षहरूको सन्दर्भमा यस आयोजनाको सम्भाव्यताको परीक्षण गर्न मद्दत पुर्याउँछ। मुख्यतया, यस प्रक्रिया अर्न्तगत "आयोजना विना" विकल्प र "आयोजना सहित" विकल्प जस्ता दुई विकल्पहरू समावेश गरिएका छन्। निरन्तर खानेपानी प्रणाली, प्रशोधन प्रणाली तथा पानीजन्य रोगप्रतिको संवेदनशीलताको सन्दर्भमा "आयोजना विना" विकल्पको सीमितताले "आयोजना सहित" विकल्पको छनौट तर्फ उन्मुख गराएको छ। प्रस्तावित आयोजनाका सम्भावित फाइदाहरूको मूल्यांकन मार्फत "आयोजना सहित" विकल्पको विश्लेषण गरिएको छ। आधार वर्ष २०१८ को अनुसार २१,६०९ (२,२५४ भाडामा बस्ने सहित) जनसंख्यामात्र विश्वसनीय पर्याप्त, सुरक्षित र पिउन

योग्य खानेपानीको सुविधाजनक पहुँच प्रदान गर्न प्रस्तावित आयोजना डिजाइन गरिएको वैकल्पिक विश्लेषणले देखाएको छ ।

३२. सम्भाव्यता अध्ययन प्रतिवेदन अनुसार प्रस्तावित शहरको लागि प्रणालीकृ डिजाइन दुई परिदृश्य अर्न्तगत गरिएको छ । प्रस्तावित खानेपानी प्रणालीको अनुकूलन प्रणाली खाका, वैकल्पिक प्रविधि, वैकल्पिक सामग्री र वैकल्पिक स्रोतको आधारमा गर्न सकिन्छ । देउराली हुप्सेकोट खानेपानी तथा सरसफाई आयोजनाको सवालमा वैकल्पिक विश्लेषण वैकल्पिक स्रोत र थप सेवा क्षेत्रको आधारमा गरिएको छ ।
३३. प्रस्तावित शहरको वरिपरी क्षेत्रमा यस आयोजनाको समग्र माग पूरा गर्न विभिन्न वैकल्पिक स्रोतहरू उपलब्ध छन् । विकल्प १ ले क) ३९ लिटर प्रति सेकेण्ड संयुक्त डिस्चार्ज भएको गिरुबारी खोला, बेताई खोला र पथर खोला सम्मिलित तीन ग्रेभिटी स्रोतहरू र ख) ११ लिटर प्रति सेकेण्ड डिस्चार्ज भएको गिरुबारी खोला सम्मिलित एक पम्पिंग स्रोत प्रयोग गर्दछ । गिरुबारी खोला, बेताई खोला, पथर खोला र गिरुबारी पम्पिंग देखि गिरुबारी पानी प्रशोधन केन्द्र/रिर्जभोयर भएको स्थान सम्मको ट्रान्समिशन लाइनको कुल अनुमानित लम्बाई करीब १४,०७७.०० मीटर रहेको छ । यस विकल्पले सेवा क्षेत्रको ३,६५२ घरधुरीलाई समेट्छ ।
३४. विकल्प २ ले क) ३९ लिटर प्रति सेकेण्ड संयुक्त डिस्चार्ज भएको गिरुबारी खोला, बेताई खोला र पथर खोला सम्मिलित तीन ग्रेभिटी स्रोतहरू, ख) ११ लिटर प्रति सेकेण्ड डिस्चार्ज भएको गिरुबारी खोला सम्मिलित एक पम्पिंग स्रोत र ग) १ लिटर प्रति सेकेण्डको चपाहा (गैडा पाखा खोला) र ५ लिटर प्रति सेकेण्डको शंखदेव (कुही खोला) सम्मिलित दुई स्रोतहरू प्रयोग गर्दछ । गिरुबारी खोला, बेताई खोला, पथर खोला र गिरुबारी पम्पिंग देखि गिरुबारी पानी प्रशोधन केन्द्र/रिर्जभोयर भएको स्थान सम्मको ट्रान्समिशन लाइनको कुल अनुमानित लम्बाई करीब १४,०७७.०० मीटर रहेको छ । साथै, सेवा क्षेत्रका लागि चपाहा १ लिटर प्रति सेकेण्ड (गैडा पाखा खोला) र शंखदेव ५ लिटर प्रति सेकेण्ड (कुही खोला) सम्मिलित अन्य दुई स्रोतहरू थपिएका छन् । थपिएको क्षेत्रमा छरिएको वस्ती भएकोले शहरी खानेपानी तथा सरसफाई आयोजनाको मापदण्डसँग मेल खाँदैन । शंखदेव वस्तीका लागि ट्रान्समिशन पाइपको कुल लम्बाई करीब १७,६१०.०० मीटर रहेको छ । प्रत्येक स्रोतको लागि छुट्टै ट्रान्समिशन लाइनको व्यवस्था गरिएको छ । यस विकल्पले सेवा क्षेत्रको ४,०४२ घरधुरीलाई समेट्छ ।
३५. स्रोतको विश्वसनीयता, ट्रान्समिसन लाइन मार्ग र सुरक्षा सावधानीका मुद्दाहरूको कारणले गर्दा विस्तृत डिजाइनका लागि विकल्प १ सिफारिश गरिएको छ ।

#### पूर्वानुमानित वातावरणीय प्रभावहरू

३६. स्थलगत अध्ययनको अवधिमा एकत्रित गरिएको विश्लेषणले प्रस्तावित आयोजनाको परिणामस्वरूप देखिने प्रत्याशित वातावरणीय प्रभावहरूको पहिचान तथा पूर्वानुमान गर्न मद्दत पुर्याउँछ । राष्ट्रिय वातावरणीय प्रभाव मुल्यांकन निर्देशिका, ई. सं. १९९३ अनुसार तय गरिएको स्कोरिङ म्याट्रिक्स प्रयोग गरी यी अनुमानित प्रभावहरूको प्रकृति, सीमा र परिमाण निर्धारण गर्न यी प्रभावहरूको मुल्यांकन गरियो । यो मुल्यांकनले प्रत्येक प्रभावका लागि उपयुक्त न्यूनिकरण विधि प्रस्ताव गर्न थप मद्दत गर्नेछ ।
३७. यी प्रत्याशित वातावरणीय प्रभावहरूलाई मुख्यतय यिनका नकारात्मक र सकारात्मक महत्वको आधारमा दुई भागमा वर्गीकृत गरिएको छ : क) लाभदायी प्रभाव र ख) प्रतिकूल प्रभाव । यी वर्गीकृत गरिएको प्रभावहरूलाई वर्तमान वातावरणमा पर्ने असरहरूको आधारमा थप चार प्रभावहरूमा वर्गीकृत गरिएको छ: क) भौतिक वातावरणीय प्रभाव ख) जैविक वातावरणीय प्रभाव ग) रासायनिक वातावरणीय प्रभाव र घ) सामाजिक आर्थिक वातावरणीय प्रभाव । यी चार प्रभावहरूलाई आयोजनाको चरण अनुसार पुन तीन भागमा विभाजन गरिएको छ जस अर्न्तगत क) डिजाइन चरण, ख) निर्माण चरण र ग) सञ्चालन चरण समावेश छन् ।

३८. यहाँ लाभदायिक प्रभावहरु अर्न्तगत रोजगार श्रृजना, क्षमता अभिवृद्धि, स्थानीय व्यापार तथा व्यापारिक अवसरहरु, सुधिएको स्वास्थ्य तथा सरसफाई, आर्थिक अवसरहरुमा वृद्धि, महिला सशक्तिकरण जस्ता प्रभावहरु समावेश छन् । त्यस्तैगरी, भूक्षय, ध्वनि प्रदुषण, वायुमा पर्ने प्रभाव, सतही पानीको गुणस्तरमा पर्ने प्रभाव, निर्माण क्षेत्र एवं श्रमिक शिविर बाट फोहोर मैला एवं फोहोर पानीको उत्पन्न, भण्डारण गरिएको ईन्धन/रसायनको आकस्मिक चुहावट, जमिन प्रयोगको वर्गीकरणमा पर्ने प्रभाव, प्राकृतिक ढल निकासमा अवरोध, भत्काइएका अवशेष बाट निस्किएका फोहोरको अनुचित ढंगबाट गरिएको विघटनको प्रभाव, खोला नालामा पर्ने प्रभाव, वनस्पति तथा वन्यजन्तुमा पर्ने प्रभाव, जलचरमा पर्ने प्रभाव, वन डढेलो, वन अतिक्रमण, नजिकैको नदीनालाको पानीको गुणस्तरमा पर्ने प्रभाव, रिजरभ्वायरमा भण्डारण गरिएको पानीको गुणस्तरमा पर्ने प्रभाव, संरचनात्मक अस्थिरता, सामुदायिक स्वास्थ्य र सुरक्षामा हुनसक्ने जोखिमहरु, हाल प्रदान भइरहेको सुविधाहरुमा हुनसक्ने क्षति, ट्राफिक जाम, स्थानिय विक्रेताको व्यवसायमा अवरोध, पेशागत स्वास्थ्य र सुरक्षामा हुनसक्ने जोखिमहरु, असुरक्षित खानेपानीको वितरण, आयोजनाका कार्यहरुको दिगोपनमा पर्ने प्रभाव इत्यादि प्रतिकूल प्रभाव अर्न्तगत समावेश छन् ।

### न्यूनिकरण तथा वृद्धि-विकासका उपायहरु

३९. माथि उल्लिखित प्रतिकूल वातावरणीय प्रभावहरुको न्यूनिकरण तथा लाभदायिक प्रभावहरुको वृद्धि-विकासका उपायहरुको प्रस्ताव गरिएको छ । यी उपायहरु अर्न्तगत मुख्यतः भिरालो ठाउँहरुको सुरक्षाका उपायहरु, वायु गुणस्तर अनुगमन, ध्वनि गुणस्तर अनुगमन, फोहोर मैला व्यवस्थापन, शीघ्र माटो पुर्ने, इन्धन तथा रसायनको उचित व्यवस्थापन, श्रमिक तथा सामुदायिक स्वास्थ्य एवं सुरक्षा सम्बन्धि हुनसक्ने खतराहरु सम्बन्धि चेतनामूलक कार्यक्रमहरुको सञ्चालन, पानी प्रशोधन प्रणालीको अनुगमन, क्लोरिनको उचित व्यवस्थापन इत्यादि जस्ता उपायहरु समावेश छन् । यी उपायहरु अध्याय ८ मा विस्तारमा वर्णन गरिएको छ । यदि यी प्रस्तावित विधिहरु उचित ढंगले अपनाउने हो भने आयोजनाको निर्माण तथा सञ्चालन चरणमा कुनै उल्लेखनीय वातावरणीय समस्याहरुको सामना गर्नुपर्ने छैन । त्यस्तैगरी, प्रस्तावित आयोजनाका प्रत्याशित लाभदायिक प्रभावहरुलाई अझै माथि उकास्नको निम्ति विभिन्न उपयुक्त वृद्धि-विकासका उपायहरुको पनि प्रस्ताव गरिएको छ ।

### सूचना प्रवाह, परामर्श तथा सहभागिता

४०. हितग्राहीहरु संगको परामर्श तथा सामुदायिक सहभागिता यस आयोजनाको तयारी चरणको कममा अपनाउने महत्वपूर्ण प्रक्रिया हो । यो सरोकारवाला तथा प्रभावित व्यक्तिहरुलाई संलग्न गराउने प्रक्रिया हो । यस प्रक्रियामा प्रमुख सूचनादातासंगको अर्न्तवार्ता, सम्बन्धित उपभोक्ता समितिसंगको स्थलगत छलफल तथा उपभोक्ताहरूसँग गरिने स्थलगत छलफल जस्ता प्रक्रियाहरु समावेश छन् । उपभोक्ताहरु संगको परामर्श अघि सम्भावित उपभोक्ताहरु र आयोजना कार्यान्वयनप्रति यिनको भूमिकाको पहिचान गर्नको निम्ति उपभोक्ता विश्लेषण र म्यापिङ्ग (चित्रण) गरिन्छ । यस पश्चात् आयोजना सम्बन्धि सूचना प्रवाह गर्न, उपभोक्ताहरुको सुझाव तथा सल्लाह संकलन गर्न र आयोजनाप्रति उनीहरुले देखाएका चासोका विषयहरुलाई जोड दिन यी सम्भावित उपभोक्ताहरुलाई परामर्शमा संलग्न गराइन्छ । उपभोक्ताहरु संगको परामर्शका प्रक्रियाहरु यस आयोजनाको निर्माण तथा सञ्चालनको अवधिभरी जारी रहनेछ । उपभोक्ताहरुको संलग्नतालाई सहज बनाउन आयोजना व्यवस्थापन कार्यालय (PMO) तथा कार्यान्वयन केन्द्रिय समूह (ICG)ले सम्बन्धित उपभोक्ता समिति र नगरपालिकासंग राम्रो सम्बन्ध तथा सहकार्य गर्नेछ ।

गुनासो सुनवाई संयन्त्र

४१. यस आयोजनाले निम्त्याएका अप्रत्याशित सामाजिक तथा वातावरणीय असरहरुप्रति भएका गुनासाहरुको समाधानको गुनासो सुनवाई संयन्त्र (GRM) रहेको छ । यस संयन्त्र मुख्य हितग्राहीहरु सँग गरिएको परामर्शबाट निर्माण गरिएको हो जसले निम्न उल्लिखित बुँदाहरुको सुनिश्चितता जनाउनेछ :
- क) यस आयोजनाले निम्त्याएको प्रतिकूल सामाजिक तथा वातावरणीय प्रभावहरुबाट पीडित हरेक व्यक्तिको आधारभूत अधिकार र चासोको सुरक्षा  
ख) ती व्यक्तिहरुको समस्यालाई समयमै प्रभावकारी ढँगले सम्बोधन गर्ने
४२. यस संयन्त्र अन्तर्गत नगरपालिकाको स्तरमा गुनासो सुनवाई समितिको गठन समावेश छन् । यी गठन गरिएको समितिमा निम्न उल्लिखित सदस्यहरु समावेश गरिने छन् :
- क) उपभोक्ता समितिको सचिव  
ख) क्षेत्रिय आयोजना व्यवस्थापन कार्यालयको इन्जिनियर  
ग) क्षेत्रिय आयोजना व्यवस्थापन कार्यालयको सामाजिक/वातावरण अधिकारी  
घ) पीडित पक्षका तर्फबाट एक प्रतिनिधि  
ङ) क्षेत्रिय डिजाइन, निरीक्षण र व्यवस्थापन परामर्शदाताकोबाट सुरक्षा विद (सामाजिक/वातावरणीय सम्बन्धित विशेषज्ञ)  
च) अतिथिको रूपमा आयोजना क्षेत्रमा सक्रिय कुनै प्रतिष्ठित एवं प्रसांगिक समुदायमा आधारित संस्था(CBO)/स्वयं सहायता समुह (SHG)को एक प्रतिनिधि  
छ) ठेकेदारको प्रतिनिधि

वातावरणीय व्यवस्थापन योजना

४३. वातावरणीय व्यवस्थापन योजनाको तयारी तथा यसको कार्यान्वयन, प्रारम्भिक वातावरणीय परीक्षणको अर्को अत्यावश्यक प्रक्रिया हो । यस योजनाको मूल उद्देश्य भन्नु नै आयोजनाका गतिविधिहरु विना क्षति जिम्मेवार ढँगले भइरहेको सुनिश्चित गर्नु हो । त्यस्तैगरी, यस योजनाका अरु उद्देश्यहरु निम्न उल्लिखित छन् :
- क) स्थलगत वातावरणीय गतिविधिको निगरानीको लागि सक्षम बनाउन एक सक्रिय , सम्भाव्य र व्यावहारिक उपकरण प्रदान गर्नु,  
ख) यस आयोजनाका लागि गरिएको वातावरणीय गतिविधिहरुका खोज तथा सिफारिशहरुको कार्यान्वयनलाई मार्गदर्शन र नियन्त्रण गर्ने ;  
ग) यस आयोजनाको वातावरणीय प्रभावहरुको न्यूनिकरण गर्न सहयोग पुर्याउनका लागि आवश्यक देखिएका विशेष कार्यहरु विस्तार गर्ने तथा लाभदायिक प्रभावहरुको वृद्धि गर्ने, र  
घ) सुरक्षा सम्बन्धि दिइएका सिफारिशहरुको अनुपालना गरिएको सुनिश्चित गर्ने ।
४४. यस आयोजनाका लागि तयार पारिएको स्थानिय स्तर निगरानी तथा प्रत्यासित प्रभावको न्यूनिकरणको कूल अनुमानित लागत रु.२,०००,०००.०० रहेको छ ।

अनुगमन तथा रिपोर्टिङ

४५. यस आयोजनाको वातावरणीय गतिविधिको निगरानी र रिपोर्टिङका लागि आयोजना व्यवस्थापन कार्यालय (PMO) र क्षेत्रिय आयोजना व्यवस्थापन कार्यालय (RPMO)जिम्मेवार रहनेछ । RPMO ले PMO समक्ष मासिक निगरानी र कार्यान्वयनको प्रतिवेदन पेश गर्नेछ भने तदनुसार PMO ले आवश्यक भएमा उचित कदम चाल्नेछ । यस पश्चात् PMO ले एसियाली विकास बैंक समक्ष अर्द्ध वार्षिक निगरानीको प्रतिवेदन पेश गर्नेछ । कानूनी कागजातमा सम्झौता भएअनुसार खानेपानी मन्त्रालयले गरेको प्रतिवेदताको लेखाजोखा गर्न एसियाली विकास बैंकले आयोजनाको गतिविधिहरुको समीक्षा गरिनेछ । आयोजना सम्पन्न नभएसम्म एसियाली विकास बैंकले आयोजनाको निगरानी गर्नेछ । यसको साथै नेपाल



सरकार अर्न्तगत रहेको खानेपानी मन्त्रालय एवं वन तथा वातावरण मन्त्रालयले आयोजनाको समीक्षा गर्न प्रसांगिक स्थलगत भ्रमणका माध्यमबाट अनुगमन कार्य पनि गर्नेछ ।

### निष्कर्ष

४६. निष्कर्षमा, प्रारम्भिक वातावरणीय परीक्षण अध्ययनले प्रस्तावित आयोजना वातावरणीय हिसाबले गम्भीर प्रकृतिको नभएको देखाएको छ । प्रस्तावित आयोजना र यसका संरचनाहरू वातावरणीय हिसाबले संवेदनशील क्षेत्रभित्र वा वरपर अवस्थित छैनन् । साथै, निर्माणको क्रममा सामना गर्नुपर्ने केही प्रतिकूल प्रभावहरू (सम्भवत अधिकतम निर्माण अवधिमा देखापर्ने) अस्थायी र छोटो अवधिका छन् । प्रस्तावित आयोजनाले निम्न उल्लिखित फाइदाहरू दिलाउने छन् :
- क) सुरक्षित र पिउन योग्य पानीको विश्वसनीय आपूर्तिमा पहुँच,
  - ख) उचित सरसफाई र स्वच्छताको अभ्यासमा उन्नति र स्वास्थ्य एवं सुरक्षा जोखिममा कमी,
  - ग) वर्षौंदेखि निरन्तर खानेपानी आपूर्तिकालागि भोग्नुपरेको कठिनाईबाट मुक्ति र
  - घ) परिणाम स्वरूप परिस्कृत सामुदायिक स्वास्थ्य , सुधारिएको जीवन स्तर र सुरक्षित समुदाय
४७. तसर्थ, यस आयोजनाले कुनै उल्लेखनीय नकरात्मक प्रभावहरू ननिम्त्याउने र एसियाली विकास बैंकद्वारा गरिएको वर्गीकरण अनुसार प्रस्तावित आयोजना Category 'B' अर्न्तगत पर्ने र वातावरण संरक्षण नियमावली, २०५४ र २०७३ मा गरिएको नयाँ संशोधनको अनुसूचि-१ लाई पालना गरेको छ । २००९ मा लागू गरिएको सुरक्षा नीति विवरण (SPS) तथा वातावरण संरक्षण नियमावली, २०५४ र २०७३ मा गरिएको नयाँ संशोधनको पालना गर्न कुनै विशेष अध्ययन वा वातावरणीय प्रभाव मूल्यांकन (EIA) को आवश्यकता नभएको यस प्रारम्भिक वातावरणीय परीक्षण अध्ययनको निष्कर्ष रहेको छ ।



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Engineer

## 1. INTRODUCTION

### 1.1. Background

1. In 2000, the Government of Nepal (GoN) endorsed the 15-year Development Plan for Small towns Water Supply and Sanitation to improve health and economic and environmental living conditions of people in small towns in Nepal. The Plan adopts a community managed demand responsive approach, where the community is involved in all aspects of planning and implementation of its town's project. In support of GoN's endeavor, the Asian Development Bank (ADB) funded the Small Towns' Water Supply and Sanitation Sector Project (STWSSSP) in 2001-2008. Twenty-nine (29) small towns of about 570,000 people benefitted from the improved water supply and sanitation services delivered under the Project. The positive impacts of STWSSSP led GoN to embark on the Second Small Towns' Water Supply and Sanitation Sector Project (2ndSTWSSSP), also financed by ADB and which benefitted another twenty-one (21) small towns. Following these two projects, the Third Small Towns' Water Supply and Sanitation Sector Project (TSTWSSSP) has been implemented to support further GoN's continuing efforts to improve water supply and sanitation service delivery in small towns in Nepal. 26 small towns were benefitted by this TSTWSSSP. The Project follows the government's 15-year Development Plan, as updated in 2009, to develop the water and sanitation sector for small towns. Hence, ADB has supported the government in improving WSS services in 70 of the 176 small towns in Nepal through three earlier projects.
2. Subsequently, ADB and GoN are working together to provide water supply and sanitation services to selected urban municipalities of Nepal through Urban Water Supply Sanitation (Sector) Project (UWSSSP) in accordance with the updated 15-year Development Plan for Small Towns and the National Urban Development Strategy. The Project will support Nepal in expanding access to community managed water supply & sanitation in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. UWSSSP will be implemented over a five-year period (indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach. This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Institutional and Community Capacities.

### 1.2. Name and Address of the Individual Institution Preparing the Report

#### 1.2.1 Name and Address of the Proponent

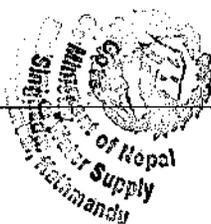
3. The name & address of the proponent of the proposed project, Deurali Hupsekot Water Supply & Sanitation Project is as follows:

#### **Name of Proponent**

Project Management Office  
Urban Water Supply and Sanitation (Sector) Project  
Department of Water Supply and Sewerage Management (Implementing Agency)  
Ministry of Water Supply (Executive Agency)  
Government of Nepal

#### **Address of the Proponent:**

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



### 1.2.2 Name and Address of the Consultant preparing the Report

4. The name and address of the consultant preparing the report is as follows:

TAEC Consultant P. Ltd. / Integrated Consultants Nepal Pvt. Ltd. JV  
 Shankhamul, Kathmandu  
 Tel: 977 1 5242846  
 Fax: 977 1 5242553  
 E-mail: [taec@mos.com.np](mailto:taec@mos.com.np)  
 Website: [www.taecconsult.com.np](http://www.taecconsult.com.np)

### 1.2.3 IEE Study Team

5. The details of the members involved in the IEE study team is tabulated below:

**Table 1-I: Details of IEE Study Team Members**

S.No.	Name of the Member	Designation	Educational Qualifications
1	Mr. Ananda Mohan Lal Das	Team Leader	Masters of Science in Public Health Engineering
2	Mr. Srijan Aryal	Design Engineer	Masters in Civil Engineering/Urban Planning
3	Mr. Binod Chandra Devkota	Senior Water Supply & Sanitation Engineer	Masters of Science in Water Resources Engineering
4	Ms. Nirala Kayastha	Environmentalist	Masters of Science in Environmental Management
5	Mr. Shiva Adhikari	Social Safeguard Specialist	Masters in Sociology

Source: IEE Study 2018/019

### 1.3. Purpose of IEE

6. IEE was conducted to ensure the environmental sustainability of the Project, to integrate environmental considerations into the Project preparation process, and provide for environmental management during Project implementation. ADB and GoN require all projects to undergo environmental assessments. All projects funded by ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The rapid environmental assessment using ADB's REA Checklist has indicated that the Project is a Category B undertaking, requiring IEE. On the GoN side, the statutory requirement that has to be adhered to is the Environment Protection Act (1997), and Environment Protection Rules (1997) and as amended in 1999, 2007 & 2016). Based on EPR Schedule 1, the Project is within the threshold of activities under the water supply and sanitation sector that will require IEE. This IEE fulfills the policy requirements of both ADB and GoN.
7. The IEE Report primarily: (i) provides information on the Project and its environmental requirements; (ii) provides the necessary baseline conditions of the physical, ecological, cultural and socio-economic environments and/or resources in and surrounding the Project's area of influence; (ii) identifies and assesses potential impacts arising from the implementation of the Project on these environments and/or resources; (iii) recommends measures to avoid, mitigate, and compensate for the adverse impacts; (iv) presents information on stakeholder consultations and participation during Project preparation (v) recommends a mechanism to address grievances on the environmental performance of the Project; and (vi) provides an environmental management plan. Relevant reports/documents



consultations with communities are included in the report, and reference to relevant government policies, laws and regulations and mainly the Terms of References (ToR) approved by MoWS.

#### 1.4. Need for the Project

8. The existing water supply system supplies water for 24 hours from the reservoir, however the supply system to each household is intermittent and is limited to only 1-2 hour in a day. The supply system is such that the downstream household will be able to fetch water only after the upstream household closes the taps. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration. Hence, the existing water supply system is not able to meet even the current demand of the proposed project town. There is also provision of water treatment plant in the existing water supply system. However, some of the components like Slow Sand Filter needs repair.
9. Regarding this, as per the detailed design of the proposed project, domestic consumption at ultimate demand i.e., 100.lpcd has been considered as the proposed project aims to provide safe & reliable water to each HH. This nodal demand also includes the institutional demand, commercial demand and wastage & leakage. Here, the institutional demand consists of water demand pertaining to institutions like schools & colleges. Similarly, the commercial demand consists of water demand pertaining to army barracks, police posts, hotels, lodges, factories, government and non-government offices. Hence, all the parts that includes Residential, Commercial, Institutional along with anticipated wastage & leakage issues within the service area has been covered under the scope of the proposed project.
10. The existing system has a design, construction, and operation & maintenance deficiencies and requires upgrading and rehabilitation to meet the growing demand. Considering the water demand and condition of existing system, there is a need for a project to upgrade the existing water supply situation in the service area to meet growing demand for private connections and to make drinking water available to the people of service area throughout the year.

#### 1.5 Rationale of the Project and IEE

##### Rationale of the Project

11. The rationale of the project is based on the increasing demand of the reliable project, hardship of people for safe drinking water, willingness to pay, affordability, public health impacts, policy commitments and various other aspects. This all will be discussed in the following chapters.

##### Rationale of the IEE

12. The proposed water supply and sanitation project is needed to be studied from the environmental point of view as per EPA 1997 AD and EPR 1997 AD, 2054 BS (Amendments 1999 AD, 2007 AD & 2016 AD). The Proposed Water Supply and Sanitation Project is intended to serve drinking water in wards 1, 2, 3 & 4. The project is expected to benefit a base year population of about 22,786 populations (2021) & a design population of 32,168 (2040) by providing a reliable and adequate supply of safe & potable water, promotion of good hygiene and sanitation practices.
13. The proposed project shall use surface water sources. The Project will not involve the construction of any tunnels; relocation of people or households, settlement plan above the gravity source and construction of river training works. As the proposed project falls within the definitions provided in the EPR 1997 (Amendments 1999, 2007 & 2017 A.D.) Schedule 1 (Clause H) for drinking water projects, only an IEE should be done. The regulation stated in

Schedule 1 (Clause H) shall only be applicable if the proposal does not fall under the Category "A" through (Clause H) of Schedule 2.

14. The following given table gives the brief details on fulfillment of the criteria for the requirement of IEE as per Schedule 1-Clause H of Environmental Protection Regulations 1997 with latest amendments 2017, by the proposed project.

**Table 1-II: Criteria for Requirement of IEE for Drinking Water Supply Projects as per Schedule 1 (H) of Environment Protection Regulation 1997 Amendment 2017**

S.N.	Condition described in the Act and Regulations	IEE Required as per the Regulation Schedule 1 (H)	Conditions in the Project
1	Supply of water in dry season from surface water with a safe yield of	Up to 1 cusec and utilizing up to 50% of the available quantity	Within the Limit (The proposed existing sources Girubari Khola, Betai Khola and Pathar Khola has safe yield of 26 lps, 5 lps and 8 lps respectively. The study shows that Girubari Khola, Betai Khola and Pathar Khola has more than 40lps, 12 lps and 10 lps flow respectively.)
2	Processing of Water Treatment	More than 25 liters per sec	Within the limit (Total Capacity of all WTPs is 45lps.)
3	Connection of New Source to supply water to existing water supply system for a population of	10,000 – 100,000	About 22,786 populations (2021) & design populations of 32,168 populations (2040).

Source: EPR, 1997(Latest Amendments) & DEDR, 2019

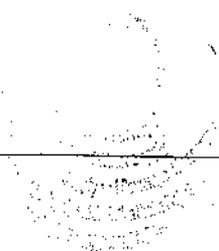


*27/10/2019*  
 Engineer

## 2 DESCRIPTION OF THE PROJECT

### 2.1 Location & Accessibility

15. The Project area of Deurali Hupsekot Water Supply and Sanitation Project lies in Hupsekot Rural Municipality, Nawalpur District, a hilly region in the Gandaki Province (Province 4) of Western Nepal.
16. Geographically, the project area lies in the hilly region between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude.
17. Formally, Nawalpur District is a part of former Nawalparasi district, which was split into two districts Nawalpur District and Parasi District after the state's reconstruction of administrative divisions as of 20 September 2015. The project town was declared as Hupsekot Rural Municipality by the Government of Nepal, Ministry of Federal Affairs and Local Development from Council of Ministers on September 20, 2015. The then VDC which were merged are Deurali, Dhaubadi & Hupsekot to form a Nawalpur Municipality with total of 6 wards covering area of 189.21 sq. km.
18. The figure given below depicts the location of the proposed service area:



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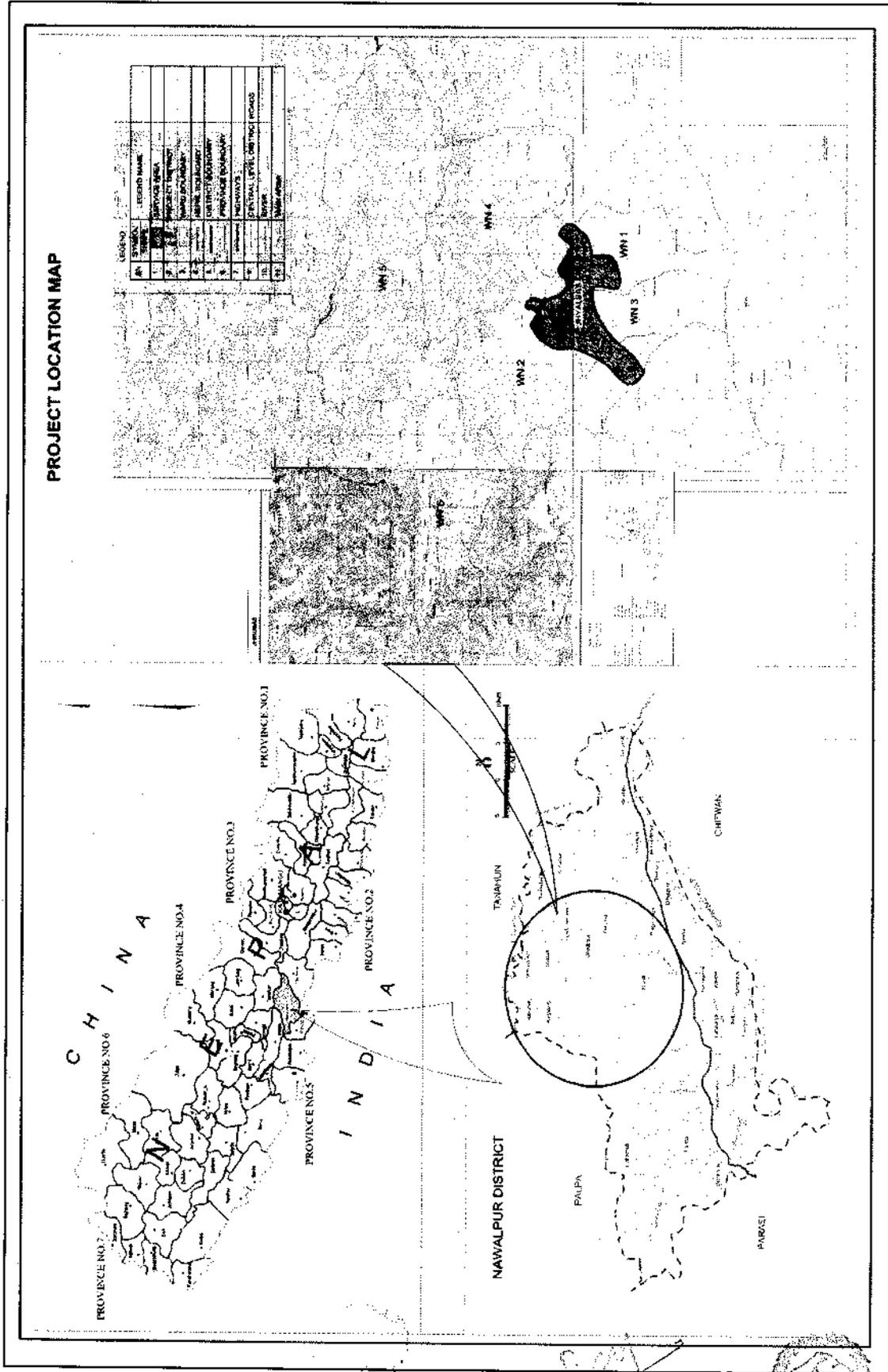


Figure 2-I: Location Map of the Project Area

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 Engineer



19. This figure given above shows that the project area belongs to Hupsekot Rural Municipality of Nawalpur District of Gandaki Province of Nepal. The project town is bounded by Bungdikali Rural Municipality & Palpa District (Nisdi Rural Municipality) in the north, Bulingtar Rural Municipality in the north east, Kawasoti & Devchuli Municipality in the east, Kawasoti & Madhyabindu Municipality in the south and Madhyabindu Municipality & Palpa District (Nisdi Rural Municipality) in the west. Out of 6 wards of the project town, the proposed project area covers areas of wards 1,2,3 & 4.
20. The following table given below gives the brief details on the ward profile of Hupsekot Rural Municipality;

**Table 2-I: Hupsekot Rural Municipality Ward Profile**

Present Ward Municipality	Former VDC/Municipality	Former Ward No.
1	Deurali VDC	WN 5
	Dhaubadi VDC	WN 2
2	Deurali VDC	WN 1,2 & 9
3	Deurali VDC	WN 3 & 4
4	Deurali VDC	WN 6 & 7
	Dhaubadi VDC	WN 7
5	Deurali VDC	WN 8
6	Dhaubadi VDC	WN 1,3,6,8 & 9
	Hupsekot VDC	WN 1 to 9

Source: Final District 1-75 Corrected Last For Rajpatra ([www.mofald.gov.np](http://www.mofald.gov.np))

21. The table given above shows that the reformed Hupsekot Rural Municipality has been divided into 6 wards. The current ward 1 of Hupsekot Rural Municipality belong to ward 5 of former Deurali VDC. Similarly, the current ward 2 belong to ward 2 of former Deurali VDC, ward 3 belong to wards 3 & 4 of the former Deurali VDC, ward no. 4 belong to wards 6 & 7 of Deurali VDC and ward 7 of former Dhaubadi VDC, the ward 5 belong to ward 8 of former Deurali VDC and ward 6 belong to wards 1,3,6,8 & 9 of former Dhaubadi VDC & ward 1 to 9 of former Hupsekot VDC.
22. The town is located about 8 km away from Danda bazaar (near Kawasoti) east-west highway. The distance from Kathmandu to Kawasoti 178 km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) 3 km and Sahid Chowk to WUSC office/ Jhyalbas 8km.
23. The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2 °C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari. The required data from this station is used for the project.

## 2.2 The Proposed Project

24. This Project has been conceptualized as surface water system with combined system comprising gravity as well as pumping system. This project uses the sources that are used for the existing water supply system that includes Girubari Khola, Betai Khola & Pathar Khola. Similarly, the existing Girubari Khola Intake & Pathar Khola Intake has been proposed to be rehabilitated and used for the project. The existing WTP at Dihidanda & Shivalaya for each



Girubari, Betai & Pathar Khola will also be used in the proposed system with necessary rehabilitation works. Hence, the proposed project is the extension of the existing water supply system.

25. The proposed service area has been delineated through a long discussion between WUSC, community and stakeholders. The distribution system layout plan has been verified together with WUSC in the field also referred as the project area. As the name of Deurali Hupsekot, it was envisaged that the majority of the settlement of Hupsekot Rural Municipality will be covered from this project. The name of the major settlements of the service area of Hupsekot Rural Municipality are as follows:

Ward no. 1: Beluwa and Jukepani

Ward no. 2: Koliya and Guheri ( water to be supplied from RVT without pumping)

Ward no. 3: Girubari and Belhani

Ward no. 4: Jhyalbas and Tallo Dihi

26. The system is designed by using multi reservoir concept. The total demand of 2021 and 2039 of every sub-system has been calculated and shown below.

**Table 2-II: Proposed Sub-system and demand**

Sub-System	WaterDemand(lpd)							Storage Volume
	2018	2019	2021	2025	2030	2035	2040	
RVT 1A & 1B	22.23	22.62	23.44	25.19	27.57	30.20	33.10	800(N)
RVT 2	9.40	9.57	9.92	10.65	11.66	12.77	14	400(N)
<b>TOTAL</b>	<b>31.63</b>	<b>32.19</b>	<b>33.36</b>	<b>35.84</b>	<b>39.23</b>	<b>42.97</b>	<b>47.10</b>	<b>1200</b>

Source: DEDR, Deurali Hupsekot, 2019

27. The project shall comprise two major components. The first and the most important component is the rehabilitation of the present water supply systems components and construction of new water supply systems to augment the present and future water demand in the proposed service area. The second component is related with the improvement of sanitation system by means of introducing institutional latrines, public latrines, collection and efficient management of solid waste of the town
28. The schematic diagram of the proposed project is presented in the figures given below:



29/11/2019  
B. B. B. B.



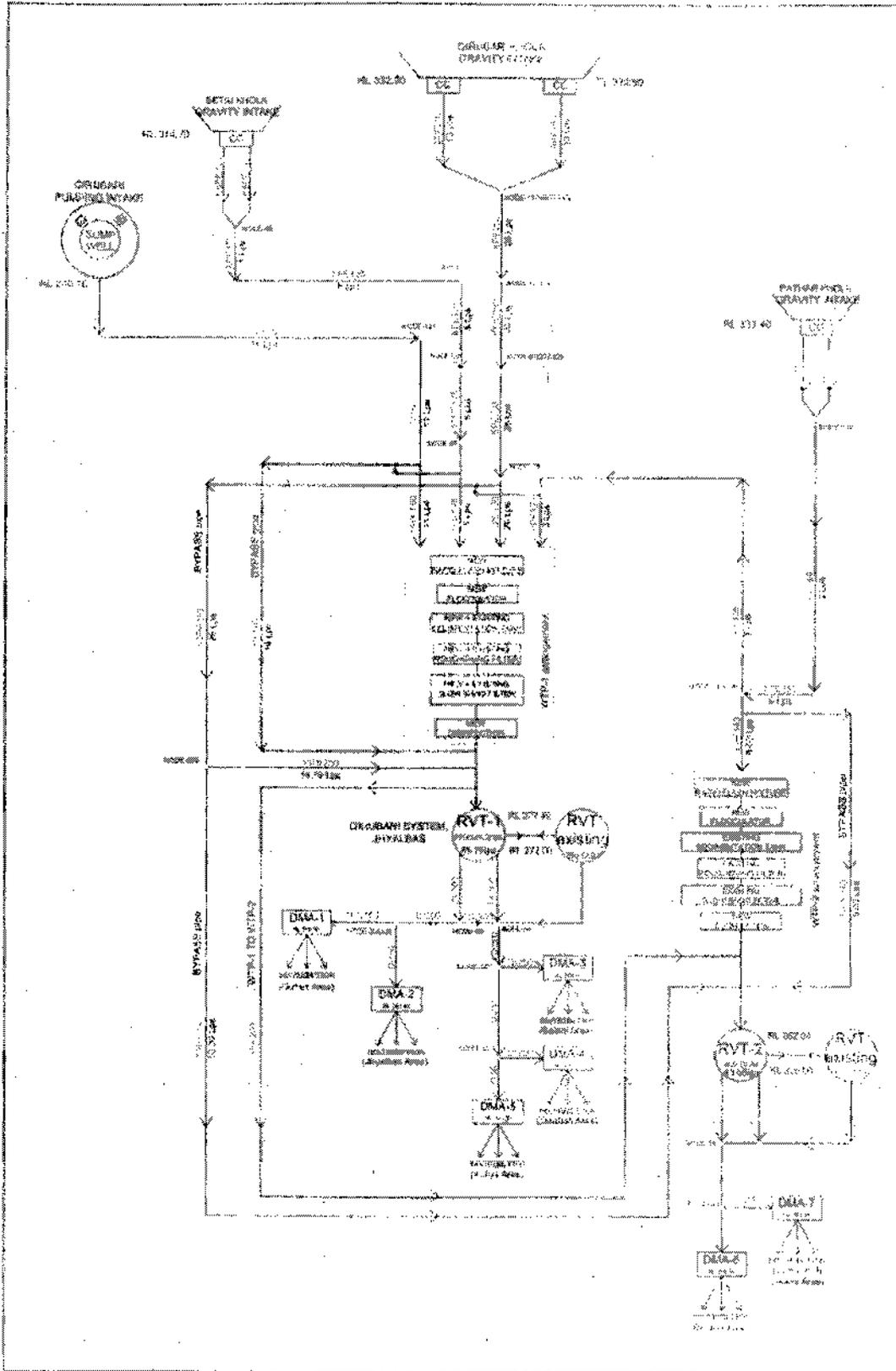
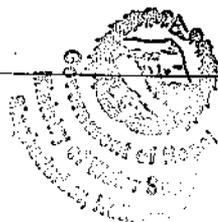


Figure 2-II: The Schematic Layout of the Proposed Project



## 2.3 Salient Features of the Project

29. The salient features of the project is tabulated below:

Table 2-III: Salient features of the project

SN.	Items	Description
1	Name of Project	Deurali Hupsekot Water Supply and Sanitation Project
2	Type	Both gravity and pumping system (use of 3 existing gravity sources and one new pumping source and gravity water supply in distribution system)
3	Location Area	
	Province	Gandaki (4)
	District	Nawalpur
	Rural Municipality/Municipality	Hupsekot Rural Municipality
	Service Area Ward and settlement	<b>Hupsekot Rural Municipality:</b> Ward no. 1: Beluwa and Jukepani Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping) Ward no. 3: Girubari and Belhani Ward no. 4: Jhyalbas and Tallo Dihi
	Impact Area	Ward no. 1, 2, 3, 4 & 5
4	Available Facilities	
	Road	Kathmandu to Kawasoti is 178km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) is 3km and Sahid Chowk to WUSC office/ Jhyalbas is 8km.
	Water Supply System	Limited supply for few hours operated by WUSC
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
5	Social Status	
	Present HHs Numbers (2018)	3,652
	Present Population (2018)	21,601 (incl rental 2,254)
	Base Year Population (2021)	22,786 (rental population kept constant)
	Design Year Population (2040)	32,168 (rental population kept constant)
	Average HHS size	5.3
	Population Growth Rate % (PGR)	2.00
	Projected HHs in Design Year (based on GR)	5,647
6	Water Demand (MLD)	
	Base Year (2021)	2.88 (2,882,429 ltr per day)
	Design Year (2040)	4.07 ( 4,069,252 ltr per day)
7	Source Characteristics	
	Source Name	Girubari Khola at 2 locations (one gravity, other pumping), Pathar Khola and Betai Khola
	Source Type	Stream
	Source Location	Hupsekot - Ward 5 (Girubari gravity at Satakon), Ward 4 (Girubari pumping), Pathar Khola Ward 4, Betai Khola Ward

SN.	Items	Description
	Source Discharge (lps)	Plenty (more than required) Girubeni 40 lps, Betai 10 lps Pather khola 12 lps & Sumpwell ( seepage of Girubeni khola, plenty)
	Tapped Discharge (lps)	50 lps (Girubari gravity 26lps, Girubari pumping-20hr a day 11lps, Patharkhola 8lps, Betai khola 5lps)
8	Type of Structures	
a)	Water Supply Components	
	Proposed intakes	Stream Intake – 1 (Girubari existing rehab) Stream/ seepage water – 1 ( Girubari khola; sumpwell well) Stream intake – 1 ( Pathar khola, existing rehab.) Stream intake – 1 (Betai khola, existing rehab)
	Water treatment plant	Rapid mixture – Flocculator-Sedimentation-Roughening – Slow sand filter-Desinfection Rapid mixture – 2 location (Dihidanda & Shivalaya) Flocculator- 2 locations (Dihidanda & Shivalaya) Sedimentation tank – 1 location (Dihidanda) + existing 2 location (rehab) Roughening filter – 1 location (Dihidanda) + existing 2 location (rehab) Slow sand filter - 1 location (Dihidanda) + existing 2 location (rehab) Disinfection – 2 locations
	Pumping Details	Single stage 25HP submersible pump to pump 11 lps from Girubari Sumpwell/ intake. Transformer 50KVA and generator-50KVA
	Ground Reservoir (No and Capacity in CUM)	RVT1: 400cum – 2 nos. (Dihidanda)-WN 4 RVT 2: 400cum – 1 no. (Shivalaya) -WN 4 (Total capacity 1,200 cum)
	Valve Chamber (Bricks/ RCC)	45 Nos
	Pipe valve box	62 Nos
	IC/BPT	
	Office Cum GH (O1) /Guard House (G 1) / Small Guard House (G2) /Dosing House (DS), Generator House, Boundary wall	WUSC office-1 no ( bazaar area land to be provided by WUSC) Guard house ( GH1) – 1 no (at sumpwell site) Guard house with store room (GH2) – 2 nos (RVT-1 Dihidanda and RVT-2 site Shivalaya) Dosing station- 2 nos (RVT-1 and RVT-2 site) Generator house – 1 no. (sumpwell site) Boundary wall – 4 locations
	Fire Hydrant (Nos)	5
	River crossing (Nos)	a) Upto 10 m length: 8 nos. b) Upto 60m length: 8 nos.
	Length of pipe in transmission main (from various intake to WTP/ RVT), (m)	13,453.00
	Length of Distribution Mains (m)	149,964.00
	Number of DMAs	7
	Number of HH connection	3,652
	Number of connections for institution	12

SN.	Items	Description
	Internal Access Roads	Length: 500m ; Width: 5m (WTP Area, Reservoir Area & Office Building)
b)	Sanitation Components	
	Public Toilets	2 nos.
	Institutional Toilets	2 nos.
	Tractor	1
9	Depth of Excavation Trench	
	For PE Pipes-(50mm to 125mm) dia.	0.90m
	For PE Pipes-(140mm to 250mm) dia.	1.00m
	For DI Pipes-(150mm to 300mm) dia.	1.00m
10	Cut & Fill Volume of Spoil	
	Cut Volume	128,409.60 m <sup>3</sup>
	Fill Volume	112,290.96 m <sup>3</sup>
	<b>Total Cost of WS Component (Inclusive of all) NRs.</b>	<b>889,958,368.07</b>
11	Cost Sharing Arrangement (NRs)	
	GON Component (70 %)	622,970,857.65
	TDF Loan (25 %)	222,489,592.02
12	WUSC's upfront (Cash contribution 5%)	44,497,918.40
13	Tariff	
	Up to 6 cum/monthly (NRs)	35
	7 to 10 cum/monthly (NRs)	45
	11 to 20 cum/monthly (NRs)	55
	21 to 30 cum/monthly (NRs)	65
	>30cum	75
	Institutional cum/month (NRs/ cum)	75
	Weighted av. Tariff (NRs./HH/month)	989 (NRs. 60.93/cum)
14	Financial Indicators	
	EIRR (Base case), %	23.50
	FIRR (Base case), %	21.50
	AIFC (Base case), NRs per cum	21.11
	AIEC (Base case), NRs per cum	28.25
15	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impacts
16	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.), NRs	39,057.24
	Per Capita Cost (for design year pop.), NRs	27,665.95



SN.	Items	Description
17	<b>Total cost of Sanitation Component (including all), NRs</b>	<b>12,255,156.81</b>
	GON Component (85 %)	10,416,883.29
	Local Authority (15 %)	1,838,273.52
18	<b>Total cost of Water Supply and Sanitation Component, NRs</b>	<b>902,213,524.88</b>

Source: DEDR, Deurali Hupsekot, 2019

## 2.4 Water Supply Project Components/Features

30. The major water supply components of the project with their characteristic features are described in the sections below:

### 2.4.1 Sources/Intakes

31. As per discussion with WUSC members, local bodies, the concerned beneficiaries and key personnel of the project area, four reliable sources have been proposed for the project.
32. The three gravity sources Girubari khola, Betai khola and Pathar khola with sufficient flow is proposed for the project. As per our study, Girubari Khola, Betai Khola and Pathar Khola has more than 40lps, 12 lps and 10 lps flow respectively. As per the design report, the quantity of water to be tapped from the proposed sources is 26 lps from Girubari Khola, 5 lps from Betai Khola and 8 lps from Pathar Khola. Hence, the combined tapped discharge of these three rivers is 39lps. Similarly, there is also provision of pumping system from Girubari Khola with 11lps tapped discharge, to be extracted for the proposed system. The designed discharge is brought to the proposed WTP site – Dehidanda and the existing WTP site- Dehidanda and Shivalaya from which the treated water is conveyed to RVTs Dehidanda and Shivalaya and water from each RVT is supplied to the distribution system by gravity.
33. The Girubari khola intake is proposed to be rehabilitated with gabions works downstream and sides of existing cutoff wall, placing of course gravel and boulder on river bed at upstream of cutoff. The PE pipe 140mm dia is perforated on top half dia and 7-10mm dia hole will be made. There are 16 numbers of perforated pipe of each 20 m length. These pipes are placed in between gravel and connected to collection chambers. Also, the direct supply of river water to each collection chamber have been provisioned. This is functioned, if perforated pipe cannot extract enough water at design volume or is used during maintenance of perforated pipes clogged.
34. The Betai khola intake is proposed to be newly constructed with RCC cutoff wall with gabions works downstream and sides of cutoff wall. The small chamber is designed to be constructed with intake cutoff wall. The strainer has been provisioned to extract the water from chamber and two pipes will run up to existing collection chamber. The existing collection chamber is also proposed to be rehabilitated.
35. The Pathar Khola intake is also proposed to be rehabilitated with gabions works downstream and sides of existing cutoff wall, placing of course gravel and boulder on river bed at upstream of cutoff. The PE pipe 140mm dia. Is perforated on top half dia. And 7-10mm dia. Hole will be made. There are 7 numbers of perforated pipe of each 7 m length. This pipe is connected at the existing collection chamber. The existing collection chamber is also proposed to be rehabilitated. These perforated pipes are placed in between gravel and connected to collection chambers. Also, the direct supply of river water to collection chamber has been provisioned. This is functioned, if perforated pipe cannot extract enough water at design volume or is used during maintenance of perforated pipes clogged.

36. The proposed location of the sump well is in between Badahare Kholsi and Chepari Gaira. The exact location of sump well at Girubari khola is finalized during implementation after test drilling at site. If the soil strata at proposed site has layer of rock, the location needs to be shifted or altered nearby proposed location. Based on drilling, the sump well site is finalized with minor modification in design, if necessary. There is only one sump well designed in the system. The perforated pipes are designed to flow the water from the filter media to sump well. The retaining wall at hill side and river side have been designed to protect the structures. The river side RCC retaining wall is proposed to be constructed to prevent the flood into the intake/ sump well site. It is envisaged that sump well collects water more than 11 lps. Accordingly, the perforated pipes 10 number of each 7 m length are arranged considering the possibility of clogging of perforation in pipes. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source. In total, the sources supply 50lps water for the project.

**2.4.2 Electrical System**

37. The system has only one stage pumping to pump 11lps water for 20hours daily during design year. All others three sources are gravity system and no need pumping. The sub meter is enough for electrical works for building and dosing house at each RVT locations.

38. The electrical system are designed as new together with overhead transmission line. It is envisaged that only one pump runs at a time and other is an additional. Accordingly, the transformer, generator and other components are designed. The capacity and number of pumps are provided in **Table 2-IV**.

**Table 2-IV:Capacity and Number of Pump**

Location	Number and capacity of pump	Remarks
Stage I (at sumpwell/ source)	2 nos × 25 HP	Only one pump will run at a time.

Source: DEDR,2019

39. In addition, spare pump is arranged at store for replacement, if any one pump does not function properly, can be replaced immediately. There is generator for backup to pump the water during NEA power failure. The transformer and diesel generator is designed as given in **Table 2-V**.

**Table 2-V: Transformer and Diesel Generator**

Pump ing stage	Description	Pump uses				Remarks
I stage	Pump 1 OR	25	HP	18.75	KW	Only one pump will run at a time
	Pump 2	25	HP		KW	
	Other load			4	KW	
	<b>Total load</b>			22.75		
	Safety factor			1.25		
	<b>Net total load</b>			28.43		
	Capacity of Transformer			35.55	KVA	
	<b>Adopt: Capacity of transformer -1no</b>			50	KVA	
	Capacity of generator					
	1.25times the capacity of transformer					
	Size of Generator			44.43		
<b>Keep generator 1 no (rated power)</b>			50	KVA		

Source: DEDR, 2019

40. **Distribution System:** The power cables from control panels to each load is calculated to satisfy the following criterions:
- Current carrying capacity of the cable is enough to carry the full load current continuously.
  - Maximum voltage drop in the cable is less than 2% of the system voltage.
41. The control panels at pump house are provided with the Star-Delta starter to reduce the high starting current drawn by the pump-motors.

#### 2.4.3 Transmission Mains & Pumping

42. Transmission line is the pipe line length from various intakes to reservoirs. The transmission line passes via road, barren land and public land. The site for intakes and transmission route seems stable. But, as per WUSC, it is known that the transmission route of Girubari khola (gravity) may experience occasional landslide events at some locations. Hence, to overcome this problem, the Girubari sump well has been provisioned though the Girubari intake site has enough discharge. Single stage pumping is designed for Girubari sumpwell.
43. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari sumpwell at Dehidanda and Shivalaya WTP/ RVT site is about 13,453.00m. Separate transmission line is provisioned for each source due to their location, elevation and topography. The transmission main of Betai has to cross Girubari Khola. Existing suspension bridge will be used for pipe crossing which is used now also.

#### 2.4.4 Thrust Blocks, Saddle Blocks and Thrust Beam

44. Thrust blocks have been proposed for DI pipes (transmission and distribution mains for both alternatives) from being moved by forces exerted within the pipes arising from the internal pressure of the pipeline or the flow of water hitting bends, tapers and closed or partially closed valves. Typical thrust blocks have been designed for a pressure of 24 kg/sq cm for both transmission lines and distribution line.
45. Similarly, there is also provision of Thrust Beam & Saddle Blocks for DI pipes that will be laid up in sloppy areas and un-buried portions. All saddle blocks are proposed to be anchored with concrete at the center of each pipe to prevent movement. Provision of RCC support for the stretches of buried & un-buried DI pipe line has also been made to prevent pipe movement which are laid-up in sloppy area.

#### 2.4.5 Water Treatment Plant & Chlorination

46. The water quality test has also been carried out for each sources to ensure the requirement of water treatment plant. Accordingly, the water quality test reports (**Refer Annex 6**) show that the sample from each sources has NTU turbidity value and hardness value within the prescribed NDWQS (Turbidity: 5-10 NTU and Hardness: 500 mg/L). However, there is no guarantee that these sources' quality will remain same in the future as the project town is leading towards urbanization and the urbanization may intensify the risk of contaminaton in the proposed sources. Similarly, the on site bacteriological test carried out during field study shows that the proposed water sources are contaminated with bacteria which constrain the provision of water treatment plant for the proposed project. Hence, this establishes the need of new WTP for the system to be served by the proposed sources.
47. It is also reported by the WUSC and community that the water becomes turbid during rain and flash flood frequently and requested to include the treatment plant for the worst condition of



surface water. The treatment plant is generally provisioned for the worst water quality though the water quality is not that bad.

48. Based upon the water quality, secondary data available and discussion with community in the surrounding of the service area, the system is designed with provision of water treatment process comprising rapid mixture, flocculator, sedimentation tank, roughening filter, slow sand filter and disinfection.
49. There are existing treatment plants that have been constructed at two locations (Dihidanda & Shivalaya) for each Girubari, Betai and Pathar Khola sources. Each of these treatment plants are of 5 lps capacity. This is also proposed to be used for the proposed project with necessary rehabilitation works followed by washing and placing of filter media by adding deficit filter media. In addition, two other components that includes Rapid Mixture and Flocculator have been added in the existing treatment plant. For the remaining discharge 40 lps, new treatment plant has been designed.
50. New small rapid flash mixture one unit of size 2.0m x 2.0m x 2.0m at each Dihidanda and New Shivalaya Baffle wall flocculator 2 unit of each 8.50m x3.00m x 1.20m at Dihidanda and one unit of 3.0m x1.00m x 1.20m at Shivalaya are designed to be constructed for the proposed project.
51. Sedimentation tank with 4 units of each 13.75m x 4.75m x 3.00m is designed taking surface loading 600 ltr/hr/m<sup>2</sup>. Roughening filter 4 units of each 7.10m x 1.60m x 1.5m is designed taking rate of filtration 2700 ltr/m<sup>2</sup>/hr. Slow sand filter 6 units of each 17.80m x 7.20m x 2.90m designed taking rate of filtration 190 ltr/m<sup>2</sup>/hr. This filter rate is taken as quite high due to limitation of the land provided by the WUSC and would be enough for the tested water quality. The scrapping/ replacement of sand from slow sand filter is increased, if the quality of water is worse than the treated quality. All new treatment plants are designed to be constructed at Dihidanda besides the existing treatment plant.
52. Accordingly, the inlet outlet arrangement of each filter units together with necessary valve arrangements are provided in the detailed drawings. The bypass arrangement from each filter inlet/ outlet are also provisioned for the repair and maintenance of the structures.
53. An emergency feeder line consisting of a solution tank connected with feeding tank having a constant level is proposed for the chlorination. As per design, bleaching powder 9.61kg / day and 13.56kg / day required during base and design year respectively. After disinfection, some part of the lime is settled at the bottom of the ground reservoir as residue. This residue is then removed through washout pipe which is connected to the drain.

#### 2.4.6 Service Reservoir

54. The whole system is divided into seven DMAs. The system is designed by using multi reservoir concept. The capacities of reservoirs are RVT1 – 2 nos each 400cum at Dihidanda, RVT 2-400cum 1 no. at Shivalaya for Jhyalbas area. But the service area has been separated due to topography of the town. There are existing reservoirs at each location with capacity of 250cum and 150 cum respectively. These reservoirs are very old age and not considered in the new system. In RVT-1 location, the first RVT of 400cum is proposed to be constructed that supplies water to the existing system. Then, only another RVT of 400 cum is constructed. The total storage requirement for the system at the end of the design period is about 1200m<sup>3</sup>. This capacity is split and constructed at various locations.

#### 2.4.7 Distribution Mains & District Metered Area

55. The distribution system comprises a pipe network, which is designed in loop network system by using EPANET-2.4 software. EPANET software is used for the analysis of the water supply network. The base demand, elevation of each node, reservoir head and distance from node to

- node are the basic input data for the software. The socio-economic survey data is used to determine the nodal/ base demand considering the demand for rapid settlement growth. The engineering survey data is used for the length of the pipe and elevation of the nodes. The software works for unlimited nodes. The input data is given directly in the software after constructing the model. The software works for both loop and dead-end system.
56. There are three different methods for the determination of the head loss. But two methods can be used for the determination of head loss in pipe. The Hazen-Williams formula is the most commonly used to determine the head loss in pipe for water only. The Darcy-Weisbach formula is the most theoretically correct formula for all flow regimes and for all liquids. Hence, Hazen-Williams formula is used in pipeline design.
57. The roughness coefficient in Hazen-Williams formula for the use of GI, DI and PE pipes is taken 110, 120 and 130 respectively. The new distribution system has been designed by using PE-100 pipe and DI pipes.
58. The PE-100 pipes of outer dia. 50mm to 200mm and DI 150mm to 300mm dia have been used in the design. The minimum pipe size used in the design is PE100- 50mm, which governs the velocity. PE100 pipe above 4 kg/cm<sup>2</sup> pressure are proposed in the distribution network design as per technical requirement. But, PE100 PN 6 pipe of 50mm and 63mm pipes are not used in the design due to technical difficulties to join the pipe with electrofusion technology. Instead of these, PN10 pipes are used. All PE pipes are joined using electrofusion technology. The washout and air valve have been arranged in the distribution system in control valve/ pipe valve chamber, wherever possible. In some nodes, the residual head is considered high to maintain the residual head in the downstream node.
59. The flow at each line has been calculated on the basis of the socioeconomic survey data and possibility of rapid increment of settlement in the near future. Pipe valve box/ valve chamber have been proposed at suitable junction to regulate the design flow in each pipe line and to stop the flow in the particular area without affecting the other area during repair and maintenance. All distribution line passes along the road network and public land. The distribution line on both sides has been proposed in core bazaar area, black topped road and the graveled road that will be black topped in the near future, DMA boundary while, pipeline along the single line has been designed in the remaining areas. Due to undulated/ irregular topography, two pipes are designed along one road, among which one pipe will supply water at the highest level without distributing water to the household and other pipe will distribute water to the households up to bottom from next pipe laid together. The distribution pipe for DMA-1 has to cross Girubari khola. The existing suspension is proposed to be used for pipe crossing.
60. The pipeline is designed by adding 10% extra length of actual one. The estimated distribution pipe is taken as 10% more than the actual one for PE pipe upto 90mm dia and 5% more than the actual one for remaining all pipes. The length of pipe is 149,964.00m.
61. The distribution system is designed in consideration with District Metering Area (DMA). Each DMA has one bulk meter to determine and control the flow into respective service area. There are 7 DMAs in total service area to supply water from each service reservoir. DMA boundary has been fixed depending upon the elevation difference, location and easy for operation and maintenance. It is presented in **Figure 2-III** given below:

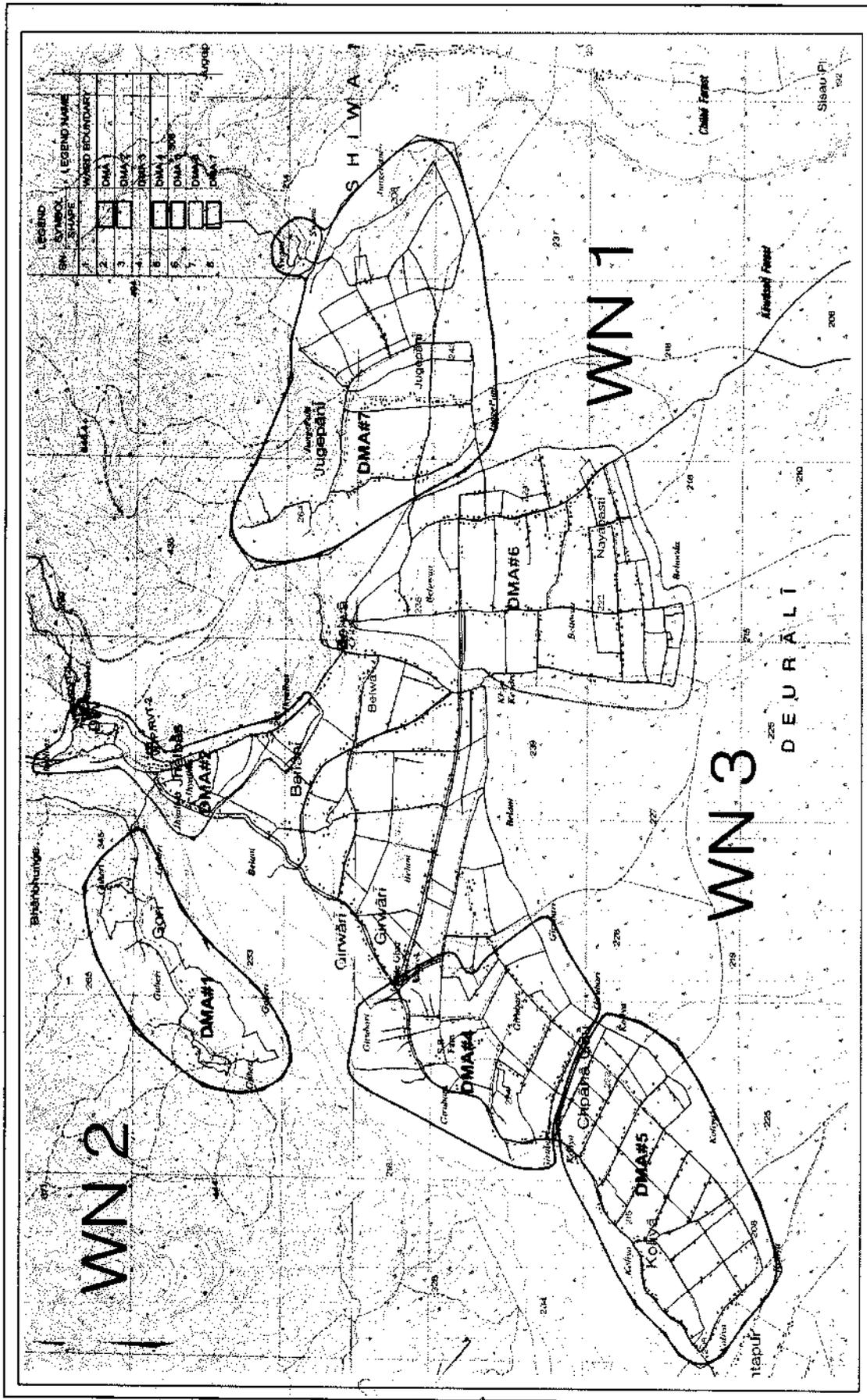


Figure 2-III: District Metered Area (DMA) of the Proposed System

#### 2.4.8 House Connection

62. The household connect the taps to their respective households directly from the main distribution pipe. There is provision of average 15m length of 20mm dia. PE 100-PN16 pipe with ferrule, compression joint, joined with GI fittings and valves up to meter for each HH connection. There are 3,664 connections including individual and institutional connections during base year. The meter is kept near and adjoining the compound of the houses. After meter, each HH extend the pipe themselves as they desire. The necessary fittings have also been designed. Electrofusion saddle has been proposed to join the HH connection at main pipe to connect ferrule in the saddle. Likewise, GI and DI saddle clamp are proposed to join the HH connection at main pipe to connect the ferrule for GI or DI pipes.
63. Two types of tap stands have been designed for the project. At the end of the design period, it is anticipated that about 89.80% of the total 3652 households is fully plumbed and 10.20% of the total households is served through yard connection. The poor households connect tap at free of cost through OBA. There are total 3,280 fully plumbed connections and 372-yard tap connections. In total, there are 3664 tap connections including institutional 12 connections during design year.

#### 2.4.9 Appurtenances

##### a) Bulk Water Meter

64. The bulk water meter is designed at various locations in the transmission and distribution system to ascertain flow and leakage in the system. The bulk meter is designed at each intake outlets, at the outlet of service reservoirs, DMA outlets. Each bulk meter provide the quantity of water supplied in the particular area, water consumed by the consumers and leakage in that area can be determined calculating the difference of HH consumption water volume and bulk meter water supplied water volume. Accordingly, the repair and maintenance works can be carried out, if the leakages more than the permissible range in such areas.

##### b) Types of Connections

65. Consumers have been classified in three categories depending on their income level. The consumers having high level of income requiring more consumption of water are placed in fully plumbed category, consumers having medium income at medium consumption level and consumers of low-income group and who can't afford tariff of fully plumb connections and use less water through tap connection at their household are benefitted through yard connection. The poor household will get tap free of cost with OBA programme. However, WUSC has to reconfirm the status of poor household during implementation of the scheme.
66. The cost estimate of the taps for all households and institutions has been included in project cost estimate. During execution of the project, the poor households connect tap from OBA facilities under the recommendation of WUSC.

##### c) Wash Out Valves

67. The washout valves have been arranged at transmission, distribution and every water retaining structures to remove the slush/ debris. Washout valves have been provided at depressions points in the pipeline and dead ends, where necessary. The purpose of the valve is to clean the debris collected in the pipeline. Sometimes the valve can also be used for the maintenance of the pipe-line without closing the whole distribution system. There are 26 washout valves provided in the whole system.



**d) Air Valve**

68. The air valves are provided in intake outlet, transmission and distribution mains. Air valves have been designed to release the air accumulated in the pipes. The water flowing through pipes always contain some air. This air tries to accumulate at the highest points and may interfere in the flow by narrowing pipe opening area. Air relief valve is provided in the distribution pipe near the outlet of service reservoir to provide the exit for such accumulated air. Also, the automatic air release valve is provided in distribution system at several locations. There are 20 air valves provided in the whole system.

**e) Control Valve**

69. The valves are placed in required location of the structures, transmission main and distribution main. The purpose of the control valve is to regulate the required flow at each distribution main from the junction/ node. Sometimes, it can be used for the maintenance of distribution system in particular area without closing whole distribution system. A control valve is provided in the system where there are more than two branches from one junction or where it is necessary. Control valves have been designed in suitable distribution junctions having more than two mains and in required places to regulate the design flow in the main. The design flow in each pipe line is based on design population, non-domestic demand and system wastage and leakage. The future demand in the main may fluctuate and the control valve/ regulating valve is useful to deliver the required flow in pipe line. In total, there are 129 gate valves, 62 nos. pipe valve box and 45 nos. washout/ air release/ control valve chambers are designed in the distribution system.

**f) Pressure Relief Valve**

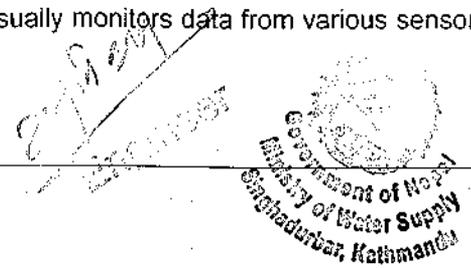
70. The pressure relief valve is a safety valve that keeps the pressure within safety limits to prevent equipment failure, mishaps or other undesirable outcomes. Pressure relief valves are designed with controls to increase or decrease the level of pressure in a pressure vessel. This type of valve is installed at each pumping stage.

**g) SCADA Valve**

71. This type of valve is operated by SCADA (Supervisory Control and Data Acquisition) system. This SCADA system is a control system that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices such as Programmable Logic Controller (PLC) and Discrete PID controllers to interface with the process plant or machinery.

72. A collection of equipment that provides an operator at remote location with enough information to determine the status of a particular piece of a equipment or entire substation and cause actions to take place regarding the equipment or network.

73. Supervisory Control and Data Acquisition (SCADA) achieves this requirement collecting reliable field data through remote terminal units (RTUs), Intelligent Electric Devices (IEDs) and presenting them to user requirement. The user interface or the man machine interface (MMI) provides various options of data presentation according to specific application and user needs. There are many parts of a working SCADA system. A SCADA system usually includes signal hardware (input and output), controllers, networks, user interface (HMI), communications equipment and software. All together, the term SCADA refers to the entire central system. The central system usually monitors data from various sensors that are either in close proximity or on-site.



74. Basic SCADA is proposed/ designed for Deurali Hupsekot town. The outlet management system (OMS) from sump well outlet and reservoirs outlets and each gravity intake outlets, Reservoir management system (RMS) at each inlet of reservoirs. SCADA control valves are also provisioned at the outlet of each DMA to monitor and control the designed flow. The Outlet Management System(OMS) is to provide uniform distribution of water to the reservoirs irrespective of its location and distance from the source of supply, to avoid the overflow of Reservoirs, to measure, monitor and control the flow delivered to the RVT without any external Electric Energy and no high recovery cost for Energy/Communication Cost such as GSM/GPRS/RADIO etc.
75. The automation to link all the components through SCADA (Hydraulically Supervised Control and Data Acquisition) and all the mentioned components which is capable to control and monitor the parameters from SCADA room/ master control center for submersible pumps of all for main and one small stages, Water level sensors for all RVTs , Online Chlorine Monitors, AMS, RMS, WMD, and zonal PFCMDS etc. are provided. The Reservoir Management System (RMS) enable to avoid the overflow of reservoirs and pressure controlling system.
76. Likewise, one-year operation and maintenance for SCADA is also provisioned for water supply system operation and maintenance. The proposed system works under Wi-Fi coverage area, on the GPRS network or on a given radio frequency. The radio frequency is a free of cost communication media, but the limitations it has are, eye visibility of two connecting devices and the distance between them. Similarly, it is difficult to reach all equipment within Wi-Fi coverage also. The other way out is the GPRS which shall work with the 3g and above cell phone network area. The services of the network providers having a full network in the given area can be used.

**h) Valve Chambers**

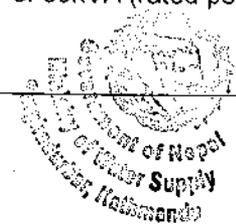
77. Two type of Chambers have been proposed in the project to control or regulate the flow of the proposed water supply system. The chambers constructed by brick masonry have been provided in non-vehicular areas and rural area. In other vehicular carriageway and city area, the chambers constructed with RCC has been provided.
78. The chambers serve as housing, protection and convenient access to these pipe appurtenances. Inside the concrete chambers, the necessary supports has been provided for pipes and valves at appropriate locations. Access to the valve chamber is given via lockable cast iron covers with frames. Manhole covers of the heavy-duty type have been recommended in RCC chambers. The covers for manholes in paths may be proposed of medium duty type.
79. In total, there are 62nos. pipe valve boxes and 45 washout/ air release/ control valve chambers designed in the distribution system.

**2.4.10 Fire Hydrants**

80. Fire hydrants are provided at major road junctions. These fire hydrants are proposed to be used for flushing of the system as required. Fire hydrants, namely, stand post type, conforming to IS908 is recommended.

**2.4.11 Generator House**

81. A Generator house is designed at Girubari sump well site. Th generator supplies power mainly for the pump installed at sump well, when there is no regular power from NEA. The generator of 50kVA (rated power) is used to pump the water during power failure at the town.



#### 2.4.12 Laboratory Building cum WUSC Office Building, Guard House and Dosing House

82. A two storied laboratory building cum WUSC office building has been designed and proposed to be built in Jhyalbas Bazaar. WUSC provide the land required for the construction of office. The Guard house type -2 is to be constructed at WTP/ RVT-1 and 2 sites while Guard house type- 1 is constructed at sump well site. The preliminary water quality test kits are arranged for regular water quality monitoring. It is included in the project components of the system.

#### 2.4.13 Boundary Wall & Retaining Wall

83. The retaining wall has been proposed at new WTP site at various location. In some cases, boundary wall is constructed above the retaining wall while in some cases, the boundary wall is built from the foundation. The metal post with chain-link fencing above brick masonry wall has been proposed to protect the structures such as sump well/ intake, office building, reservoir sites, generator house, WTPs etc. as necessary.

#### 2.4.14 Internal Access Roads

84. There is also provision of Internal Access Roads which has been included under Reinstatement Works. This involves construction of Approach Road of Gravel of total length 500m with 5m width.

#### 2.4.15 Miscellaneous Works

85. There is also provision of miscellaneous works for this proposed project that includes Construction of Dry Random Rubble Stone Wall, Gabion Wall, Concrete Saddle, Anchor Blocks, Thrust Blocks etc. for River Protection Works, Site Development Works, Drainage for the protection of Intakes, WTPs, RVTs, Guard House and Distribution system.

### 2.5 Sanitation Components

86. The sanitation component is considered as an integral part of the water supply project so as to minimize the coverage gap between water supply and sanitation components. The main issues that need to be addressed in the sanitation components as they would have consequential impacts on all the activities are:

- i. Toilets/Septage/Sludge Management
- ii. Drainage System
- iii. Solid Waste Management
- iv. Institution Building/Strengthening
- v. Raising Awareness

87. The sanitation practice is directly related with their hygiene consciousness. The socioeconomic survey shows that there is no separate sewerage system within the proposed service area. But almost, all the households in the urban areas as well as in rural areas have their own latrines with septic tanks. The survey revealed that out of 4024 households, about 95.90% (3858) households have water sealed latrines whereas, 2.10% (84) households have pit latrines. About 0.5% (22) HHs have ventilated pit latrines whereas 0.1% (3) of total households are using cistern flush type of pit latrine. Similarly, minimal percentage i.e.s 1.4% (57) of total households do not have latrines.

88. The survey also revealed that there are not any public toilets or institutional toilets within the project town. Hence, the basic sanitation requirement of the proposed project is the construction of public toilets for institution as well as general public for the betterment of facilities in this area. The thrust point is to avail basic sanitation facilities and declare the whole municipality as ODF. The aim of sanitation is universal coverage. ODF, based on

multiple approaches like basic sanitation package, School sanitation and hygiene education program, Community-led total sanitation, School-led total sanitation, Local body-led total sanitation, is considered as the bottom line for program intervention.

89. There is provision of two public toilets under the sanitation components of this proposed project. The location for these proposed public toilets includes (i) Ward no. 1 at Jukepani (ii) Ward no. 4 -Jhyaalbaas Bazaar. Similarly, there is also provision of two institutional toilets viz., one at health post and location of other needs to be finalized during implementation.
90. There is also provision of tractor to collect and dispose the waste of the project town. It is envisaged that the waste of each household is collected nearby house and then the tractor collects this waste at regular interval and dump in safe place. The dumping site is proposed to be managed by WUSC by either buying the land or taking the land in lease at safe location. It is envisaged that the rural municipality supports WUSC for solid management of the town.
91. These sanitation components contribute towards the betterment of sanitation facilities in this area. These facilities also inculcate behavior of toilet use as well as of effective solid waste management among students and the general public. Hence, the proposed project also address basic sanitation issues through the provision of toilets and solid waste management.

## **2.6 Construction Planning**

92. It provides the basis for the fulfillment of the requirement during construction period of the proposed project. It involves the following described requirement of the project;

### **2.6.1 Land Requirement for the project area**

93. The project requires significant areas of the project town for the construction of project components as well as project facilities. This requirement is either temporary or permanent that is based on the type of requirement of the structures. It is noted that for any kind of project construction activities, there is no requirement of occupying of land of the forest area. The land requirement and the ownership details of the land required for the following mentioned project components and project facilities are given below:

Table 2-VI: Land Requirement & Ownership Details for the project components

A. Intake Details

S. No.	Project Components	Land Requirement (m <sup>2</sup> )	Land Availability (m <sup>2</sup> )	Type of Source	Requirement	Ownership
1.	Stream intake: Girubari Khola	508.74	1017.47	Perennial Stream	Permanent	GoN
2.	Stream intake: Betal Khola	254.37	508.74	Perennial Stream	Permanent	GoN
3.	Stream intake: Pathar Khola	254.37	508.74	Perennial Stream	Permanent	GoN
4.	Stream intake: Girubari Khola Sump	508.74	1017.47	Perennial Stream	Permanent	GoN

Source: Due Diligence Report, Deurali Hupsekot, 2019

B. Transmission Mains, WTP, RVT & Distribution Mains

S. No.	Project Components	Land Requirement	Land Availability	Type of Land	Requirement	Ownership
1.	Transmission Main from Intake to WTP and from WTP to RVT	14,077.00m	RoW	Public Land	Permanent	GoN
2.	WTP/RVT-1-400 m <sup>3</sup>	5598.14 m <sup>2</sup>	22696.58 m <sup>2</sup>	Public Land	Permanent	WUSC
3.	WTP/RVT-2-400 m <sup>3</sup>	1017.47 m <sup>2</sup>	2543.69 m <sup>2</sup>	Public Land	Permanent	GoN under Hupsekot Rural Municipality
5.	Distribution System from RVT to household end	153,045.00m	Barren Land/ Foot Trails will be used	Barren Land	Permanent	GoN

Source: Due Diligence Report, Deurali Hupsekot, 2019



C. Public Toilet

S. No.	Location	Land Requirement	Land Availability	Type of Land	Requirement	Ownership
1.	Jhyalbas Bazaar, Chautari, Local Bus Park-Ward 4	104 m <sup>2</sup>	338.70 m <sup>2</sup>	Public Land	Permanent	GoN
2.	Stadium Chowk-Ward 2	104 m <sup>2</sup>	338.70 m <sup>2</sup>	Public Land	Permanent	GoN

Source: Due Diligence Report, Deurali Hupsekot, 2019

D. Construction of Project Facilities

S. No.	Project Components	Land Requirement	Land Availability	Type of Land	Requirement	Ownership
1.	Office Building (O1) at Beluwaa-Ward no. 3	190.45 m <sup>2</sup>	684.69 m <sup>2</sup>	Public Land	Permanent	GoN/Rural Municipality
2.	Guard House (GH 1)-Small-2 nos. within WUSC Compound and Sump Well Site	13.38 m <sup>2</sup>	For WUSC compound - 684.69 m <sup>2</sup> and Along River Bank	Public Barren Land	Permanent	WUSC/GoN
3.	Guard house with store room (GH2)- 2nos-Medium at Shivalaya & Dihidanda	27.87 m <sup>2</sup>	22696.56 m <sup>2</sup> at Dihidanda and 2543.69 m <sup>2</sup> at Shivalaya	Vacant Land	Permanent	WUSC/GoN
4.	Dosing Station at Shivalaya & Dihidanda	0.84 m <sup>2</sup>	22696.56 m <sup>2</sup> at Dihidanda and 2543.69 m <sup>2</sup> at Shivalaya	Vacant Land	Permanent	WUSC/GoN
5.	Internal Access Road	2500 m <sup>2</sup>	-	Vacant Land	Temporary	GoN
6.	Camp Site (2 nos.)	100 m <sup>2</sup> for each camp site	<ul style="list-style-type: none"> <li>22696.58 m<sup>2</sup> at WTP/RVT-1 site</li> <li>Sufficient Space available on the bank of D/S of Pathare Khola</li> </ul>	<ul style="list-style-type: none"> <li>Vacant Land</li> <li>Barren Land</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>WUSC (WTP/RVT-1 Site)</li> <li>GoN</li> </ul>

S. No.	Project Components	Land Requirement	Land Availability	Type of Land	Requirement	Ownership
7	Stockpiling Site (2 nos.)	100 m <sup>2</sup> for each site	<ul style="list-style-type: none"> <li>• 22696.58 m<sup>2</sup> at WTP/RVT-1 site</li> <li>• Sufficient Space available on the bank of D/S of Pathare Khola</li> </ul>	<ul style="list-style-type: none"> <li>• Vacant Land</li> <li>• Barren Land</li> </ul>	Temporary	<ul style="list-style-type: none"> <li>• WUSC (WTP/RVT-1 Site)</li> <li>• GoN</li> </ul>

Source: Due Diligence Report, Deurali Hupsekot, 2019



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 Engineer



## 2.6.2 Energy Requirement

94. There will be requirement of energy use either for any construction activities or for workers camp. Generally, Petroleum fuel & Electricity is used as a source of energy at the construction site. There is also possibility of use of solid fuel biomass like firewood by workers. However, burning of biomass releases carbon emissions. Hence, burning of biomass should be prohibited. Instead, cooking fuel like kerosene or gasoline fuel should be provided to the workers. For lighting facilities at construction site as well as worker's camp, electricity should be used as source of energy. While, for construction works, On-site Diesel Generators and Concrete Mixing Plant using petroleum fuel as well as electricity can be used.

## 2.6.3 Human Resource Requirement

95. Human Resources are the main functional units of the construction projects. The contractor should ensure that the project has sufficient human resources. The human resources include Skilled Labours and Unskilled labours. For ensuring punctuality and sincerity in work schedule, hiring local human resources especially labours would be preferable. As per design estimate, the total number of Skilled Labors and Unskilled Labours are 91,795 and 408,330 respectively. Similarly, during operation phase, human resources for operation & maintenance are mobilized by the concerned WUSC.

## 2.6.4 Construction Materials

96. For ensuring availability, the local construction materials would be more preferable. The construction materials like stone, sand & aggregates can be locally brought from the authorized local vendor. There is no requirement of quarrying hence, there will be no need of crusher plant for the proposed project.

97. The materials other than Stone, Aggregates and sand including Bricks, Cement, Iron bar and Iron sections have been envisaged to procure from the nearest market centers that includes Butwal, Kawasoti & Narayanghat towns. Hupsekot town is 56.7km, 15.9km & 41.9km far from Butwal, Kawasoti & Narayanghat respectively. Other miscellaneous construction materials like pipe materials, fittings, sanitary items etc. will be purchased from the available and nearest market areas.

98. As per the detailed design estimate, the total quantity of these major construction materials required for the overall project construction activities will be around as follows:

Stone: 4160 m<sup>3</sup>

Sand: 2642 m<sup>3</sup>

Aggregate: 4000 m<sup>3</sup>

Cement: 2115 tonnes

Bricks: 62175 nos.

Reinforcement Bars: 365 tonnes

99. Other miscellaneous construction materials like pipe materials, fittings, sanitary items etc. will be purchased from the available and nearest market areas. As per the detailed design, the total estimated quantity of pipe materials for pipe laying works, house connection works and for other project components is; a) DI Pipes is 5356m, b) PE pipes is 142,873m and c) GI pipes is 776m.

### 2.6.5 Worker's Camp Site

100. The proposed project has provision of worker's camp site to ensure worker's safety & rights during construction phase. The contractor will temporarily facilitate the construction workers with well equipped worker's camp. The camp site will be located nearby the construction sites at two tentative locations that includes a) WTP/RVT 1 Area at Dihidanda and c) Near Buddha Chowk on the bank of downstream of Pathare Khola. This is depicted in the *Figure 2-IV* given below. There will be provision of proper drainage, sanitation and basic utilities at camp site to ensure good health & sanitation behaviour of each workers.

### 2.6.6 Stockpiling Site

101. There is also provision of the stockpiling site which will be located nearby the construction site so that the stockpiled construction materials would be readily available. Various locations for this stockpiling site have been proposed that is same as that of the location of worker's camp site which has been clearly described in the above section. This is depicted clearly in the *Figure 2-IV* given below. This location ensures that the proposed stockpiling sites do not interfere any natural drainage courses, drain inlets or concentrated flows of storm water. This ensures the control of blockage problems to these features that may be caused by some materials like soil, cement, rubbles etc. These locations are adjacent to worker's camp site so that the stockpiled materials will be under proper supervision of the workers. To control wind erosion, water or dust palliative will be applied to stockpiles and the bagged materials will be placed on ballets under cover.

### 2.6.7 Cut and Fill Volume of Muck

102. Cut & Fill Volume of muck after earthworks has been estimated during detailed design of this proposed project. After using the excess of cut in filling works, the resulting muck will be disposed off properly to Spoil Disposal Site. As per detailed design, the total quantity of cut volume of muck is 128,409.60 m<sup>3</sup> and of fill volume of muck is 112,290.96 m<sup>3</sup>. Hence, the remaining volume of muck after backfilling will be 16,118.59 m<sup>3</sup> which will remain as excess spoil. This will be managed by disposing into the proposed spoil disposal site.

### 2.6.8 Spoil Disposal Site

103. There will be also provision of Spoil Disposal Site at various tentative locations that same as that of the location of worker's camp site which has been clearly described in the above section. The location of each Spoil Disposal Site is depicted in the *Figure 2-IV* given below. Each location of this Spoil Disposal Site ensure environmental safety. Each of this location is nearby the existing roads so that it will be easy to transport the excess spoil from the construction site.





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SN	SYMBOL	LEGEND NAME
1	▲	CAMP SITE
2	●	SPOIL DISPOSAL SITE
3	○	STOCKPILE/INGEST
4	○	STREAM INTAKE
5	○	PUMPING INTAKE
6	○	WTRTRF SITE
7	□	COKE AREA
8	□	SURROUNDING AREA
9	□	TRANSMISSION MAINS
10	□	DISTRIBUTION MAINS
11	□	WARD BOUNDARY
12	□	RIVER/STREAM CROSSINGS

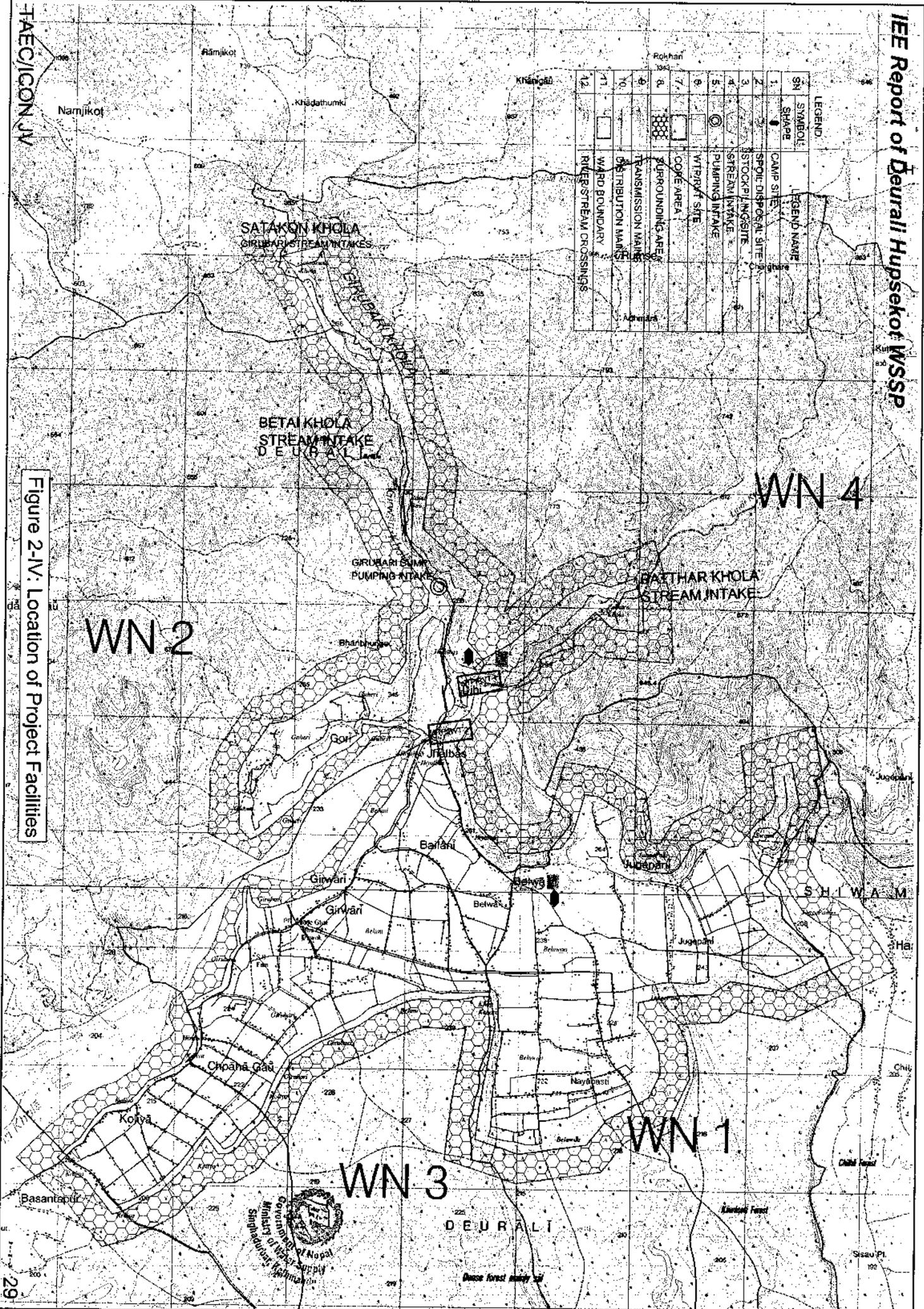


Figure 2-IV: Location of Project Facilities



## 2.7 Project Activities

104. To carry out IEE study, information on the proposed activities of the proposed project needs to be collected. The study categorizes the project activities on the basis of project phase. This has been listed below:

### 2.7.1 Construction Activities

105. The list of construction activities of the proposed project are given below:

- a) Construction of Internal Approach Roads
- b) Establishment of Temporary Facilities for workers
- c) Establishment of the Stockpiling Areas
- d) Establishment of the Spoil Disposal Sites
- e) Movement of Construction Vehicles
- f) Transportation of Construction Materials
- g) Loading/Unloading of Construction Materials
- h) Construction of Boundary Wall for the protection of the proposed sites
- i) Construction of Proposed Project Components that includes Sump Well, Sump RVTs, WTP, Service Reservoirs, Office Buildings, Generator House, Guard Houses and Public Toilets.
- j) Use of Diesel Generators
- k) Use of On Site Concrete Mixers
- l) Earthwork Excavation Works for pipe laying works
- m) Pipe Laying Works
- n) Backfilling Works
- o) Haulage & Disposal of Spoils to Spoil Disposal Site
- p) Waste Generation from the construction sites and worker's camp
- q) Stockpiling of Construction Materials
- r) Storage of Fuels/Chemicals
- s) Slope Protection Measures like Gabion Wall Construction, Retaining Wall Construction
- t) Dismantling of Temporary Facilities for workers, Stockpiling Areas and Spoil Disposal Sites after the completion of construction works
- u) Reinstatement Works

### 2.7.2 Operation Activities

106. The list of operation activities of the proposed project are given below:

- a) Regular Cleaning of Sedimentation Tank
- b) Frequent Washing of Sand within Slow Sand Filter
- c) Disinfection of treated water at dosing unit by the WUSC operator
- d) Occasional Removal of Algae if found settled down at the bottom of the reservoir tank
- e) Operation & Maintenance of the project components

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### 3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

#### 3.1 Constitution of Nepal

107. The Constitution of Nepal is the fundamental law of Nepal.

- Article 30 (1) of the Constitution of Nepal guarantees a "clean environment" as a fundamental right, and elaborates that "every citizen shall have the right to live in a clean and healthy environment".
- Article 30 (3) of the constitution also encourages the state to formulate necessary legal frameworks to balance environment and development.

#### 3.2 Nepal's Environmental Policy and Legal Framework

108. The Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislations that provide the framework within which environmental assessment is carried out in Nepal are the:

##### 3.2.1 Environmental Protection Act, 2053 B.S. (1997 A.D.) with 1<sup>st</sup> and Latest Amendment 2075 B.S. (2018 A.D.)

109. Environmental Protection Act (EPA), 1997, which requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA Report approved by the concerned sector agency, respectively, prior to implementation. This EPA:

- sets out the review and approval process of IEE and EIA Reports, that involve informing and consulting stakeholders;
- stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards;
- specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA Report;
- provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and
- states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

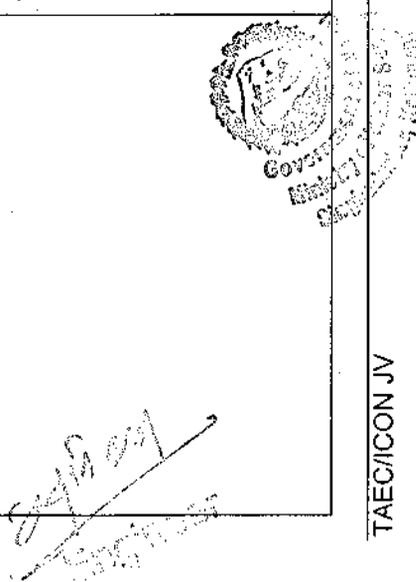
##### 3.2.2 Environmental Protection Rules, 2054 B.S. (1997 A.D.) with Amendments 2073 B.S. (2017 A.D.)

110. Environmental Protection Rules (EPR), 1997, and its amendments in 1999, 2007 & 2017 defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA Reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2017.

111. Other environmental policies, laws, rules, conventions & standards that provide general context in the environmental assessment of water supply & sanitation works are presented in the table given below:

Table 3-1: Other Relevant Environmental Act, Rules, Plan, Policies, and Guidelines of Nepal

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
<b>1.Plans, Policies &amp; Strategies</b>			
National Environmental Policy & Action Plan (NEPAP)	2050 B.S. (1993 A.D.)	Of its five objectives, most relevant to the Project are to (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	<ul style="list-style-type: none"> <li>The subproject will not encroach any physical &amp; cultural heritage areas and will not affect biodiversity.</li> <li>EMP provides measures to mitigate anticipated adverse impacts.</li> </ul>
Water Resources Strategy	2059 B.S. (2002 A.D.)	Among the ten strategic outputs of this strategy, third output focusses on Adequate Supply of and access to potable water and sanitation & hygiene awareness provided.	This provision will strengthen implementation capacity for the proposed project.
Rural Water Supply and Sanitation National Policy and Rural Water Supply and Sanitation National Strategy	2060 B.S.(2004 A.D.)	Recognizes that all people have a right to access to basic water supply and sanitation services and that these services are necessary for socio economic development and to combat waterborne diseases.	The proposed project ensures easy access to safe, reliable & potable water.
Rural Water Supply and Sanitation Sectoral Strategic Action Plan (Unofficial Translation)	2060 B.S.(2004 A.D.)	<ul style="list-style-type: none"> <li>This action plan has proposed "Environmental Aspects" as one of its major components.</li> <li>This underscores the environmental aspects of all levels of plans and their implementation and consolidates them according to rules &amp; policies to ensure the execution of development works.</li> </ul>	Though this action plan has main focus on rural areas and the proposed project is for urban area, the IEE study has duly followed this strategic action plan as a reference.
National Water Plan-Nepal	2062 B.S. (2005 A.D.)	<ul style="list-style-type: none"> <li>This includes subsector-wise action programmes in water induced disasters, environmental action plan on management of watershed and aquatic ecosystem, water supply, sanitation and hygiene, irrigation for agriculture, hydropower development, industries, tourism, fisheries, and navigational uses, water-related information systems (Decision Support System for River Basin Planning and Management), legal frameworks, and institutional mechanisms</li> <li>This also includes Environment Management Plan, a strategic document for the implementation of environmental protection measures (including</li> </ul>	This has been considered in IEE study.



Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
National Urban Policy	2063 B.S. (2007 A.D.)	<p>downstream water pollution and groundwater quality, erosion/landslide and sedimentation, water pollution and sanitation, effect on aquatic life and wetland ecosystem), monitoring (baseline, impacts, and compliance), environmental auditing and institutional and procedural arrangements.</p> <p>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.</p>	The IEE study will meet the provisions of this policy.
National Urban Water Supply & Sanitation Sector Policy (Final Draft)	2065 B.S. (2009 A.D.)	<p>The Policy requires the IEE or EIA of proposed WSS projects by the EPA/EPR to (i) incorporate consultations with key stakeholders, including endpoint users; &amp; (ii) specify measures to mitigate environmental impacts before, during construction &amp; operation, as well as corrective measures.</p> <p>The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.</p>	The IEE study will meet the provisions of this policy.
Updated 15-yr Development Plan for Small Towns Water Supply and Sanitation Sector	2066 B.S. (2009 A.D. Amendments in 2015A.D.)	<p>The goal of this Policy is to reduce urban and rural poverty by ensuring equitable socio-economic development, improving health and the quality of life of the people and protection of environment through the provision of sustainable water supply and sanitation services.</p>	<p>EMP prescribes performance monitoring &amp; evaluation to minimize the anticipated, environmental impacts.</p> <ul style="list-style-type: none"> <li>• The proposed project is solely for provision of sustainable water supply service to Hupsekot Rural Municipality residents.</li> <li>• The IEE study ensures the protection of the environment from the construction activities of the proposed project.</li> </ul>
National Water Supply & Sanitation Policy (Draft)	2071 B.S. (2014 A.D.)	<ul style="list-style-type: none"> <li>• Contribute to overall development of the nation and its citizens by creating a conducive environment for implementation of infrastructure development projects</li> <li>• Facilitate timely execution (completion) of development projects by minimizing adverse impacts on economic,</li> </ul>	<p>There is no issue of any kind of Land Acquisition, Rehabilitation and Resettlement in this project.</p>
Land Acquisition, Rehabilitation and Resettlement Policy	2015		

Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Land Use Policy	2072 B.S. (2015 A.D.)	<ul style="list-style-type: none"> <li>social and cultural aspects of affected families/people and the project area</li> <li>Improve social and economic status of project-affected families by providing fair and adequate compensation, appropriate resettlement and rehabilitation assistances/allowances.</li> <li>The strategy 3 of Policy 2 has taken into account to maintain a balance between physical infrastructure development and environment.</li> <li>The strategy 3 of Policy 10 focusses on adoption of principle of sustainable development in view of the impact of climate change during any construction and/or development works in order to keep balance between land, environment and development.</li> </ul>	<ul style="list-style-type: none"> <li>The proposed project will maintain balance between construction activities and environmental aspects of the project town.</li> <li>The IEE study ensures this issue.</li> </ul>
National Urban Development Strategy	2074 B.S. (2017 A.D.)	<ul style="list-style-type: none"> <li>This strategy assesses the existing conditions of infrastructures, environment, economy and governance, establishes benchmarks and desirable standards.</li> <li>It identifies prioritized strategic initiatives for investment in infrastructure and environment to realize the comparative advantages of urban areas.</li> </ul>	The IEE study has duly followed this.
Fifteenth Plan Approach Paper (2076/77-2080/81)	2076/77-2080/81	<p>This plan also has separate provision for water supply &amp; sanitation sector. Regarding this sector, this plan aims to ensure access to safe water supply &amp; sanitation service and to enhance quality service. This plan has also its own strategy, working policy and expected positive outcomes through various development works in the field of water supply &amp; sanitation service.</p>	The successful implementation of the proposed project shall be the expected outcome of this plan.
National Environmental Policy	2076 B.S. (2019 A.D.)	<ul style="list-style-type: none"> <li>This encourages the state to control pollution, manage wastes and promote greenery so as to ensure citizens' right to live in a fair and healthy environment. This was framed to guide the implementation of environment related laws and other thematic laws, realize international commitment and enable collaboration between all concerned governments on environmental government organizations on environmental</li> </ul>	This will be followed during the proposed project implementation phase.

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Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
<p><b>2.Laws &amp; Acts</b></p> <p>Essential Goods Protection Act</p>	<p>2012 B.S. (1955 A.D.)</p>	<p>management actions.</p> <ul style="list-style-type: none"> <li>The policy has entrusted the federal government with the responsibility for looking after national-level policy, law and standards related works for environmental protection and management.</li> </ul>	
<p>Aquatic Animal Protection Act</p>	<p>2017 B.S. (1961 A.D.) with Amendments (2055 B.S. (1997 A.D.))</p>	<ul style="list-style-type: none"> <li>Deems drinking water an essential commodity and strictly protects drinking water.</li> <li>Prohibits any unauthorized use or misuse, stealing, damaging etc. of drinking water.</li> </ul> <p>This act renders punishment to any party introducing poisonous, noxious or explosive materials into a water source or destroying any dam, bridge or water system with the intent of catching or killing aquatic life. It also emphasizes that GoN empowers to prohibit catching, killing and harming of certain kinds of aquatic animals by notification in Nepal Gazette.</p>	<p>The proposed project ensures safe, reliable &amp; potable water along with the provision of protection works and metering system to prevent any misuses, stealing and damage problems.</p> <ul style="list-style-type: none"> <li>Information of this act will be delivered to the construction workers, as they may get involved in fishing during construction period.</li> <li>This issue has been covered by this IEE study.</li> </ul>
<p>Town Development Act</p>	<p>2045 B.S. (1988 A.D.)</p>	<p>This act has provision of necessary services and facilities to the residents of the town by reconstructing, expanding and to develop existing towns and by constructing new towns and to maintain health, convenience and economic interest of general public.</p>	<p>The proposed project is solely for provision of continuous water supply facilities as per the increasing demand of water of the increasing population of Rupakot Majhuwagadhi town.</p>
<p>Water Resource Act</p>	<p>2049 B.S. (1992 A.D.)</p>	<ul style="list-style-type: none"> <li>The umbrella Act governing water resource management.</li> <li>Provides for the formation of water user associations and establishes a system of licensing.</li> <li>Prohibits water pollution.</li> </ul>	<p>WUSC has been formed for this proposed project as per this act and There is provision of control of water pollution through protection works and strict supervision.</p>



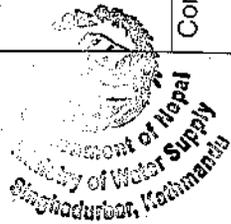
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Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Land Acquisition Act	2034 B.S. (1977 A.D.)	It guides the compulsory acquisition of land. It also describes that GoN can acquire land at any place and in any quantity by giving compensation pursuant to the act for the land acquired for any public purposes or for operation of any development project initiated by GoN.	There is no requirement of land acquisition of private land. All the land required are under the ownership of GoN.
Child Labor Prohibition and Regulation Act	2056 B.S. (2001 A.D.)	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 subclause 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.	This provision has been stated in EMP.
Water Supply Management Board Act	2063 B.S. (2006 A.D.)	It guides to prevent the misuse of potable water and prevent pollution of potable water	The proposed project has followed this as it has provision of protection works at the intake site, WTP & RVT sites that will prevent pollution of water.
Solid Waste Management Act	2068 B.S. (2011 A.D.)	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 must reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
Labour Act	2074 B.S. (2017 A.D.)	<ul style="list-style-type: none"> <li>The has provisions for the rights, interest, facilities and safety of workers and employees working in enterprises of various sectors.</li> <li>The Act emphasizes on occupational health and safety of workers and stipulates provision of necessary safety gears and adopting appropriate precautionary measures against potentially hazardous machine/equipment in the workplace.</li> <li>It also specifies to arrange such as removal of waste accumulated during production process and prevention of dust, fume, vapor and other waste materials, which adversely affect the health of workers.</li> </ul>	These provisions are stated in EMP.


  
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Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Local Government Operation Act	2074 B.S. (2017 A.D.)	<ul style="list-style-type: none"> <li>It specifies the provision of controlling the communicable diseases at the construction site. It also prohibits mobilization of child as a labor. It emphasizes on the provision of temporary camp, safe drinking water and necessary food supplies to the workers.</li> </ul>	Provides a basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.
Consumer Protection Act	2075 B.S. (2018 A.D.)	<p>The Act gives Province Government the functions, duties &amp; powers to: (i) entrust municipalities with responsibility of WSS services, (ii) conserve &amp; protect their local environment &amp; natural resources; (iii) plan, implement &amp;/or operate &amp; maintain WS projects at local level; (iv) implement or arrange for implementation local sanitation/sewerage &amp; drainage projects; (v) protect cultural heritage &amp; religious sites; &amp;/or (vi) monitor project activities within their respective jurisdictions.</p> <ul style="list-style-type: none"> <li>Article 3 of the act states that every consumer shall have the rights to quality goods and services.</li> <li>Article 7 talks about compensation to the customer if any kind of damage is caused due to the manufacture of goods and service.</li> <li>Article 12 has provisions that states that the service provider should provide services without any discrimination.</li> </ul>	<ul style="list-style-type: none"> <li>In regard to this proposed project, it ensures the rights of water users/beneficiaries as consumers to get easy access to safe, reliable and potable water supply service as well as effective sanitation services.</li> <li>It also provides basis for the concerned ministry to implement the policy related to proper water supply &amp; sanitation services.</li> </ul>
Land Use Act	2076 B.S. (2019 A.D.)	The main aim of the act is to ensure that land is properly used and managed and that land set aside for one purpose is not used for other. The act has assigned the responsibility for implementing the act to not only the federal government but also to the provincial and local governments.	Information on this act is necessary for this project to avoid misuse of land for the construction of project components. However, as this project requires RoW of the public road for the proposed components, land misuse May not be a serious issue.
<b>3. Rules &amp; Regulations</b>			



Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Solid Waste (Management & Resource Mobilization), Rules	2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992A.D.)	<ul style="list-style-type: none"> <li>This act focusses on the management of solid waste and mobilization of resources related.</li> <li>These also ensure the health convenience of the common people by controlling the adverse impact on pollution from solid waste.</li> </ul>	<ul style="list-style-type: none"> <li>This act needs to be reviewed during construction phase.</li> <li>EMP covers the requirement of this rule for the proposed project.</li> </ul>
Water Resource Regulations	2050 B.S. (1993 A.D.)	<ul style="list-style-type: none"> <li>This is the umbrella Regulation governing water resource management.</li> <li>Sets out the procedure to register a Water User Association and to obtain a license.</li> <li>Sets out the rights and obligations of Water User Associations and license holders.</li> </ul>	The proposed project has followed these provisions.
Drinking Water Regulations	2055 B.S. (1998 A.D.)	<ul style="list-style-type: none"> <li>Regulates the use of drinking water.</li> <li>Provides for the formation of Drinking Water User Associations and sets out the procedure for registration.</li> <li>Deals with licensing of use drinking water.</li> <li>Deals with the control of water pollution and maintenance of quality standards for drinking water.</li> <li>Sets out the conditions of service utilization by consumers.</li> </ul>	The proposed project has followed all these provisions.
Solid Waste Management Rules	2070 B.S. (2013 A.D.)	<ul style="list-style-type: none"> <li>GoN has issued these rules by exercising the power conferred by the section 50 of the Solid Waste Management Act, 2068.</li> <li>Section 3 of this rule focuses on Segregation &amp; management of solid wastes.</li> </ul>	EMP for this proposed project covers this matter focused by this rule.
Labor Rules	2075 B.S. (2018 A.D.)	<ul style="list-style-type: none"> <li>GoN has issued these rules by exercising the power conferred to it under the section 184 of the Labor Act, 2074.</li> <li>Section 7 of these rules deals with Occupational Safety &amp; Health Policy.</li> </ul>	EMP for this proposed project covers this matter focused by this rule.
<b>4.Directives, Guidelines &amp; Manuals</b> National EIA Guidelines	2049 B.S. (1993 A.D.)	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	This has been followed for evaluation of the anticipated environmental impacts.

  
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Act/ Rule Policy/Law/Guidelines	Year	Relevant Provisions	Remarks
Guidelines for Community Noise by WHO	2055 B.S. (1999 A.D.)	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. It provides basis for global standards in noise quality at community level that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guidelines will be followed.
WHO Air Quality Guidelines, Global Update	2061 B.S. (2005 A.D.)	It provides basis for global standards in air quality that are designed to offer guidance in reducing the health impacts of air pollution.	During air quality monitoring, this guidelines will be followed.
National Noise Standard Guidelines	2068 B.S. (2012 A.D.)	It provides basis for national standards in noise quality that are designed to offer guidance in reducing the health impacts of noise pollution.	During noise quality monitoring, this guidelines will be followed.
WHO Guidelines for Drinking-water Quality, Fourth Edition	2073 B.S. (2017 A.D.)	It provides the recommendation of WHO for managing the risk from hazards that may compromise the safety of drinking water.	During water quality monitoring, this guidelines will be considered and followed.

Source: IEE Study, 2018/019



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### 3.3 Environmental Agreements

#### 3.3.1 International Environmental Agreements (Conventions & Treaties)

112. Nepal is a signatory to many international agreements and conventions related to environmental conservation. However, all of those conventions are not interrelated to the proposed project. The conventions related to the proposed project are as follows:

- a) The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973
- b) International Covenant on Economic, Social and Cultural Rights (ICESCR), 1976
- c) Worst Forms of Child Labour Convention, 1999

113. The relevance of the aforementioned environmental agreements to the Subproject are with their emphasis on human activities to (i) take measures to protect local, as well as global, natural resources and environment; (ii) prevent or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Millennium Development Goals, the seventh goal of which is to "ensure environmental sustainability" targeting the reverse of loss of forest and environmental resources, reduction of biodiversity loss, and increase in the proportion of the population with sustainable access to safe drinking water and basic sanitation.

114. The Deurali Hupsekot Water Supply & Sanitation Project does not and will not break or go against Nepal's commitment to these international agreements.

### 3.4 Environmental Standards

115. The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed below and their details are featured in **Annex 2B**:

- National Drinking Water Quality Standards 2062 B.S. (2005 A.D.)
- National Ambient Air Quality Standards, for Nepal (NAAQS), 2003 A.D. & Updated in 2012 A.D.
- National Diesel Generator Emission Standard, 2012
- Nepal Vehicle Mass Emission Standard, (NVMES), 2069 B.S. (2012 A.D.)
- The key environmental quality standards applied in the GoN IEE (as well as in the ADB IEE) are listed in **Table 4-II** and their details on the acceptable level criteria of these standards are featured in **Annex 2B**.

**Table 3-II: Relevant Environmental Quality Standards**

Particular	National Standard	International Standard
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Noise	National Noise Standard Guidelines, 2012	WHO Noise Level Guidelines
Drinking water quality	National Drinking Water Quality Standards, 2005	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011
Emission standard for diesel	National Diesel Generator Emission Standard, 2012	

Particular	National Standard	International Standard
generator discharge to ambient Air		

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

Source: IEE Study, 2018/019

116. As shown in the above **Table 3-II, National Ambient Air Quality Standards, for Nepal, 2003** is enforced by GoN that has set quality standards for seven parameters TSP, PM<sub>10</sub>, Sulphur Dioxide(SO<sub>2</sub>), Nitrogen Oxide(NO<sub>2</sub>), Carbon Mono-oxide (CO), Lead (Pb) and Benzene at national level. Similarly, *WHO Air Quality Guidelines, Global Update, 2005* enforced by WHO has set quality standards for four parameters PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>2</sub> at international level. Both standards provide guidelines to follow and comply the set standards for the ambient air quality during construction period. The acceptable level criteria for ambient air quality as per both standards are given below:

**Table 3-III: Standards for Ambient Air Quality**

Parameter	Averaging Period	Nepal's	WHO Air Quality Guidelines (µg/m <sup>3</sup> )	
		Ambient Air Quality Standard (µg/m <sup>3</sup> ) *	Global Update 2005	Second Edition † 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM <sub>10</sub>	Annual	-	20	-
	24-hour	120	50	-
PM <sub>2.5</sub>	1-year	-	10	-
	24-hour	-	25	-
SO <sub>2</sub>	Annual	50	-	-
	24-hour	70	20	-
	10-minute	-	500	-
NO <sub>2</sub>	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	-	-

Source:

- \* National Ambient Air Quality Standards for Nepal, 2003. Compiled 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.

117. Similarly, *National Noise Standard Guidelines, 2012* has set the standard noise levels measured in dBA for Industrial area, Commercial Area, Rural Residential Area, Urban Residential Area, Mixed Residential Area and Quiet Area. This also has provision of standard values for the noise level generated by Water Pumps and Diesel Generator also. This is limited within the country only. For international level, *WHO Noise Level Guidelines* has set the standard noise levels measured in dBA for two areas that includes residential and commercial areas. The standard values for ambient noise quality are given in the table given below:



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**Table 3-IV: Standards for Ambient Noise Quality**

Receptor / Source	National Noise Standard Guidelines 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors* (One Hour L <sub>eq</sub> in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	65		
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.

118. Similarly, National Drinking Water Quality Standards, 2005 provides guidelines for various parameters for the required frequency of water quality monitoring. This is acceptable at the national level only. For international standards, WHO has set standards for drinking water quality. This is shown in detail in the following table:

**Table 3-V: Standards for Drinking Water Quality**

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) <sup>**</sup>	-
	pH		6.5 - 8.5	none
	Color	TCU	5 (15)	none
	Taste & Odor		Would not be objectionable	-
	TDS	mg/l	1000	-
	Electrical Conductivity	µS/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 <sup>††</sup>	1.5
	Lead	mg/l	0.01	0.01
Chemical	Ammonia	mg/l	1.5	none established
	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
Micro Germs	Residual Chlorine	mg/l	0.1 - 0.2	5 <sup>†††</sup>
	E-coli	MPN/100ml	0	must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml	0 in 95% of samples taken	sample

\* Health-based guideline values

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

† These standards indicate the maximum and minimum limits.

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

††† Parameter with WHO guideline value as more stringent than national standard value.

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

Source: National Drinking Water Quality Standards, 2005 and Implementation Directives for NDWQS, 2005

119. *National Diesel Generator Emission Standard, 2012* has been introduced by the Government of Nepal in 2012 for new and in use diesel generators with a capacity of 8 kW-560kW (under the 1997 Environment Protection Act). The emissions standards set for new diesel generator imports is equivalent to Bharat Stage III standards and, for in-use diesel generators, is equivalent to Bharat Stage II. The Diesel Power Generation: Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal 60 emissions limits are set for four major pollutants: CO, HC, NO<sub>x</sub>, and PM. This is given in detail below:

**Table 3-VI: National Diesel Generators Emission Standards, 2012**

1. Emissions Limits (g/kWh) for Imports of New Diesel Generators

Category (kW)	CO	HC+NO <sub>x</sub>	PM
kW < 8	8.00	7.50	0.80
8 = kW < 19	6.60	7.50	0.80
19 = kW < 37	5.50	7.50	0.60
37 = kW < 75	5.00	4.70	0.40
75 = kW < 130	5.00	4.00	0.30
130 = kW < 560	3.50	4.00	0.20

Note: This standard is equivalent to Bharat III standards.

2. Emissions Limits (g/kWh) for In-use DG Sets

Category (kW)	CO	HC	NO <sub>x</sub>	PM
kW < 8	8.00	1.30	9.20	1.00
8 = kW < 19	6.60	1.30	9.20	0.85
19 = kW < 37	6.50	1.30	9.20	0.85
37 = kW < 75	6.50	1.30	9.20	0.85
75 = kW < 130	5.00	1.30	9.20	0.70
130 = kW < 560	5.00	1.30	9.20	0.54

Note: This standard is equivalent to Bharat II standards.

- a) Sampling collection point should be located at one-third of the DG set stack height.
- b) kW= Power Factor \* kW
- c) Testing Methodology: Should be according to ISO 8178 or equivalent to ISO 8178 standard set by the manufacturing country.

Source: *Diesel Power Generation, 2014* by The World Bank

### 3.5 Environmental Assessment Requirements

120. The Project is subjected to the environmental safeguard requirements of both the ADB and Government of Nepal.

#### 3.5.1 Environmental Assessment Requirements of the ADB

121. All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. Concerning the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines<sup>2</sup>.
122. ADB's Environmental Safeguards policy principles are defined in SPS (2009), Safeguard Requirements as per **Table 3-VII** and the IEE is intended to meet these requirements.

<sup>2</sup> 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/EnvironmentalGuidelines>

Table 3-VII:SPS 2009 Safeguard Requirements

SPS 2009 - Safeguard Requirements	Remarks
<p>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.</p>	<p>REA has been undertaken, indicating that the Project is <b>NOT</b>: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area. The extent of adverse impacts is expected to be local, site-specific, confined within main and secondary influence areas. Significant adverse impacts during construction will be temporary &amp; short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient.</p>
<p>Conduct EA to identify potential direct, indirect, cumulative, &amp; induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical, cultural resources in the context of the project's area of influence. Assess potential transboundary global impacts, including climate change.</p>	<p>IEE has been undertaken to meet this requirement. (Chapter 6 &amp; 7). No transboundary &amp; global impacts, including climate change.</p>
<p>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.</p>	<p>Analysis of alternatives is presented in Chapter 6</p>
<p>Avoid, and where avoidance is not possible, minimize, mitigate, &amp;/or offset adverse impacts and enhance positive impacts using environmental planning &amp; management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.</p>	<p>An EMP has been prepared to address this requirement.</p>
<p>Carry out meaningful consultation with affected people &amp; facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people &amp; concerned NGOs, early in the project preparation process &amp; ensure that their views &amp; concerns are made known to &amp; understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive &amp; facilitate resolution of affected people's concerns &amp; grievances on project's environmental performance.</p>	<p>Key informant and random interviews have been conducted. A grievance redress mechanism for the resolution of valid Project-related social and environmental issues/concerns is presented in Section VIII.</p>



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SPS 2009 - Safeguard Requirements	Remarks
<p>Disclose a draft EA (including the EMP) promptly, before project appraisal, in an accessible place &amp; a form &amp; language(s) understandable to affected people &amp; other stakeholders. Disclose the final EA, &amp; its updates if any, to affected people &amp; other stakeholders.</p>	<p>The draft IEE will be disclosed on ADB's website before Project appraisal. The GoN has approved the IEE Report. Copies of both SPS-compliant IEE and GoN-approved IEE will be made available at the offices of the PMO, ICG and WUSC for public consultation.</p>
<p>Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.</p>	<p>EMP implementation, reporting and disclosure of monitoring reports are in this IEE.</p>
<p>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.</p>	<p>The project does not encroach on areas of critical habitats. No trees will be cut. However, ground cover and low shrubs in the project footprint and some work easement will have to be removed from the transmission main. Although in due time, ground cover is expected to grow over the backfilled affected area naturally, EMP recommends seeding of the re-surfaced area to accelerated re-growth.</p>
<p>Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health, and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.</p>	<p>This requirement is only minimally applicable to the Project in the aspect of waste generation, e.g., effluent from septic tanks and generated sludge and sludge disposal from water supply and sanitation structures. The Project will not involve hazardous materials subject to international bans/phase-outs.</p>
<p>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.</p>	<p>EMP provides measures to mitigate health and safety hazards during construction and operation.</p>



SPS 2009 - Safeguard Requirements	Remarks
Conserve physical, cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during the 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 Project will not affect any physical, cultural resource. The EMP recommends the measure/s mitigate the adverse impact on PCRs in case of the chance find.

Source: Safeguard Policy Statement, ADB, 2009 and IEE Study, 2018/019

### 3.5.2 Environmental Impact Assessment Requirements of Government of Nepal

123. The Environmental Protection Rules (EPR) defines the environmental impact assessment process that should be followed in the preparation, review, and approval of environmental assessment reports. The process applicable to the Project is summarized in Table 3-VIII given below.

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

Steps in the Process	Remarks
Proponent refers to EPR Schedules 1 & 2 for the required environmental assessment (IEE or EIA) to carry out.	The project requires an IEE.
If proposed project requires an IEE, Proponent prepares an IEE schedule of work/ToR using the format prescribed in Schedule 3 of the EPR and submit this to the CSA for approval.	The project has secured an approved ToR.
Proponent carries out IEE according to the approved work schedule/ToR and prepares an IEE Report following the format prescribed in EPR Schedule 5 and incorporating stakeholders' feedback applying the consultation procedure specified in the EPR.	The project carried out IEE and prepared the IEE Report accordingly.
Proponent submits 15 copies of the IEE Report along with the project proposal and recommendation of the Municipality to the CSA.	Project submitted documents accordingly for review and approval.
CSA conducts review and grants approval of IEE Report.	
<ul style="list-style-type: none"> <li>➤ If the review reveals project implementation to have no substantial adverse impact on the environment, CSA approves within 21 days from receipt of the report.</li> <li>➤ If the review reveals the necessity to carry out an EIA, Proponent conducts an EIA following the prescribed EIA process.</li> </ul>	
Proponent implements approved IEE Report and any terms and conditions given with the approval.	Project has not started and being implemented
CSA monitors and evaluates the impact of project implementation. When necessary, issue directives to the Proponent to institute environmental protection measures.	Project has not started and being implemented
MoWS conducts the environmental audit after two years of project commissioning/operation.	Project has not started and being implemented

Source: IEE Study 2018/019



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## 4 METHODOLOGY

124. To meet the objectives of the IEE study a systematic and integrated methodology was followed by the legal requirements of GoN. The Ministry of Water Supply has already approved the Terms of Reference (ToR) for the IEE study of Deurali Hupsekot Water Supply and Sanitation Project. The IEE study has followed basically the procedures outlined in the approved ToR.
125. The IEE study was conducted as per provisions of the Environmental Protection Rules (1997 with amendments 1999, 2007 & 2017) following the provision of Rules 5, 7, 10 & 11 in compliance with the schedule 1, 3 & 5.
126. The IEE study has followed the procedures outlined in the approved ToR and has covered the issues delineated therein. The principal steps undertaken in the IEE methodology to accomplish the assignment are briefly discussed below:

### 4.1 Literature review

127. Available primary and secondary literature in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps, etc. were collected and reviewed to obtain secondary information. The key documents & reports collected and reviewed to determine the nature and scope of activities of the project that influences the environmental conditions of the proposal area are listed below:
- Final Feasibility Study of Deurali Hupsekot Water Supply and Sanitation Project, 2019
  - Detailed Engineering Design Report of Deurali Hupsekot Water Supply & Sanitation Project, 2019
  - Due Diligence Report of Deurali Hupsekot Water Supply & Sanitation Project, 2019
  - Final Socio-Economic Profile of Deurali Hupsekot Water Supply & Sanitation Project, 2019
128. Likewise, data on climate, rainfall and other meteorological conditions were also collected from Department of Hydrology & Meteorology (DHM). Similarly, published and unpublished reports about environmental standards, Acts, Regulations, etc. were also collected and reviewed (*Refer Chapter 14*). Published and unpublished literature of the project area about biological, social, chemical, physical, and cultural environments in the form of maps, and reports, etc. were collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

### 4.2 Impact Area Delineation

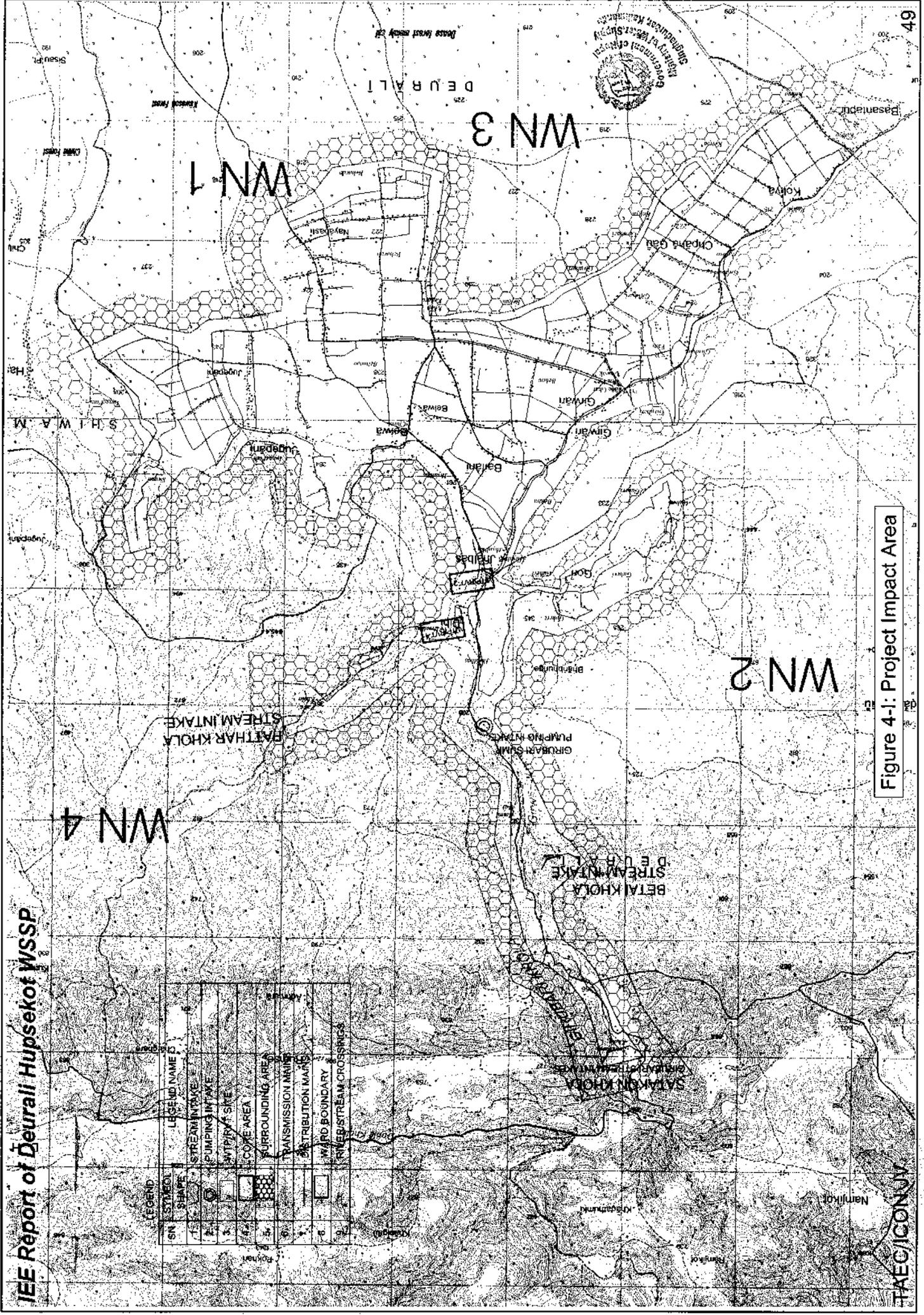
129. To carry out IEE study, the possible areas where the anticipated impacts have either significant or insignificant effects, need to be delineated. To specify the area that would be covered by the assessment, the geographical boundary of the influence area is delineated on the topographical map. This delineating methodology is called Impact Area Delineation. The project impact area refers to the area of the project town which is susceptible to either significant or insignificant impacts by the proposed project. This impact area is delineated by demarcating the geographical boundary of the impact area on the topographical map. The impact area has 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.
130. **Core Area:** Here, 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 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 & 4 of Hupsekot Rural Municipality which has been clearly depicted in *Figure 2-IV*.

131. This also includes the construction area where the proposed project components will be constructed. Hence, this also covers the following areas:
- a) Intake Areas: i) Hupsekot Ward 5 (Girubari gravity at Satakon),; ii) Ward 4 Girubari pumping) and iii) Pathar Khola Ward 4, Betai Khola Ward 2
  - b) WTP Areas; WN 4-Dihidanda & WN 4 Shivalaya
  - c) RVT Areas; i) RVT 1 at Dihidanada- WN 4 and ii) RVT 2 at Shivalaya WN 4
  - d) Transmission Mains: WN 4 of Hupsekot Rural Municipality
  - e) Distribution Mains: WN 1, 2, 3 & 4 of Hupsekot Rural Municipality
132. *Surrounding Area:* Here, the Surrounding Area 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. Hence, here in this proposed project, the surrounding area covers partial areas of wards 1, 2, 3, 4 & 5.
133. The Core Area & Surrounding Area of the proposed project is depicted in the figure given below:



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Figure 4-1: Project Impact Area



LEGEND	
GN	STREAM
GN	STREAM NAME
GN	SHAPE
1	STREAM INTAKE
2	PUMPING INTAKE
3	SWIFERY SITE
4	CORE AREA
5	SURROUNDING AREA
6	TRANSMISSION MAIN
7	DISTRIBUTION MAIN
8	WARD BOUNDARY
9	RIVER/STREAM CROSSINGS



### 4.3 Field Study

134. The field study was carried out in the project service areas in an extensive manner by a multidisciplinary team, comprising a) an Environmental Specialist; b) Water Supply & Sanitation Engineer; c) Sociologist; d) Geo-hydrologist and e) Botanist. During the visit, baseline information on physico-chemical, biological, and socio-economic & cultural conditions of the core area and surrounding areas of the project area were collected using Simple Checklist and Survey Questionnaire method (Refer Annex 4). Similarly, during field study, Rapid Assessment Checklist (**Refer Annex 2A**) as recommended by ADB as per SPS, 2009 has been duly followed in which data regarding physico-chemical, biological, socio-economic & cultural environment has been filled up. The sub-sections below briefly describes the various approaches and methodological tools used during the field study.

#### 4.3.1 Physico-Chemical Environment

135. An extensive physico-chemical environment survey was carried out by delineating the project impact area to collect the baseline information through simple checklist method. Topographic and geomorphological features were observed and documented. Physical features such as topography, air quality, erosion and land stability & land use pattern were also observed and Information in regard to these features were recorded in the simple checklists (**Refer Annex 4**). These data on physico-chemical environment were collected through literature review, field survey & investigation by the team of experts, expert's judgement and stakeholder consultations.

136. Similarly, the baseline information regarding water quality was collected by sampling process. This involved collection of four water samples; each from the proposed sources Betai Khola, Girubari Khola & Pathar Khola. These water samples were taken to the certified laboratory i.e., Nepal Environmental & Scientific Services (P) Ltd. Located at Thapathali, Kathmandu for further analysis. The laboratory analysis primarily measures the value of important parameters that includes pH, Color, Taste & Odor, Total Hardness, Calcium and Iron. Besides this, other parameters were also measured. The values of these parameters were then compared to the value prescribed as per NDWQS to measure the equivalence of the water quality of the proposed sources with NDWQS. This has been presented in a tabular form and has been attached in **Annex 6**.

137. Similarly, information on air quality and noise quality condition was collected through field observation and expert's judgement. For convenience, simple checklist for Physical environment has been prepared and this checklist as included in **Annex 4** is duly followed and filled up during field study. The consultations with the local communities and interviews with a few government officials, schools and representatives of the local bodies also provided aid to assess the physico-chemical aspects.

138. The information on the Physio-chemical environment helps to identify and analyse the impacts on the Physio-chemical environment. The qualitative analysis on the impacts on Physio-chemical environment was carried out through the Checklists method as well as Stakeholder's Consultation as mentioned above, whereas, the quantitative analysis was carried out through expert/professional judgement as the quantitative physical modelling cannot be adopted due to limited data availability.

#### 4.3.2 Biological Environment

139. The baseline information regarding biological environment was collected through walkthrough survey throughout the core & surrounding areas of the project area by adopting simple checklist method (**Refer Annex 4**), through professional judgement and local interaction. Types of vegetation and forests were identified based on the species composition. Information on rivers of the project area were also collected through interaction with the locals

and through field observation. The protected vegetation (rare, endangered, indigenous, etc.) of the project area as per IUCN Red Book, CITES Appendices, IBAT Report generated by ADB and GoN list species were enumerated based on consultation with the local people and the expert judgement. Similarly, information on the aquatic species were also collected through the expert judgement and discussions with the locals.

#### 4.3.3 Socio-economic and Cultural Environment

140. Household surveys were conducted through interviews by simple questionnaire method to obtain information on the socio-economic & cultural environment that includes demography, ethnicity, education, health & sanitation, drinking water condition of the project area, irrigation facility, local traditions, religions, land use patterns, incomes & expenditures and to acquire their perception towards the proposed project, etc. Information on Migratory patterns of the local people and the Impact of river on settlements & agriculture were also collected. Information on the people residing within the core area of the proposed project town has also been collected through socio-economic survey. The survey covered 100% of the total HHs whereas only 10% of the total HHs was surveyed in detail for this study. The sample of Household Survey Questionnaire that has been filled up during field study has been included in **Annex 4**.
141. Focus Group discussions (FGD) were also conducted to obtain suggestions and comments from all the potential stakeholders. The checklist followed for FGD and its findings have been included in **Annex 4**. Direct observation method was adopted 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. During this, findings on the existence of Project Affected Families (PAFs, families whose land or property will be impeded by the project construction activities) were made. Our findings show that no such PAFs exist as the project construction activities will not hinder any of the families residing within the project area. The Consultations with the village elites and Group discussions were done to assess the current situation of the project area community.

#### 4.4 Public Notice & Public Consultation

142. A public notice of 15 days was published in Arthik Abhiyan Dainik, a national daily newspaper on 2076/08/04. The main aim of the notice is to seek written opinions from the concerned people and institutions regarding the possible impacts that may result from the implementation of the proposal. Copies of the Public Notice has been pasted at the concerned ward offices of the proposed town. The public consultation program was conducted in the concerned ward offices according to which no dissatisfaction regarding the proposed project has been felt.

#### 4.5 Collection of Muchulkas (Deed of Inquiry) and Recommendation Letter

143. Deed of Inquiry (Muchulka) from the concerned wards of Hupsekot Rural Municipality has been prepared right before the date of publication of public notice. Then, it was collected within the 15 days from the date of public notice publication. This is included in **Annex 3**.
144. Similarly, Recommendation Letter from the local authority (Municipality) was collected after the completion of 15 days from the date of publication of public notice that mentions no objection regarding the project implementation.

#### 4.6 Impact Identification, Prediction & Evaluation Methods

145. The information regarding Physico-chemical, Biological and Socio-economic & Cultural aspects as mentioned above has been collected to identify the susceptibility of these aspects to be affected by the proposed project activities. This helped to identify the anticipated

environmental impacts of the proposed project. For this, Simple Checklist method has been adopted for the impact identification. This helps in the qualitative analysis of the anticipated impacts. This has been carried out by using Rapid Environmental Assessment (REA) Checklist prepared by ADB (*Refer Annex 2A*) and by using simple checklists and household survey questionnaire (*Refer Annex 4*) prepared during the desk study. These checklists explains the environmental features or factors that need to be addressed when identifying the impacts of projects and activities. Along with this Checklist Method, Stakeholder/Public Consultation also helps in the qualitative analysis of the environmental impacts.

146. Along with the qualitative analysis, the impact assessment requires Quantification or quantitative analysis. Here, Expert Judgement/Professional Judgement is adopted for the quantification of impacts which is based on the professional option of experts that have considerable experience in the areas of assessed impacts such as on water, soil, biodiversity and communities. This method has been preferred due to limited data and information availability that did not allow for predictive modelling to explore the impacts.
147. Once all the important impacts had been identified, their potential characteristic were predicted. The baseline data on physical, biological, socio-economic and cultural aspects were used to estimate the likely characteristics and parameters of impacts that includes Nature, Magnitude, Extent and Duration.
148. The nature of each predicted impact has been classified into Direct (D) and Indirect (ID). The magnitude of the impact has been classified into High (H), Medium (M) and Low (L). The extent has been classified into Site-Specific (SS), Local (L), and Regional I. Similarly, the duration of impact has been classified into Short Term (ST), Medium term (MT), and Long term (LT).
149. Impact predictions are generally made against a baseline established by the existing environment. Hence, during our field study, the baseline data were used as reference point against which the characteristics and parameters of impact related changes were analysed. Impact predictions were also made by considering the future state of the environment. This also requires professional judgement for accuracy.
150. After the impact identification and prediction method, these impacts need evaluation to assess the adversity of adverse impacts and efficiency of beneficial impacts within the project core & surrounding areas. The impacts were evaluated regarding the significance of the predicted impacts. This was done by following the *National EIA Guidelines 1993* according to which scoring for each likely parameters of the impacts was carried out and the level of significance was assessed as recommended by this guidelines.
151. The scoring of impacts as per *National EIA Guidelines 1993* is tabulated below:

**Table 4-1: Scoring of Impacts**

S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines, 1993
1.	Nature	Direct	No Scoring Required
		Indirect	
2.	Magnitude	High (H)	60
		Medium/Moderate (M)	20
		Low (L)	10
3.	Extent	Regional ( R )	60
		Local (L)	20

S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines,1993
		Site Specific (SS)	10
4.	Duration	Long Term (LT)	20
		Medium Term (MT)	10
		Short Term (ST)	5

Source: National EIA Guidelines 1993

152. Then, the significance level of Impact rated will be assessed as per the following table:

**Table 4-II: Significance of Impacts**

S. No.	Scoring as per National EIA Guidelines,1993	Level of Significance as per National EIA Guidelines,1993
1.	Less than 50	Insignificant
2.	50 to 75	Significant
3.	More than 75	Very Significant

Source: National EIA Guidelines 1993

This evaluation was done as per the professional judgement by the key expert team involved in the IEE study.

## 5 DESCRIPTION OF THE EXISTING ENVIRONMENT

### 5.1 Existing Physical Environment

#### 5.1.1 Landforms and Topography

153. It falls under Inner Terai Valleys of Nepal which are part of the Terai-Duar-savanna and grasslands ecoregion. Moreover, it belongs to Inner Central Terai i.e., Chitwan valley. Hence, the landform of this project town include hills & valleys. It lies at the foothills of the Chitwan Valley. Hence, it has fairly flat topography. The project area lies between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude.

#### 5.1.2 Geology & Soil

154. The project area comprises mainly sandstone, feldspar and Lithic fragments (comprises (6 to 35) % of Siltstone, sandstone, shale and carbonate lithics). Basically, the subsurface lithology is composed of boulder, cobble, pebble, gravel and sand with intercalation of clays as well as detritus of quaternary age.

#### 5.1.3 Land use pattern

155. There is no specific data in regard to this as the project town belongs to recently formed rural municipality. The rural municipalities were formed right after the dissolution of VDC on 10 March, 2017. Hence, the land use planning has not been done yet. Generally, the field observation shows that the agricultural land dominates the land use pattern of the project area. This is followed by forests and residential areas. Likewise, the remaining area has been used by rivers & rivulets and commercial areas.

#### 5.1.4 Water Resources

156. The project town is rich in water resources. This includes Rohini Khola, Soti Khola, Ramkot Kholsi, Badahare Kholsi, Chepari Gaira Kholsi, Girubari Khola, Betai Khola, Pathar Khola, Gaida Pakha Khola and Kuhi Khola. Among these available sources, Girubari Khola, Betai Khola and Pathar Khola shall be used for the proposed project. Similarly, people of the project town also rely on hand pumps, tube wells, kuwa & water harvesting available within their area.

#### 5.1.5 Climate

157. The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2 °C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari

#### 5.1.6 Water Quality

158. During the survey, respondents were asked in term of existing water quality in the project area. The survey revealed that out of total 4024 respondents, about 18.90% (761) feel as good quality, 78.20% (3147) feel satisfactory or moderate, and 2.90% (116) respondents feel bad in term of water quality.

159. The water treatment plants (sedimentation, 11.25m x 4.25m x 2.16m), roughening (12.60m x 7.0m x 1.32m) and slow sand filter (11.80m x 10.52 X 2.8m)) are constructed recently at two locations (one for Soti Khola system at Shivalaya and another for Deurali system, Dihidanda) which can be used in new system with some repair works has to be carried out. One chamber of slow sand filter of Sotikhola system has leakage problem that needs to be repaired. The valves has to be replaced and filter materials need to be washed and placed again. But, the sizes are inadequate for the new system. The size for the new system has to be determined

and the deficit size has been included in the new system. Hence, the existing water treatment system is not functioning properly.

160. During field survey, water samples collected from the existing sources were tested for various physical and chemical parameters. The test reports show that all parameters of water quality of the sample collected are observed to be within the permitted value of NDWQS. The result of this water quality test is shown in detail in **Annex 6**.
161. Similarly, during field study, simple bacteriological tests (Coliform P/A Test Vial) which has been developed by ENPHO to determine the presence of Coliform bacteria at the water source was carried out. This on-site bacteriological test is based on the principle developed by Manja et. al in 1982. The test is based on the readily observable formation of black precipitate iron sulfide in the test bottle, as a result of the reaction of H<sub>2</sub>S with iron. The results of the Coliform P/A Test Vial shows that the samples collected are contaminated with bacteria.
162. The main reason behind the water pollution can be the anthropogenic sources. Like, as the locations of these rivers are near the settlement area, the main source of pollution of these rivers is human interference that includes dumping wastes, littering activities, throwing sewage etc. Along with this, animal intrusion also pollutes the water bodies. Similarly, agriculture runoff can also be one of those anthropogenic sources of water pollution.

#### 5.1.7 Air Quality

163. Air pollution is caused by fugitive dust from vehicle movements, particularly over unpaved roads and other unpaved grounds, construction activities, and wind action on unpaved exposed surfaces. 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 is also very low.

#### 5.1.8 Acoustic Environment

164. The sources of noise in the project town are the construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market places. Noise levels in the project area are expected to be within permissible standards prescribed by the Ministry of Environment of the GoN.

#### 5.1.9 Landslide Susceptibility

165. The project town lies in inner terai valley hence, there is possibility of landslide. The study also shows that there are records of occurrence of occasional landslides at some locations along the transmission route of Girubari River Gravity System.

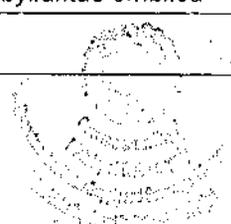
### 5.2 Existing Biological Environment

#### 5.2.1 Flora

166. Nawalpur District is blessed with natural beauty of floral diversity. The site specific vegetation types are described below. The major plant life forms available in the project area are given in **Table 5-1** below:

**Table 5-1: Plant Life Forms Found in the Project Area**

Local name	English Name	Botanical Name	Life Forms
Aank	Giant Milkweed	<i>Caloptis gigantea</i>	Shrub
Amala	Indian Gooseberry	<i>Pbyllantus emblica</i>	Tree



Local name	English Name	Botanical Name	Life Forms
Bakaino	China Berry	<i>Melia azedarach</i>	Medium Sized Shrub or Tree
Barro	Bedda Nut Tree	<i>Terminalia bellirica</i>	Tree
Bayer	Indian Plum	<i>Zizyphus mauritiana</i>	Tree
Bot Dhaiyanro	Small Flowered Crape Myrtle	<i>Lagerstroemia parviflora Roxb.</i>	Tree
Bhalayo	Charoli Nuts	<i>Busbanania latifolia</i>	Tree
Bhimsenpati Jhar	Three Leaf Isodon	<i>Isodon ternifolia</i>	Shrub
Chhatiwan	Blackboard Tree	<i>Alstonia scbolaris</i>	Tree
Dabdabe	Garuga	<i>Garuga pinnata</i>	Tree
Damaikath	Colicwood	<i>Myrsine sp.</i>	Tree
Dhatrung	Chamror	<i>Ebretia laevis</i>	Tree
Dhurseli	Indian Squirrel Tail	<i>Colebrookea oppositifolia</i>	Shrub
Dudhkhirro	Indrajao	<i>Holarrbena pubescus</i>	Tree
Harro	Chebolic Myrobalan	<i>Terminalia chebula</i>	Tree
Jamun	Black Plum	<i>Syzygium cumini</i>	Tree
Kadam	Burflower-Tree	<i>Anthocephalus cbinensis</i>	Tree
Khayer	Cutch Tree	<i>Acacia catechu</i>	Tree
Kumbhi	Slow Match Tree	<i>Careya arborea</i>	Tree
Kuro	Cristed Phillippine Violet	<i>Barleria crsitata</i>	Shrub
Kutmiro	Meda	<i>Litsea monopetala.</i>	Tree
Kyamun	Rai Jamun	<i>Cleistocalyx operculatus (Syzygium nervosum)</i>	Tree
Lahare gayo	Spinous Kino Tree	<i>Bridelia retusa</i>	Tree
Latikath	Oblong-Petal Dogwood	<i>Swida oblonga</i>	Tree
Nim	Indian lilac	<i>Azadiracbta indica</i>	Tree
Palans	Bastard Teak	<i>Butea monosperma</i>	Tree
Rajbrikshya	Golden Shower	<i>Cassia fistula</i>	Tree
Sal	Sal	<i>Shorea robusta</i>	Tree
Sandan	Chariot Tree	<i>Desmodium oojeinense</i>	Tree
Satisal	Indian Rosewood	<i>Dalbergia latifolia</i>	Tree
Saj	Indian Laurel	<i>Terminalia alata</i>	Tree
Sindure	Monkey Face Tree	<i>Mallotus pbilippensis</i>	Tree
Sisau	North Indian Rosewood	<i>Dalbergia sissoo</i>	Tree
Tantari	Karmal (Dog Teak)	<i>Dillenia p...</i>	Tree

Source: IEE Field Visit Survey, 2018

5.2.2 Fauna

167. Some species of mammals available in the project area is given below. The status of these mammals are as per IUCN & IBAT reports.

Table 5-II: Mammals in the Project Area

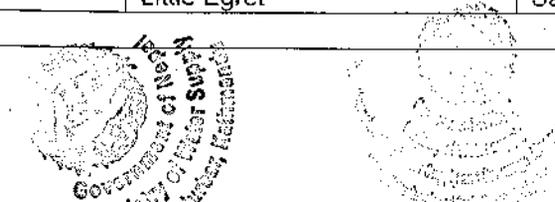
S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Herpetes auro-punctatus</i>	Small Indian Mongoose	Nyauri Musa	LC
2	<i>Macaca mulatta</i>	Rhesus Monkey	Rato Badar	LC
3	<i>Felis Chaus/Prionailurus bengalensis</i>	Jungle Cat	Ban Dhade	LC
4	<i>Funambulus Pennantii</i>	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
5	<i>Canis lupus</i>	Gray Wolf	Bwanso	LC
6	<i>Panthera pardus</i>	Common Leopard	Chituwa	VU*
7	<i>Rattus Rattus</i>	House Rat	Musa	LC
8	<i>Vulpes Bengalensis</i>	Bengal Fox	Fyauro	LC
9	<i>Canis aureus</i>	Golden Jackal	Syaal	LC
10	<i>Cynopterus sphinx</i>	Greater Short Nosed Fruit Bat	Chamera	LC

Source: Field Survey, 2018

168. According to the local people, local and migratory birds are found within the project area. However, none of these are protected or endangered. Species The commonly found species of birds are given in the table given below:

Table 5-III: List of Birds in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Aethopyga Siparaja</i>	Crimson Sun Bird	Sipraja Bungechara	LC
2	<i>Amaurornis Phoenicurus</i>	White Breasted Water Hen	Sim Kukhura	LC
3	<i>Anas penelope</i>	Eurasian Wigeon	Sindure Haans	LC
4	<i>Anas platyrhynchos</i>	Mallard	Hariyo Tauke	LC
5	<i>Anas strepera</i>	Gadwall	Khadkhade Haans	LC
6	<i>Anthracoceros albirostris</i>	Oriental Pied Hornbill	Kaalo Dhanesh	LC
7	<i>Athene Brama</i>	Spotted Owlet	Kochalgaade Latokoshero	LC
8	<i>Columba Livia</i>	Rock Dove (Blue Rock Pigeon)	Malewa	LC
9	<i>Corvus macrorhynchos</i>	Large Billed Crow	Kaalo Kaag	LC
10	<i>Corvus Splendens</i>	House Crow	Kaag	LC
11	<i>Lophura leucomelanos</i>	Kaiij Pheasant	Kaiij	LC
12	<i>Cuculus Canorus</i>	Common Cuckoo	Cuckoo Koili	LC
13	<i>Cuculus Micropterus</i>	Indian Cuckoo	Kafal Pakyo	LC
14	<i>Dendrocopus Macei</i>	Fulvous breasted Woodpecker	Kaasthakut	LC
15	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Silsile	LC
16	<i>Egretta Garzetta</i>	Little Egret	Saho Seto	LC



S. No.	Scientific Name	English Name	Local Name	Status
			Bakulla	
17	<i>Eudynamys Scolopaceus</i>	Western (Asian) Koel	Koili	LC
18	<i>Francolinus Francolinus</i>	Black Francolin	Titra	LC
19	<i>Hirundo Rustica</i>	Barn Swallow	Ghar Gauthali	LC
20	<i>Megalaima haemacephala</i>	Coppersmith Barbet	Milchara	LC
21	<i>Megalaima lineate</i>	Lineated Barbet	Kuthurke	LC
22	<i>Merops Leschenaulti</i>	Chestnut Headed Bee Eater	Katus Tauke Murali Chara	LC
23	<i>Milyus Migrans</i>	Black Kite	Kalo Chil	LC
24	<i>Passer Domesticus</i>	House Sparrow	Ghar Bhangera	LC
25	<i>Passer Montanus</i>	Eurasian Tree Sparrow	Rukh Bhangera	LC
26	<i>Psittacula cyanocephala</i>	Plum headed Parakeet	Tuisi Suga	LC
27	<i>Streptopelia orientalis</i>	Oriental Turtle Dove	Dhukur	LC
28	<i>Upupa epops</i>	Common Hoopoe	Fapre Chara	LC

Source: IEE Field Visit Survey, 2018

169. As per Wikipedia - List of Butterflies of Nepal based on the list prepared by Colin Smith in 2006, there are 690 species or sub species of butterflies in Nepal. The project area also provides habitats for a variety of butterflies, and during the walkover surveys, various types of butterflies were observed.
170. The commonly found Herpito-fauna (reptiles & amphibians) observed in the project area are shown in Table 5-IV given below:

**Table 5-IV: List of Herpito-Fauna Found in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Ptyas mucosus</i>	Rat snake	Dhaman	LC*
2	<i>Atretium Schistosum</i>	Olive Keelback Water Snake	Pani Sarpa	LC
3	<i>T. albolabris</i>	Green Pit Viper	Hariyo Sarpa	LC*
4	<i>Varanus Bengalensis</i>	Common Indian Monitor	Bhainse Gohoro	LC
5	<i>Calotes versicular</i>	Garden lizard	Chheparo	LC*
6	<i>Hemidactylus Flaviviridis</i>	House Lizard	Mausuli	LC*
7	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Common toad/Himalayan Toad	Khasre Bhyaguto	LC
8	<i>Rana cyanophylectis</i>	Stream Frog	Bhyaguto	LC*

Source: IEE Field Visit Survey, 2017

### 5.2.3 Aquatic Life

171. Similarly, the list of common fishes found in the project area is given below in Table 5-V. These species are found in the nearby water bodies of the project area that includes Girubari Khola, Betai Khola, Pathar Khola, Gaida Pakha Khola and Kuhl Khola.

**Table 5-V: List of Fishes Found in the Project Area**

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Amblyceps mangois</i>	Indian Torrent Catfish	Bokshi Machho	LC

S. No.	Scientific Name	English Name	Local Name	Status
2	<i>Amphipnous cuchia</i>	Blind Fish	Andha Bam	LC
3	<i>Barilius barna</i>	Barna Baril	Titar Kani Phaketa	LC
4	<i>Chagunius chagunio</i>	Chaguni	Jarua	LC
5	<i>Channa Gachua</i>	Dwarf Sankehead	Hile	LC
6	<i>Clarias batrachus</i>	Walking Catfish	Mangur	LC
7	<i>Clupisoma garua</i>	Garua Bachcha	Jalkapoor	LC
8	<i>Garra Annandalei</i>	Stone Roller	Chuche Buduna	LC
9	<i>Heteropneustes fossilis</i>	Stinging Catfish	Singhi	LC

Source: IEE Field Study, 2018

172. There will be no significant effects on the lives of fish species as well as fisheries by the proposed project activities.

\*Note:

(LC= Least Concern; VU= Vulnerable)

\*Note: Though some species fall under VU category, the project activities will not affect the habitat of these species as the construction area does not interfere their habitats.

LC\* are the status of the species according to IUCN Red List of Threatened Species however it is not included in IBAT report

#### 5.2.4 Protected Area

173. The study shows that no such protected areas exists within the proposed project area.

#### 5.2.5 Community Forest Area

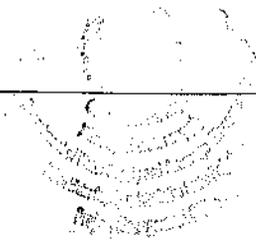
174. The field study shows that major project components does not encroach into any of the community forests of the project area. The study also shows that there is no requirement of cutting trees. There is requirement of clearing of some bushes and shrubs, only along the proposed pipeline alignment. Hence, there is no such significant effect on any of the forest areas.

### 5.3 Socio-economic and Cultural Environment

#### 5.3.1 Demographic Features

##### 5.3.1.1 Settlement pattern

175. The settlement pattern of project area is mixed type. The core bazaar area( Jhyalbas) which is located in ward no. 4 is quite dense and populated than other wards of the Hupsekot Rural Municipality. Similarly, settlement patern of the other wards (1, 2 and 3) are semi urban type and is quite scattered. However, the settlement pattern is gradually changing and rural cluster are developing as market. The rate of migration into service area from surroundings villages and from other districts is increasing during few years.



**5.3.1.2 Population Distribution**

176. The project area has been delineated in consultation with WUSC, the local community, Chairman of Rural Municipality. As per social survey, total HHs and population are 3,652 and 21,601 (permanent 19,347 and rental 2,254) respectively in 2018 with average family size of 5.3.
177. The service area comprises of merging Hupsekot VDC, Deurali VDC's ward and Dhaubadi VDCs wards. Based on the available record and census data, the growth rate of the service area is ranging from -1.2% to 1.93% based on the population between 2001 to 2011 of the VDCs. Whereas, the population growth of Nawalparasi district is 1.35% between 2001 and 2011 and is in decreasing order. Based upon these figures, the average growth rate of the service area is taken as 2.0%. The population and growth rate of Nawalparasi District and Hupsekot Rural Municipality are shown in **Table 5-VI** and **Table 5-VII**.

**Table 5-VI: Population and Growth Rate**

SN	District	2011		2001		Growth Rate
		POP	HHs	POP	HHs	
1	Nawalparasi	643508	128793	562870	98340	1.35

**Table 5-VII: Population and Growth Rate of Hupsekot Rural Municipality**

SN	NEW WARD	COMBINED VDC/MUNICIPALITY(NEW)	2011		2001		Growth Rate
			POP	HHs	POP	HHs	
1	1	Deurali (5)	2099	493	1734	323	1.93
2		Dhaubadi (2)	1944	374	1661	304	1.59
3	2	Deurali (1, 2, 9)	4392	828	3805	646	1.45
4	3	Deurali (3, 4)	4721	937	3903	675	1.92
5	4	Deurali (6, 7)	3092	542	2798	385	1
6		Dhaubadi (7)	2514	447	2177	323	1.45
7	5	Deurali (8)	1095	175	1113	138	-0.16
8	6	Dhaubadi (1, 3-6, 8, 9)	1527	240	1723	214	-1.2
9		Hupsekot (1-9)	3681	552	3464	505	0.61
<b>TOTAL</b>			<b>25065</b>	<b>4588</b>	<b>22378</b>	<b>3513</b>	<b>1.14</b>

Source: CBS, 2001 and 2011

178. As per socioeconomic survey (2018), the present population in the proposed service area is 21,601 in 3,652 HHs. Out of the total 19,347 permanent population, there are 9783 male and 9,564 females living in 3,652 HHs. The forecasted populations of the town are 22,786 and 32,168 in 2021 and 2040 respectively with growth rate of 2.00 % in permanent population. The rental population has been kept flat throughout the project period and is included in above figures
179. The population growth rate percentage of the project area is determined based upon population census 2001 AD, 2011AD of the Nawalparasi district, former Deurali VDC, Dhaubadi VDC and Hupsekot VDC and proposed service area. This has been consulted with WUSC.

**5.3.1.3 Male/Female Ratio**

180. The survey revealed that total permanent households and population in the service area are 4,024 and 21,534 respectively. Out of total population 50.65% & 49.35% are male and

female respectively. According to the survey, family size (5.37) of the service area is more than national size of 4.8 (CBS Nepal-2011). Detail information of population by sex and family size are given in the tables below:

Table 5-VIII: Distribution of Population by Sex and Family Size

S.N.	Ward #	Total Household	Male	Female	Total	Average Family Size
1	1	1215	3071	2943	6014	4.95
2	2	486	1326	1282	2608	5.37
3	3	1637	4562	4497	9059	5.53
4	4	686	1948	1905	3853	5.62
	<b>Grand Total</b>	<b>4024</b>	<b>10907</b>	<b>10627</b>	<b>21534</b>	<b>5.37</b>

Source: Socio-economic Survey 2018

Table 5-IX: Male/Female Ratio by Sex

S. N.	Sex	Total Population	Percent
1	Male	10,907	50.65
2	Female	10,627	49.35
	<b>Total</b>	<b>21,534</b>	<b>100</b>

Source: Socio-economic Survey 2018

### 5.3.2 Caste/Ethnic Groups

#### 5.3.2.1 Caste/Ethnicity

181. The composition of community by caste/ethnic is heterogeneous in nature. So, diversity of culture, custom, tradition, norms and values exists in this project area. The household survey of the sub project area has also reflected the cross section of major ethnic groups of the country.
182. The survey revealed that out of total 3652 households, Janajati/ethnic (Tamang, Danuwar, Magar, Newar, etc.) are major group comprising of 64.20% (2346) households in the service area. Similarly, Brahmin/Chhetri are the second largest group comprising of only 19% (695) of total household whereas, Dalit comprises 16.30% (595). And, the minimal percentage i.e., 0.4% (16) belong to other castes groups (Musalman, Madhesi). Details of information are presented in the table given below:

Table 5-X: Distribution of Households and Population by Ethnic Composition

S.N.	Caste/Ethnic composition	Ward #				Total	%
		1	2	3	4		
1	Brahmin/Chhetri	124	91	439	41	695	19
2	Janajati	902	206	932	306	2346	64.2
3	Dalit	185	131	259	20	595	16.3
4	Others (Musalman, Madhesi)	4	4	7	1	16	0.4
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100</b>

Source: Socio-economic Survey, 2018

#### 5.3.2.2 Religion

183. Majority of people of the project area follow Hindu Religion. Besides this, some are Buddhist and Minority belong to Christianity and Muslim.

**5.3.2.3 Language/Dialect**

184. The officially used language is Nepali. However, as the major ethnic group of Hupsekot Rural municipality is Magar, the commonly used local language is Magar and besides this Gurung & Tharu is commonly used languages.

**5.3.3 Economic Features**

**5.3.3.1 Landholding Size and Ownership**

185. This is one of the major indicators to find out the economic status of a household within the community. Hence, the land ownership status as well as land holding pattern has been recorded and assessed so far. The survey shows that about 96.3 %(3876) of household have own land where as only 3.7%(148) are landless households.

186. The survey shows that about 57.75% of households are holding 5-20 Ropani of land where as 25.35% are holding 20-50 Ropani of land so far. The details of land ownership and landholding pattern of project area is presented in the tables given below.

**Table 5-XI: Status of Land Ownership in Service Area**

S.N.	Owership of Land	Ward #				Total	%
		1	2	3	4		
1	Yes	1120	485	1588	683	3876	96.3
2	No(Landless)	95	1	49	3	148	3.7
	<b>Grand Total</b>	<b>1215</b>	<b>486</b>	<b>1637</b>	<b>686</b>	<b>4024</b>	<b>100</b>

Source: Socio-economic Survey 2018

**Table 5-XII: Land Holding Pattern in Service Area**

S.N.	Range of Land Holding	Total	%
1	<5 Ropani	250	6.21
2	5-20 Ropani	2324	57.75
3	20-50 Ropani	1020	25.35
4	>50 Ropani	430	10.69
	<b>Total</b>	<b>4024</b>	<b>100</b>

Source: Socio-economic Survey 2018

**5.3.3.2 Economy: Occupation/Employment**

187. During the course of household survey of project area, detail information data has been collected about the major occupation and economic activities of all household head. As a result of the survey as illustrated in the table below shows that, highest number of population ie 62% engaged in agriculture, whereas ramittance (20% population) is second source of occupation. Likewise, 3.9 percentage of population are engaged in labour. Similarly, about 6.6% and 6.4% of household head are dependent upon service and business respectively. Detailed information of occupation of household head has been presented in the table given below:

**Table 5-XIII: Distribution of Occupation of Households by Ward**

S.N.	Occupation	Ward #				Total	%
		1	3	2	4		
1	Agriculture	602	1,117	317	469	2,505	62.3
2	Business	69	91	29	69	258	6.4
3	Service	99	104	14	47	264	6.6
4	Industry	6	5	0	3	14	0.3
5	Remittance	358	262	108	83	811	20.2
6	Labor	78		16	15	158	3.9

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 Ministry of Water Supply  
 Singhadurbar, Kathmandu  
 Engineer

S.N.	Occupation	Ward #				Total	%
		1	3	2	4		
7	Others	3	9	2	0	14	0.3
	<b>Grand Total</b>	<b>1,215</b>	<b>1,637</b>	<b>486</b>	<b>686</b>	<b>4,024</b>	<b>100</b>

Source: Socio-economic Survey 2018

**5.3.3.3 Income and Expenditure**

**a) Monthly Income Details**

188. The survey revealed that main sources of household income of the service area are agriculture, service, remittance and wage labour, respectively. Among the total 3652 households, 45.45% (1660) have monthly income of more than Rs. (20,001-50,000) and about 30.64% (1119) have monthly income of Rs. (10,876 - 20,000). Likewise, 8.21% (300) are earning ore than Rs. 50,000. The study shows that only 4.52%(165) falls under poor category that covers the households with income less than Rs 7,500 per month. The monthly income of HHs in the service area is given in table below:

**Table 5-XIV: Income Level of Households by Ward**

S.N.	Income Level Range	Ward #				Total	%
		1	2	3	4		
1	< NRs. 7,500	64	5	70	26	165	4.52
2	NRs. 7,501-10,875	95	43	241	29	408	11.17
3	NRs. 10,876-20,000	267	200	545	107	1119	30.64
4	NRs. 20,001-50,000	665	177	630	188	1660	45.45
5	> Rs. 50,000	124	7	151	18	300	8.21
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100.00</b>

Source: Socio-economic Survey 2018

**b) Monthly Expenditure Details**

189. The socioeconomic survey has also assessed the details on the monthly expenditure of each households of the service area. The survey revealed that among 3652 households, 12.60% (460) HHs expend less than Rs. 7500 per month. Similarly, 26.83% (980) households have monthly expenditure level of the range (Rs. 7,500-10,875) whereas 44.72% (1633) of household's expenses are in the range of Rs. (10,876 to 20,000). Likewise, about 13.58% (496) of total households expend within the range (Rs 20,001-50,000) per month. Similarly only 2.27% (83) of household's expenses are more than Rs. 50,000. Hence, it is found that expenditure level is less than income level of households within the service area. So, it can be assumed that capacity for upfront cash contribution and affordability of community for regular tariff collection after implementation seems high. Details of monthly expenditure level are presented in the table below:

**Table 5-XV: Expenditure Level of Households by Ward**

S.N.	Expenses	Ward				Total	%
		1	2	3	4		
1	<Rs. 7,500	100	68	221	71	460	12.60
2	Rs. 7501-10,875	235	105	536	104	980	26.83
3	Rs. 10,876-20,000	617	212	663	141	1633	44.72
4	Rs. 20,001-50,000	203	45	196	52	496	13.58
5	>Rs. 50,000	60	2	21		83	2.27
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100</b>

Source: Socio-economic Survey 2018

### 5.3.3.4 Willingness to Pay

#### a) Monthly Water Tariff

190. The sampled survey was carried out to observe the response of the community towards the willingness to pay for monthly water tariff. As per the findings, out of total 210 sampled households, 17.10% (36) households prefer to pay monthly water tariff from Rs. 151 to 200 whereas about 4.80% (10) of sampled households prefer to pay tariff from Rs. 201-250. Similarly, none of the sampled households are willing to pay between Rs. 250-301 per month. Likewise, the survey also shows that only 1.0% (2) of HHs are willing to pay from Rs. 301 to Rs.350. Similarly, none of the sampled households are willing to pay between Rs. 351 & Rs.400 and between Rs. 401 & Rs.450. The survey also shows that 2.90% and 74.30% of 210 sampled households are observed to be willing to pay between Rs. 451 & Rs.500 and more than Rs. 500 respectively. Details information about willingness to pay monthly water Tariff is presented in the table below.

Table 5-XVI:Willingness to pay for monthly tariff by Ward

S.N.	Tariff Range	Ward				Total	%
		1	2	3	4		
1	>Rs. 500	22	9	91	34	156	74.3
2	Rs.451-500	0	6	0	0	6	2.9
3	Rs.401-450	0	0	0	0	0	0
4	Rs.351-400	0	0	0	0	0	0
5	Rs. 301-350	0	2	0	0	2	1.0
6	Rs. 250-301	0	0	0	0	0	0
7	Rs. 201-250	0	10	0	0	10	4.8
8	Rs. 151-200	0	36	0	0	36	17.1
	<b>Grand Total</b>	<b>22</b>	<b>63</b>	<b>91</b>	<b>34</b>	<b>210</b>	<b>100</b>

Source: Socio-economic Survey, 2018

#### b) Up-front Cash Contribution

191. To assess details on willingness to pay for upfront cash contribution, the detailed socioeconomic survey was carried out. As per the survey, 98.41% (3594) of total 3652 HHs showed willingness to pay 5% up-front cash contribution for the proposed project. That means only 1.59% (58) of total 3652 HHs seemed unwilling for upfront cash contribution. It shows that most of the HHs are ready to contribute required upfront cash so far. Similarly, most of the poor HHs has also shown interest towards this project and willingness for cash contribution even there is provision of free tap connection to poor household. This indicates the longing, the people of the project town have for the proposed project.

### 5.3.3.4 Affordability

192. The study has also assessed affordability of community in terms of monthly income level for expense on water supply & sanitation service. Hence, while assessing the income level of households, it has been observed that only 4.52% (165) of 3652 households falls below poverty level as per the implementation guidelines ( Income < 7500 per month). This means more than 85% of households can afford monthly water tariff and contribute for up front cash. Hence, affordability of the community has been observed as encouraging and positive towards the program.

193. The WUSC can manage provision of subsidy to poor households for regular monthly tariff assessing the economic condition and affordability

### 5.3.4 Education and Skills

#### 5.3.4.1 Literacy Rate

194. The socioeconomic survey also assessed on the education status of each household head. The survey revealed that only 9.10 % (332) of total 3652 households project area are illiterate. Whereas, just literate ratio is 47.40% (1731) and more than SLC to above MA are 13.60% (495). Details of education status of household head are presented in the table below:

Table 5-XVII: Education Status of Household Head by Ward

S.N.	Education	Ward				Total	%
		1	2	3	4		
1	Illiterate	133	18	128	53	332	9.1
2	Literate	624	196	786	125	1731	47.40
3	Primary	197	111	321	110	739	20.20
4	Secondary	52	71	186	46	355	9.7
5	SLC	146	24	137	22	329	9.0
6	Intermediate	31	6	40	9	86	2.4
7	Bachelor	25	4	25	3	57	1.6
8	MA	1	2	12		15	0.4
9	Other	6		2		8	0.2
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100</b>

Source: Socio-economic Survey 2018

195. There are various educational institutions in the project town. According to the institutional data obtained from the survey, 8 educational institutions including higher secondary schools, secondary schools as well as primary schools in service area with 2,858 people including students (Total: 2,698, Male: 1,292, Female:1,406), staffs (Total:15, Male: 8, Female:7) and teachers( Total:145, Male:58, Female:87). Almost of all educational institutions are relying on boring water, tap water and other sources. All of these educational institutions have water sealed latrines.

### 5.3.5 Health and Sanitation

#### 5.3.5.1 Health Posts/Hospitals

196. General medical facilities are available in the service area. There is one health post named Deurali Health Post available within the service area. Similarly, small pharmaceutical stores are also available in Jhyalbaas Bazaar. For further medical services, most of the people prefer going to Kawasoti Municipality (15.9 km from Hupsekot) and Narayanghat, Chitwan (41.90 km from Hupsekot).

#### 5.3.5.2 Incidence of Water-Borne Diseases and Infectious Diseases

197. The survey also collected cases of water born diseases such as diarrhea, dysentery, stomach ache and skin disease etc. within the service area. It was found that cases of mortality by water related diseases are nil. The information related to water borne and communicable disease was crossed checked by visiting hospital and health posts within the service area. According to the obtained information, about 5.13% (1221) were observed to be suffered from diarrhea where as 4.74% (1128) were observed to be suffered from dysentery. Similarly, about 5.23%(1245) were found to be suffered from other diseases such as skin, stomach pain, fever etc. In total, only 15.10 %(3594) of populations are known to be suffered from the water related diseases.

5.3.6 Community Infrastructure

5.3.6.1 Existing Drinking Water Condition

a) Source to House Connections

198. Initially, two water supply systems were there, namely Deurali and Soti Khola. After joining together, the WUSC named as Deurali Soti Khola WUSC and later on it became Deurali Hupsekot Water Supply and Sanitation Project. There are several sources used in the service area. The system was implemented on 2040 B.S. and completed on 2047 B.S. with 21 numbers of public tap stands. The system handed over to WUSC on 2055 B.S. The WUSC had received NRs 25,000.00 during endowment of the project from GoN. The system has been expanded several times depending upon the budget available at each time from GoN / or other various agencies. The system is gravity water supply system from intake/ source to WTP/ RVT and distribution system.
199. Because of the fund availability, there are several pipes laid parallel from each source to reservoirs. The water treatment plants (sedimentation, 11.25m x 4.25m x 2.16m), roughening (12.60m x 7.0m x 1.32m) and slow sand filter (11.80m x 10.52 X 2.8m)) are constructed recently at two locations ( one for Soti Khola system at Shivalaya and another for Deurali system, Dihidanda) which can be used in new system with some repair works has to be carried out. The one chamber of slow sand filter of Sotikhola system has leakage needs to be repaired. The valves have to be replaced and filter material to be washed and placed again. But the sizes are inadequate for the new system. The size for the new system has to be determined and deficit size has been included in the new system.
200. The private tap distribution has been started on 2060 B.S. At present, there are 2,337 private taps in the service area. GI pipes and HH water meter are used in the house service connection. The system supplies water for 24hour from reservoir but each house will get water only 1-2 hour in a day. The upstream house hold closes the tap and downstream house will fetch water though system supplies 24 hours in a day through service reservoir. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration.
201. The WUSC has 10 regular staffs to regulate the system. They are enjoying with provident fund, medical facilities, overtime payment, Dashain allowance, gratuity, payment against balance leave etc. The WUSC has implemented progress water tariff. Minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. They have implemented computer billing system for 5-6 years. Currently, WUSC has about NRs. 423 lakhs in their bank account. That amount is deposited in Muktinath Bank, NCC Bank, Prabhu Bank and Rastriya Banijya Bank. Currently, WUSC shall collect monthly about NRs 5-6 lakhs from water tariff bill.

**Currently used source not used in new system:**

202. **Rohini Khola/ Rohini Ghari Water Supply System:** It is located in ward no 4. The length of pipe is about 2.5 km from intake to WTP/ RVT. 90mm pipe has been used. It is reported that the water has lime content and source will drying up during summer. Hence, this source is not used for the new system.
203. **Soti Khola Water Supply System:** It is located in ward no 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 75mm and 32mm pipe have been used. The source is said to dry up during summer. Hence, this source is not used for the new system.
204. **Ramkot Kholsi Water Supply System:** It is located in ward no. 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 2 nos parallel pipe of 75mm dia. have been laid. The water

has lime content and the source is reported to dry up during summer. Hence, this source is not used for the new system.

205. **Badahare Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The water has lime content and the source is said to dry up during summer. Hence, this source is not used for the new system.
206. **Chepari Gaira Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The source is said to dry up during summer. Hence, this source is not used for the new system.

**Currently used sources used in new system**

207. **Girubari Khola Water Supply System:** It is located in ward no 5, Satakon. The length of pipe is about 8.0km from intake to WTP/ RVT (Dehidanda). The low height dam (about 2m height) having gabion and RCC cutoff wall constructed across the river to divert the water into collection chamber. 4 pipes of each 110mm dia HDPE perforated at upper half are laid to receive the water from filter/ gravel and allow into collection chamber. The collection chamber is provisioned with two number of HDPE pipes of 140mm diameter. One pipe is used and another pipe is kept spare. The transmission pipe has 90mm dia and has leakage at several locations and pipe is sliding at kholsa crossing. The pipes are very old and exposed on the ground. Currently, it is supplying about 4-5 lps water. This can be increased with proper construction of intake, addition of collection chamber and resizing the transmission pipe. The source has more than 40 lps discharge. About 26lps is withdrawn from the source in new system.
208. During inception visit, it was observed that the height of RCC wall is enough and existing gabion wall needs to repaired and added. The water is collected upstream of the low height dam. The additional collection chamber is constructed and the number of perforated pipes is increased to extract the water into new and existing collection chambers.
209. The transmission pipe is replaced by new to cater the designed discharge. The transmission pipe size has been chosen to supply water for rainy and summer season to decrease the pumping cost.
210. **Pathar Khola Water Supply System:** It is located in ward no. 4. The length of pipe is about 2.50 km from intake to WTP/ RVT (Shivalaya). The low height dam (about 2m height) having gabion and RCC wall constructed across the river to divert the water into collection chamber. 3 pipes of each 140mm dia HDPE perforated at upper half are laid to receive the water from filter and allow into collection chamber.
211. The collection chamber has 140mm dia HDPE pipes and breakdown into 90mm 90mm 63mm dia pipes to reach water into WTP/ RVT. Currently, the perforated pipe is clogged and water is directly supplied into collection chamber. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more than 12 lps discharge. About 8 lps is withdrawn from the source in new system with proper rehabilitation of intake and replacement of pipe in the transmission main.
212. During field visit, it was observed that the height of RCC wall is enough. The existing collection chamber is rehabilitated and the number of perforated pipes is increased to extract the water into collection chamber. The transmission pipe is replaced by new to cater the design discharge. The transmission pipe size is chosen slightly higher to supply more water during rainy season and summer season to decrease the pumping cost.
213. **Betai Khola Water Supply System:** It is located in ward no. 2. The length of pipe is about 2.50 km from intake to WTP/ RVT (Dehidanda). The intake is safe and need RCC cutoff wall, some gabion works for side protection. 3 pipes of each 63mm, 63mm and 75mm pipes are

laid parallel in transmission main. The pipes are exposed above ground and crossing from suspension bridge of Girubari Khola to reach water into WTP/ RVT. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more about 10 lps discharge. About 5lps is withdrawn from the source in new system with reconstruction of intake and replacement of pipe in the transmission main.

214. The survey revealed that largest numbers of household about 81.4% (3277) and 12.4% (500) are fetching water from private taps and public taps from the existing water supply system respectively. Whereas, minimum numbers of households rely on well/ spring/ stream/ rain water harvesting etc. All households reported that they use same source of water for all purposes as drinking, cooking, bathing, washing clothes, watering in kitchen garden etc. There is treatment plant in existing systems but it is not well functioning and size is not enough. Hence, the water is directly supplied into RVTs and distributed in the service area.

**b) Consumption Level**

215. The survey team has collected the information related to water consumption level during dry and wet season in the service area. Due to use of water from private/ public tap and well, spring, dhungedhara, consumption pattern and quantity do not vary between two seasons.
216. The survey revealed that the water consumption level of each household is found to be 199 liters per day and spent total time of about 42.4 minutes (per trip about 8.5 minutes) to fetching water. Similarly, the total trips for collections of water are about 7.1 trips daily. The per capita per day consumption is about 37 liters per day

**c) Operation Costs & Current Tariff**

217. There is existing piped water supply system. In addition, the communities are dependent in hand pump, tube well, kuwa, pond etc. The communities are ready to pay handsome amount for piped water for the proposed water supply and sanitation project. They are aware of the quality of supplied water and economic in comparison to the water rate of vender. Hence, the communities are ready to pay the water tariff reasonably fixed by the committee.
218. Now, they are fetching water through khola, hand pump, kuwa, where the tapped aquifer is easily susceptible to pollution and contamination. As there is hardship of water during dry season, quality of water is not good and found polluted, they are ready to pay whatever may be the tariff only they need water in sufficient quantity.
219. Currently, the WUSC is collecting minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. This shows that the community is familiar with water tariff and ready for that.

**d) Problems of the existing system**

220. The problems of the existing water supply system in Hupsekot Rural Municipality are as follows:
- The existing water treatment components requires repair and maintenance.
  - The intermittent supply system of the existing water supply system is not sufficient to meet the water demand of the increasing population;

**5.3.6.2 Existing Sanitation Situation**

**a) Sanitation Facilities**

221. The survey shows that out of total 3652 households, about 95% (3469) have water sealed latrine where as 2.3% (25) of total households have pit latrines. About 0.7% (25) have

ventilated pit latrines whereas, 0.1% (2) of total households are using cistern flush type of latrine. The table below gives the information regarding the availability of the latrine facility within the project area.

**Table 5-XVIII: Coverage of sanitary facilities**

S.N.	Type of Toilet	Ward #				Total	%
		1	2	3	4		
1	Pit Latrine	55	6	15	7	83	2.3
2	Ventilated Pit Latrine			17	8	25	0.7
3	Water Seal/Pour Flush	1149	422	1553	345	3469	95.0
4	Cistern Flush Latrines	1			1	2	0.1
5	Others	1				1	0.0
6	No Toilet	9	4	52	7	72	2.0
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100.0</b>

Source: Socio-economic Survey, 2018

**b) Drainage Facilities**

222. There is provision of storm water drain along the main market area at both side of road. The service area is located in mild slope terrain, hence, there is no water logging problem foreseen. The WUSC has not prioritized to construct storm drainage at this stage.

**c) Wastewater Management Practices**

223. Almost all households in the urban areas have their own latrine with septic tanks. Similarly, private toilet with septic tank has been constructed in some households in rural area also. Such toilet with septic tank has been constructed in more than 61% HHs of service area. Hence, it is concluded that the people of the service area are much more aware in sanitation.

**d) Solid Waste**

224. The sampled survey among 210 households revealed that 63.80% (134) are disposing domestic solid waste in the pit near to the house while none of them are disposing their wastes by private collector. Similarly, it is also observed that 36.20% (76) are disposing waste in the waste bin managed by the local authority. It was observed that the respondent have sufficient knowledge about the solid waste management issues that may affect the public health and surrounding environment. The detailed information are given in the table below:

**Table 5-XIX: Existing Solid Waste Management Practices**

S.N.	WASTE MANAGEMENT	Ward				Total	%
		1	2	3	4		
1	Pit Near to House	13	60	46	15	134	63.8
2	Private Collector	0	0	0	0	0	0
3	Waste Bin Managed by VDC/Municipality	9	3	45	19	76	36.2
4	Other	0	0	0	0	0	0
	<b>Grand Total</b>	<b>22</b>	<b>63</b>	<b>91</b>	<b>34</b>	<b>210</b>	<b>100</b>

Source: Socio-economic survey, 2018

**5.3.6.3 Irrigation**

225. There are various irrigation systems within the project town. Like, Sprinkle Irrigation System at Baseni, Irrigation System at Durlunga and various other small irrigation systems.

#### 5.3.6.4 Transportation

226. Transportation facilities are available in Hupsekot Rural Municipality. For transportation regular buses/micro/sumo services are available from New Buspark, Koteshwor and Kalanki of Kathmandu which heads to Hupsekot. It takes about 5 to 6 hours to reach Hupsekot from Kathmandu. Similarly, local bus/micro services are available from Hupsekot to Kawasoti and Narayanghat. The nearest airport is the Bharatpur airport, where daily flights from Kathmandu provide their services. The project area is about 42.2 km far from this airport. Various local transportation services are available to reach the airport.

#### 5.3.6.5 Communication and Electricity

227. There is provision of regular services of landline phone and mobile service within the project area. All kinds of modern telecommunication services are available at the reasonable price. Major national daily newspapers as well as local newspapers are available within the project town early in the morning.

228. The project area is well connected to the national electricity grid provided by National Electricity Authority (NEA) and hence, 24 hours supply of electricity is available in Hupsekot Rural Municipality.

#### 5.3.7 Water Use Right and Downstream Users

229. During the social survey, details information of existing water supply facilities of the project area has been collected. The survey revealed that the largest numbers of household about 81.4% (3277) and 12.4%(500) among 3652 total HHs are fetching water from private tap and public tap by existing water supply system respectively whereas, the least numbers of households rely on well/spring/stream/rain water harvesting etc. As per our study, the existing water supply system has been using the same sources including Girubari Khola, Pathare Khola & Betahi Khola and all these sources have been proposed for the proposed system. Hence, there is no chance of conflict regarding the water use right for the proposed system.

230. During field study, details on the downstream users have also been collected. As per the study, there exists irrigation canal 200m downstream of the proposed Girubari Sump Well site. This canal is used by the users of the proposed service area. However, from the technical point of view, no impact on the downstream users has been assessed as the existing supply system has also using the same source since years and no impact on the downstream users has been experienced and recorded either.

#### 5.3.8 Archeological Areas/Sites

231. There are local temples at various locations within the project areas as would be expected in a typical Nepali urban centre. This project town is famous for various historically important monuments and culturally important places like Rudrapur Gadhi Palace of Rudra Pratap Sen, Golpokhari Shanti Park, Historical Magar Museum, Durbar Thumka and Mayurpokhari belonging to Mythical Period

#### 5.3.9 Local Institutions

##### 5.3.9.1 Water Supply and Sanitation User's Association

232. The project has been conceptualized on community based and participatory approach. Almost one third of the project cost has to be mobilized and shared by the community. The community is responsible for operation and management of the system after handover the project. So, their active involvement in the decision-making regarding project preparation/design, implementation, operation and maintenance has to be ensured. In this regard, they are represented in project related activities. The WUSC takes necessary decision on behalf of the consumer community, mobilizes necessary fund for project implementation as up-front

cash and assists PMOWSSDO/ICG Engineer for the project implementation. The WUSC makes necessary arrangement after completion of operation and maintenance period of the project.

233. The existing Deurali Hupsekot Water Supply and Sanitation Committee consists of 11 members representing from various clusters within the service area. The executive committee consists of 9 male and 2 female members and none of female member are working in key executive post of WUSC.
234. Initially, the WUSC was formed and registered in 2054 BS in Water Resource Committee, Nawalparasi as per the Water Resource Act-2049 and Water Resource Rule 2050 and involved in management and improvement of the water supply system in Deurali Hupsekot. The existing committee, comprising of 11 members, were formed for the proposed water supply system. This WUSC is registered as per GoN rule and regulation. The Name list and position of the WUSCs are tabulated below:

Table 5-XX: Members of Deurali Hupsekot WSSP

S.No.	Name	Position
1	Mr. Mek Bahadur Pulami	Chairman
2	Mr. Fagaraj Pandey	Senior Vice Chairman
3	Mr. Guru Prasad Subedi	Vice Chairman
4	Mr. Bhim Narayan Regmi	Secretary
5	Mr. Lal Bahadur Serpuja	Vice-Secretary
6	Mr. Mani Pandey	Treasurer
7	Mr. Nabal Singh Damai	Member
8	Ms. Durga Devi Khanal	Member
9	Ms. Bhagwati Pandey	Member
10	Mr. Shyam Prasad Lamsal	Member
11	Mr. Yam Bahadur Somai	Member

Source: DEDR, 2019

235. It is intended that the WUSC will assist the PMO to implement the proposed project and it will operate and maintain Deurali Hupsekot Water Supply System to provide regular and quality drinking water to the consumers.

#### 5.3.9.2 Governmental Organizations/NGOs/CBOs

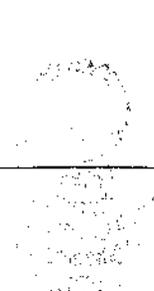
236. There are various governmental organizations that includes Nepal Telecom Branch, Nepal Electricity Authority, Hupsekot Rural Municipality Office, Police Station, Municipality Post Office etc. are available in the project town. Various financial institutions (Banks & Cooperatives) are existing in the area and providing services to the community. The existing financial institutions include Rastriya Banijya Bank, Siddhartha Bank, Global IME Bank, Mega Bank Nepal Limited, Nepal SBI Bank, Century Commercial Bank Limited, Global IME Laghubitta Bittya Sanstha Ltd., Hajurko Bachat, Womi Microfinance Bittiya Sanstha Ltd., etc. Similarly, some small cooperatives are also actively involved in the project area.

#### 5.3.9.3 Other Development Activities

237. **Industries:** There are various small scale scale industries like Ply Industries, Rice Mills, Poultry Farming, Furniture Industries, Dairy Industries etc. in the project town. Similarly, the initiation of Mining Iron Ore Industries is gaining ground as the construction of road leading to the iron reserve site has opened up. The survey also shows that there are various hotels & lodges available within the project area that have been boosting the economic activities of the project town.



238. **Agricultural Development:** The areas adjoining the project area even within the municipal boundary are good for agriculture. The survey report shows that around 62% of total population of the project area is dependent upon the agriculture products. The area is famous for its paddy production. The major crops produced here are paddy, wheat, maize, and seasonal vegetables.



Signature  
Engineer

Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

## 6 ANALYSIS OF ALTERNATIVES

### 6.1 With and Without Project Alternatives

240. Analysis of the alternatives of the proposed project is another important process of IEE study that will help to assess the feasibility of the project in regard to technical, environmental & social aspects. Primarily, this involves two alternatives that includes "Without Project" or "Do-nothing" Alternative and "With Project" Alternative.

#### 6.1.1 Without Project Alternatives or Do-nothing alternatives

241. "Without Project" or "Do-nothing" Alternative conducted study on the existing water supply system to analyze the existing condition of the project town in the absence of the proposed project.

242. The study shows that there is provision of water treatment plant in the existing water supply system. However, it requires repair due to leakage problems. Similarly, apart of public & private taps, people of the project town are dependant on well/ spring/ stream/ rain water harvesting etc. where the tapped aquifer is easily susceptible to pollution and contamination. Though there are not any evidence of impacts of untreated water on the lives of local people at present situation, there is possibility of incidence of water-borne diseases in the future due to continuous consumption of unreliable water. This results in the health hazards in the project area that will in turn expose the surroundings to environmental problems.

243. There are various but small existing water supply systems. The existing water supply systems within the project area is intermittent and is not able to meet the increasing demands of the increasing population of the project area. Insufficient water supply compels them to control the use of water for various purposes even for sanitation practices. Lack of water in the sanitation practices like flushing of water after use of latrine, bathing, washing clothes etc. will demote the domestic hygiene of the project area. This may pose outbreak of diseases like Typhoid, Cholera, Dysentery etc. This may in turn result in various environmental problems.

244. 'Without Subproject' or 'Do-Nothing' alternative toughens the chance of the occurrence of the abovementioned threats to the environment of the project area. Without subproject, people of the project area continue to consume the partially treated or untreated water from the existing water supply system. This may increase the risk of bacterial infection resulting health issues that obviously can have impact on public health, animal health and the health of the ecosystems. Similarly, 'Do-Nothing' alternative constrain the locals to be content with the intermittent water supply service.

245. This would further impede (i) further social and economic development of the municipality, (ii) fundamental right related to health as guaranteed in Constitution of Nepal (Article 35) that says that "Every citizen shall have the right of access to clean drinking water and sanitation", (iii) Goal of National Urban Water Supply & Sanitation Sector Policy, 2009 (Final Draft) to ensure the socio-economic development, improved health status and quality of life of urban populations, including the poor and marginalised, through the provision of sustainable water supply and sanitation services and protection of the environment and (iv) Nepal's delivery of its commitment to SDG 6th to increase the proportion of the population with sustainable access to safe drinking water and basic sanitation.

246. Beside this, 'Do-Nothing' alternative has one positive aspect as it may prevent the service area of the project town from the susceptibility towards the anticipated environmental impacts of this proposed project. However, for this only positive aspect, it is irrational to ignore the hardship that locals of this project town are facing for safe, reliable and potable water. Hence, 'Do-Nothing' alternative is the better option to be followed in order to get rid of the anticipated environmental impacts as these environmental impacts can either be avoided or minimized by suitable mitigation measures.

### 6.1.2 With Project Alternative

247. With Project Alternative was also analyzed by envisaging the likely benefits of the proposed project. The analysis shows that the proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. With the Subproject alternative, 21,601 (including rental 2,254) populations (2018) is benefitted from adequate, safe, reliable and potable water supply & sanitation service. In overall, the 'with subproject alternative' brings about the improved public health and living environment that will contribute to improved quality of life in the project municipality.
248. Hence, the 'with project' alternative contributes to the realization of the Updated 15-Yr Development Plan for Small Towns Water Supply & Sanitation Sector, compliance with the fundamental right related to health as guaranteed in Constitution of Nepal (Article 35), fulfillment of Goal of National Urban Water Supply & Sanitation Sector Policy, 2009 (Final Draft) and the delivery of Nepal's commitment to SDG 6.
249. Along with this, the limitation of "Without Project" Alternatives continuous water supply system, treatment system and susceptibility to water borne diseases leads to choose "With Project" Alternative. The proposed sub project is the best alternative to overcome the aforementioned threats that is likely to occur in the absence of this subproject. This "With Project" Alternative also involves analysis of alternatives to assess the most cost-effective, reliable and efficient system that can serve the design population. The alternatives regarding "With Project" Alternative is described in detail in the following section.

#### 6.1.2.1 Alternatives Relative to Planning and Design

250. As per Feasibility Study Report by PPTA team, the system design for the town has been done under two scenarios. The optimization of a proposed water supply system can be done regarding system layout, alternative technology, alternative materials and alternative source. In case of Deurali Hupsekot WSSP, the development of system alternatives has been done using alternative source and additional service areas.

##### i) Alternative Sources

251. Various alternative sources are available in the nearby vicinity to meet the overall demand for this project. The alternative I uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps and (ii) one pumping source i.e., Girubari Khola with 12 lps discharge. The alternative II uses (i) three gravity sources that includes Girubari khola, Betai khola and Pathar khola with combined discharge 39 lps; (ii) one pumping source i.e., Girubari Khola with 12 lps discharge and (iii) two sources that includes Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps ( Kuhi Khola).

##### ii) Alternative Design

252. The environmental issues can be a deciding factor to choose the best alternative design among the list of alternatives. The design of both proposed alternatives is environmentally sound. In both alternatives, the structures from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site remain the same. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m in both alternatives. The main difference between the proposed alternatives is the use of sources and additional service areas. Both alternatives are briefly discussed below:

##### a) Alternative I: Supply Water from Three Gravity Sources and One Pumping Source

253. The three gravity sources Girubari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping has 12lps discharge to be extracted for the new

water supply system. The designed discharge is brought to the proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source.

254. The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative covers 3,652 HHs of the service area.

b) Alternative II: Supply Water from Three Gravity Sources, One Pumping Source and Other Two Gravity Source in New Service Area

255. The three gravity sources Giruari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping has 12lps discharge to be extracted for the new water supply system. The designed discharge is brought to proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system is based on quality of water of the source.

256. The total estimated transmission pipeline length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. In addition, other two sources are added for Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola) service area. The area is scattered and does not match the criteria of UWSSP. The transmission main for Sankhadev settlement is about 17,610.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative cover 4,024 HHs of the service area.

### iii) Selected Alternative Scheme

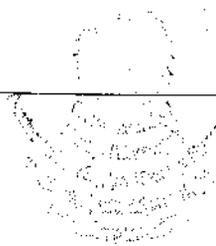
257. Environmentally, they are not much different and both of the alternatives have no such environmental issues too.

258. Depending upon the location, alternative I needs treatment plant at two location for total discharge i.e. 51lps. There is existing treatment plant for 10lps flow. New additional treatment plant is required for the remaining flow. In addition, in alternative I, one set treatment plant is constructed for Chapaha and other set will be constructed for Sankhadev. Both settlements are rural nature. Hence, based on the location, settlement pattern, sources to be used, alternative I is better than alternative II.

259. Major structures are provisioned at only two locations in alternative I, where in alternative II separate reservoirs and infrastructure are proposed at additional 9 locations. Hence, security threat is more in alternative II than in alternative I. Similarly, the transmission length in alternative II is more than alternative I and it requires additional precautions for its safety. Similarly, the additional service area of the alternative II is scattered and not match the criteria of UWSSP.

260. The financial indicator also indicates that the affordability percentage of the source alternative I and II is almost same. The affordability is in between 3%-5% in alternative I and II. Financially, in risk factor, both alternatives are similar despite of feasibility of both alternatives. Alternative I is recommended for the detailed design because of the reliability of source, transmission line route and safety precaution issues.

This indicates that the Alternative II is unfeasible option for the project town as per technical assessment. Hence, Alternative I has been selected as the best feasible alternative as this alternative is technically, environmentally and financially feasible.



## 7 ANTICIPATED ENVIRONMENTAL IMPACTS

261. The anticipated environmental impacts are mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This is then further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts are sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Post Construction (Operation & Maintenance) Phase. These impacts are discussed below in detail .

### 7.1 Beneficial Impacts

262. The development of water and sanitation facilities will have numerous beneficial impacts on individuals as well as to the entire community. Availability of clean and adequate drinking water and sanitary facility are basic human needs. Also, any development efforts aimed at improving water and sanitation needs of an area will significantly contribute towards improving the quality of life of that area. Some of the major beneficial impacts of the project are categorized below:

#### 7.1.1 Impact on Socio-economic Environment

##### 7.1.1.1 Construction Phase

##### a) Employment Generation

263. The project provides direct employment opportunities to the local people of the project area. The construction activities of the proposed project offers the locals a grand opportunity to be engaged in the proposed project activities as either skilled or non-skilled workers in terms of their proficiency. The main target group for this benefit is People relying on daily wages. The socioeconomic survey shows that minimal percentage 2.71% of total 3652 households have to rely on daily wages. Hence, this project is beneficial to this 2.71% of total households. The amount of money earned by the local people somehow increases the local economy thereby reducing the chances of seasonal migration of the local people depending upon daily wages works to survive.

264. The impact is direct in nature, local in extent, high in magnitude and short-term in duration.

##### b) Skill Enhancement

265. The construction of the project not only provides direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce. The project activities such as construction of intakes, treatment plant, valve chambers, buildings, public toilets etc. will provide transferable skills. In future, these skills can be a plus point for the locals in any relevant work as such. Hence, this benefit is targetted to the local people relying on daily wages and those to be involved in labor works of this proposed project.

266. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

##### c) Local trade and business opportunity

267. The proposed project directly adds in building business opportunity within the area. As construction work involves a lot of human resources, some grocery stores and agriculture & livestock products may gain a momentum in the vicinity of the construction site. This in turn boosts the local trade and business sector. Similarly, the procurement of locally available construction materials helps to improve the local trade and business opportunity. The main target group for this beneficial impact is local people involved in local business sector. The socioeconomic survey shows that about 5.15% (188) and only 0.30% (11) of total 3652 HHs

are involved in business and industry sector respectively. Though the target group quantity is not so significant, the enhancement of local trade & business opportunity is fruitful to these people. This can further boost the local trade & economy.

268. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

#### 7.1.1.2 Operation Phase

##### a) Improved health and hygiene

269. Deteriorating water quality and unsanitary conditions are often the causes of waterborne communicable diseases. The socioeconomic survey revealed that the cases of waterborne diseases such as diarrhoea, dysentery, stomach ache and skin disease etc. are found very few in numbers. Similarly, cases of mortality by water related diseases are nil. However, it is not certain that this condition will be well maintained in the future too. The provision of water treatment plant under the proposed project components provides solution to this uncertainty. After the implementation of the project, easy access to safe & potable water helps to reduce the chance of occurrence of water-borne communicable diseases within the project area in the future. This also helps them in bringing a decrease in medical expenses that may require to be incurred if any incidence of water borne diseases is observed.

270. Similarly, the proposed project also ensures improved hygiene of people of the project area through the provision of two public toilets and two institutional toilets as these sanitation components inculcate good sanitation behaviour of people and contributes towards betterment of sanitation facilities.

271. As this proposed project aims to provide safe, reliable & potable drinking water supply services and sanitation services through provision of public & institutional toilets to the proposed service area of the project town, the main target group of this beneficial impact are the beneficiaries or people residing in the service area of this proposed project

272. The impact is direct in nature, local in extent, high in magnitude and long-term in duration.

##### a) Increased economic opportunity

273. Reliable Water Supply System is one of the most important infrastructures for the urban development. Hence, this proposed project increases rural-town migration due to availability of better infrastructures. This boost economic level of the town. The increased economic level increases the value of the land, thereby uplifting the economic status of the local people.

274. These benefits can be maximized by ensuring regular maintenance of water supply and sanitation components and by promoting land development activities in the area. The main target group for this beneficial impact are people of the service area involved in business & industry.

275. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

##### c) Social Empowerment

276. Social Empowerment refers to the process of self empowerment enabling to overcome the sense of powerlessness in the society. This covers Gender Equity, Women's Participation and Social Inclusion. The proposed project enhances this social empowerment through various capacity building programs. Gender Inequality that is still prevailing within the project town is expected to be eliminated through the implementation of the proposed project.

277. The socioeconomic survey revealed that major household works such as cleaning of houses, washing clothes, child care, cooking, rearing animals, and fetching drinking water is considered as work of women. As per the sampled household survey carried out in 2018, 58% of female are observed to be involved in water fetching & storage and 42% of male are

observed to be involved in this activity. This indicates that women are more responsible for fetching water in comparison to the men. As the proposed project aims to provide water supply service to each household through private connection, easy access to safe & potable water through the implementation of this proposed project contributes towards their betterment. It is because the time that may be spent for fetching water is saved and utilized in various other activities. The improved water supply system contributes towards their better health and hygiene through the provision of safe & potable water. This in turn ensures the maintenance of health & hygiene of other family members as the sampled survey also shows that 60% of female are involved in taking care of family members especially children and senior citizens.

- 278. The proposed project also encourages women participation in the project related activities by enforcing at least two women in water user's committee. As per the **Table V-12** given above, two female members are appointed as general members of Deurali Hupsekot Water Supply Users & Sanitation Committee. Though they are not appointed in key positions, their involvement in WUSC boost their confidence and decision making ability. Similarly, it also provide them opportunity to actively participate in meetings, discussions and many other relevant programs.
- 279. The socioeconomic survey revealed that in comparison to men, women have much more work load regarding household activities as the gender inequality is still existing in emerging urban areas like Hupsekot Rural Municipality. Hence, women of the project area are mostly entangled within the household activities. The involvement of women members in WUSC can be the exemplary effort to encourage other women to come out of the cocoon within which they have been entwined by household activities for decades and isolated from the society. The proposed project gives emphasis on various activities like stakeholder consultations, meetings etc. to persuade women to actively participate in project related activities.
- 280. The proposed project also expects to enhance the condition of underprivileged people (Dalits & Poor People) by making them involved in various programs organized under the proposed project. Hence, this proposed project has also prioritized Social Inclusion.
- 281. The impact is indirect in nature, local in extent, low in magnitude and long-term in duration.
- 282. Overall, the Project will lead to enhanced public health and urban environment, significantly contributing to the improvement in the quality of life of Hupsekot Rural Municipality residents.
- 283. To sustain the positive outcomes, effective operation, and maintenance guided by an O&M manual that contains Water Safety Guide, among others, is essential. Continuing hands-on training of WUSC in EMP implementation particularly water quality monitoring is necessary. The summary of impact matrix of beneficial issues of the project is given in **Table 7-1**.

**Table 7-1: Summary of Impact Matrix of Beneficial Issues of the project**

Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
<b>Construction Phase</b>					
Employment Generation	D	H (60)	L (20)	ST (5)	Very Significant (85)
Skill Enhancement	ID	M (20)	L (20)	LT (20)	Very Significant (80)
Local Trade and Business	D	M (20)	L (20)	LT (20)	Very Significant (80)
<b>Operation Phase</b>					
Improved Health and Hygiene	D	H (60)	L (20)	LT (20)	Very Significant (100)
Increase Economic Opportunity	ID	M (20)	L (20)	LT (20)	Very Significant

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Beneficial Impacts	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
					(80)
Social empowerment	ID	L (10)	L (20)	LT (20)	Significant (50)

Source: National EIA Guidelines, 1993 & IEE Field Study

**Note: Scoring is done based on following;**

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**

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

**7.2 Adverse Impacts**

**7.2.1 Impact on Physical Environment**

**7.2.1.1 Design Phase**

**a) Soil Erosion & Slope Instability**

284. During design phase, there is possibility of incorporation of sloped areas due to which construction activities in such area may result in soil erosion and slope instability.

285. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

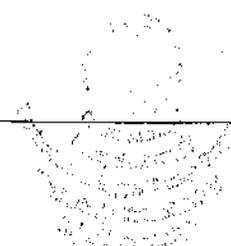
**7.2.1.2 Construction Phase**

**a) Soil Erosion & land surface disturbance**

286. Excavation and digging of trenches during construction has the potential to cause erosion and cave in thereby causing soil erosion, silt runoff and unsettling of street surfaces as the bazaar area lies on the top of the hills. Unorganized disposal of the excavated earth can disturb the street surface and decrease the value of the area where it is disposed. The activity as such will be a discomfort to the road users and inhabitants.

287. Similarly, the proposed project involves the construction of Internal Access Road that includes 500m length of gravel road. The construction activities for this may result in Slope Instability and Landslides due to site clearance and earthwork excavation works.

288. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.



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**b) Spoil Disposal & Gully Erosion**

289. Inappropriate disposal of spoils from the construction activities may result in gulying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff. This leads to destruction of vegetations, damage to agricultural lands and destruction to private property. This affects the people possessing those agricultural lands as well as the anticipated properties.
290. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

**c) Air Pollution**

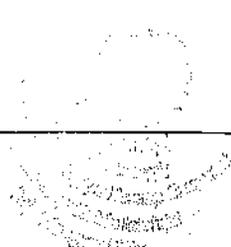
291. There can be greater impact on air quality from the inadequately managed or haphazard project activities that includes: (i) earthworks such as clearing, grubbing, excavations, and drilling especially during dry seasons; (ii) demolition works; (iii) stockpiling of natural aggregates, excavated materials and spoils; (iii) transport, loading and unloading of natural aggregates; (iv) movement of construction-associated vehicles; (v) on-site concrete mixing; (vi) burning of firewoods for cooking & heating in work and labour camps; (vii) construction of sanitation components at core bazaar area (Jhyalbaas Area) and (viii) open burning of solid waste by workers.
292. These activities may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in the air. This affects the construction workers, people residing in this area and the passers by.
293. The impact is indirect, local to regional in extent, medium in magnitude and short-term in duration.

**d) Noise Pollution**

294. Noise-emitting construction activities include earthworks, rock crushing, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, construction of sanitation components at market area and loading & unloading of coarse aggregates. The significance of noise impact is observed to be high in areas where noise-sensitive institutions such as healthcare and educational facilities are situated. This may affect the construction workers, people residing in this area and the passers by.
295. The impact is direct in nature, local in extent, high in magnitude and short-term in duration.

**e) Generation of solid waste & waste water from construction sites and worker's camp**

296. 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. Construction activities during construction of sanitation components at market areas may generate construction wastes creating nuisance and hindrance to the surroundings of busy market areas like Jhyalbaas & Julkepani area. Unmanaged solid waste & effluent from workers camp may contaminate the surroundings. This can affect the construction workers, people residing in this area and the passers by.
297. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.



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**f) Accidental Leakage or Spillage of Stored Fuel/Chemicals**

298. During construction phase, there will be requirement of storage of fuel/chemicals. During the process of storage and handling process, there is possibility of accidental leakage or spillage of stored fuel/chemicals. If not removed quickly, the spilled chemicals/fuel may be absorbed by the floor. This may lead towards the contamination of soil & water. This will affect the community living around this area.
299. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.

**g) Impact on Land Use Pattern**

300. The project components that includes WTP/RVT, Transmission Mains, Public Toilets, Office Buildings, Guard Houses and Dosing Stations require total area of 11,082.37 m<sup>2</sup> of the land of the core project area as mentioned in *Sub Section 2.6.1 a)*. This requirement establishes the need to occupy significant area of the land within the core area. This may affect the current land use pattern as the land to be used for the construction of these components could be used for other purposes like agricultural, residential etc. This effect is direct in nature.
301. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

**h) Disruption to Natural Drainage**

302. The pipe laying works along ROW of the public road within the service area of the proposed project may disrupt the existing natural drainage system as the natural drainage flow may be interfered by the construction activities that includes earthworks, backfilling, stockpiling etc. This can have significant consequences like Localised Flooding, Channel Erosion, Landslides etc affecting the residents of that area.
303. The impacts are direct in nature, local in extent, medium in magnitude and long-term in duration.

**i) Haphazard Disposal of Dismantled Debris**

304. The proposed project also involves dismantling activities for rehabilitation of existing intakes, for pipe laying works and other miscellaneous works. This will result in the generation of dismantled debris.
305. Similarly, after the completion of construction works, the temporary facilities like labour camps, stockpiling sites, temporary toilets etc. needs to be dismantled immediately. The dismantled properties in the form of debris if not properly and instantly disposed off, may create nuisance in the surroundings. This may degrade the environmental quality. This affect the people living nearby the haphazardly disposed places and even the construction workers also
306. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

**7.2.1.3 Operation Phase**

**a) Impact on the Proposed Source**

307. The three gravity sources Girubari khola, Betai khola and Pathar khola with sufficient flow is proposed for the project. It is possible that withdrawal of water from these sources may affect the normal source yield and the sources may dry out.
308. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

## 7.2.2 Impact on Biological Environment

### 7.2.2.1 Construction Phase

#### a) Impacts on Flora and Fauna

309. Major project components does not interfere any of the forest areas. Hence, there will be no such effect on the existing flora & fauna. However, there may be requirement of clearing of some bushes and shrubs along the proposed pipeline alignment i.e. from sump well to WTP sites. The study shows that there is no requirement of cutting trees. Similarly, during pipe laying works, some of the top soil may be lost. As some portion of transmission mains pass through vegetated areas, during pipe laying works, the noise of construction activities may affect the faunas living nearby these areas.
310. Haphazard site clearing, parking, and movement of construction vehicles and equipment, stockpiling results in unnecessary loss of vegetation & fauna beyond Project footprints.
311. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

#### b) Impacts on Aquatic Life

312. During construction phase, nearby water bodies may be used by the workers for their daily activities like waste disposal, sanitation activities which may pollute the river quality which in turn lead the habitat of aquatic life towards risk.
313. Similarly, the construction works for the proposed sump wells may also contaminate the quality of existing & proposed sources affecting the aquatic habitat.
314. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

### 7.2.2.2 Operation Phase

#### a) Impacts on Aquatic Life

315. The effluent produced from the filter backwashing, if discharged directly into the nearby water bodies, may pollute the water bodies endangering the existence of aquatic lives. This impact will be more troublesome during dry season when the flow will be less and self cleansing capacity of the river will be less.
316. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

## 7.2.3 Impact on Chemical Environment

### 7.2.3.1 Construction Phase

#### a) Impacts on Water Quality of the nearby rivers

317. During construction phase, there is high possibility of water resources to be polluted due to the chance of disposal of solid wastes by the workers and poor sanitation behavior of the workers. This lowers the water quality of these water bodies. Polluted water bodies is detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.
318. Similarly, some sections of the distribution pipeline cross water bodies, exposing these resources to risks of pollution caused by poorly managed construction sediments, wastes and hazardous substances.
319. The impact is direct in nature, local to regional in extent, medium in magnitude and short-term in duration.

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### 7.2.3.2 Operation Phase

#### a) Impacts on Quality of Water Stored in Reservoir

320. Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins reducing the water quality within the reservoir and this may cause serious illness in humans consuming water. The algal growth may also impart earthy taste & odor.
321. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

#### b) Impacts on Water Bodies

322. The sedimentation tank requires periodic cleaning through periodic removal of sediments settled down (Raw Sludge) at the bottom of the tank. The removed sediments or sludge from sedimentation tank needs to be properly disposed. But, there is high chance of disposal of sludge directly into the nearby water bodies. This will degrade the water quality of the river. This impact will be more troublesome during dry season when the flow will be less and self cleansing capacity of the river will be less.
323. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

### 7.2.4 Impact on Socio-economic Environment

#### 7.2.4.1 Design Phase

##### a) Structural Instability

324. Hupsekot Rural Municipality belongs to hilly region as it falls under inner terai region, hence, it is prone to natural calamities like Soil Erosion, Landslides etc.. Though this impact is experienced during operation phase, this needs to be considered during design phase so that such possibility of structural failure can be reduced to greater extent through safe design of earthquake resistant structures.
325. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

##### b) Health & Safety of Community & Workers

326. During design phase, if the project components are designed without focusing on the health & safety of community & workers, it will have greater impact on socio-economic environment.
327. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

##### c) Damage to the existing utilities

328. During construction phase, if the proposed pipelines interfere any of the existing utilities, there is greater possibility of those utilities getting damaged. This will create discomfort to the people getting facilities from those damaged utilities. Similarly, there is also possibility of some fraud people to take advantage of this impact and may make false claims for damaged utilities. Though this problem appears during construction phase, its mitigation measure should be considered during design phase. Hence, this impact is categorized for design phase.
329. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

#### 7.2.4.2 Construction Phase

##### a) Community health and safety hazards

330. Overall, communities will be exposed to cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc. Communicable and transmittable diseases may potentially be brought into the community by construction workers.
331. The impact is indirect in nature, local in extent, medium in magnitude and short-term in duration.

##### b) Workers' Health and Safety Hazards

332. Workers will also be exposed to the cross-cutting threats of the impacts above during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures, pose additional threats to the health and safety of construction workers. Construction workers may also be potentially exposed to communicable and transmittable diseases in the community and the workforce.
333. The impact is indirect in nature, local in extent, medium in magnitude and short-term in duration.

##### c) Traffic Congestion

334. The project town may be susceptible to traffic congestion during transportation of construction materials, construction of public toilets & institutional toilets at proposed market areas as well as pipeline laying works that may provide discomfort to the passer-by & shopkeepers and may obstruct the daily activities of the people living in that area.
335. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

##### d) Public Protests

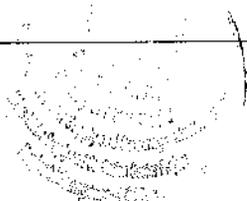
336. Due to the interruption of traffic flow, there is high chance of protests by the local people. This may interrupt the construction activities of the proposed project.
337. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

##### e) Disruption to Local Vendor's Business

338. The construction works during pipe laying activities may disrupt local vendor's business as the construction activities may obstruct their customers to have easy & direct access to their shops. This may hamper their daily business activities.
339. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

##### f) Mobilization of Child Labor

340. During construction period, there is possibility of mobilization of child labor by the contractors which is against the Child Labor Prohibition Act,2000 as child labor deprives children off their childhood and their right to education,health, safety and moral development.



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Bishadurbar, Kathmandu

341. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

**g) Impacts on the Sustainability of Works**

342. The terai region of Nepal suffers great loss from the flooding events yearly. Though various flash flood events were recorded in Parasi district in the past, the project district, Nawalpur, despite of being neighbourood district, there are no such events recorded so far. But, we cannot ignore the fact that there is possibility of occurrence of such events in the future within the project town also. If this occurs during the construction period of the proposed project, this may unsustain the project by causing damage to the unsettled/unfinished/uncured and/or completed structures affecting their structural integrity.

343. The impact is direct in nature, local in extent, high in magnitude and short-term in duration.

**h) Damage to the existing utilities**

344. During the construction phase, while excavating the earth, there is possibility of the existing water supply distribution pipelines getting damaged in a few places particularly in the market area. Similarly, the existing paved as well as unpaved road will also get damaged. This will obviously create discomfort to the people and people will be deprived of regular facilities they are getting from the existing utilities.

345. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration

**i) Impact on Downstream Users**

346. During construction works at Intake/Sump Well site, there is chance of contamination of the source water due to carelessness in the sanitation behaviour of workers. The consumption of contaminated water may affect the health of the downstream users. However, this impact is not so significant as the socioeconomic study shows that no consumptive use of water has been noticed upto 4 km downstream of the proposed rivers and there is no human settlement area near the proposed sources. This water quality if found altered due to project activities, this can be recovered after certain duration through self purification capacity of the rivers. Nevertheless, as a preventive measure, some mitigation measures can be adopted.

347. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration

**7.2.4.3 OperationPhase**

**a) Occupational Health and Safety Hazards**

348. Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards.

349. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.

**b) Delivery of Unsafe Water**

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

351. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

**c) Impacts on Consumer's Health**

- 352. Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins causing serious illness in humans consuming water. The algal growth may also impart earthy taste & odor which may create dismay to the consumers and this may result in customer complaints that may lead to protests also.
- 353. The impact is direct in nature, local in extent, medium in magnitude and short-term in duration.

**d) Impacts on Downstream Users**

- 354. Consumption of water from the proposed source may lessen the quantity of water at the downstream due to which downstream users may be deprived of sufficient quantity of water they have been drawing regularly from the proposed source
- 355. The impact is direct in nature, local in extent, medium in magnitude and long-term in duration.

**e) Non-sustainability of Services or Completed Works**

- 356. The critical impacts induced by climate change droughts are changes in temperature, precipitation, which has varying consequences not only on the ecosystem but on the availability of water supplies. Climate change alters the hydrological characteristics of surface water due to changes in seasonal rainfall pattern and surface run-off. This affects stream, river and reservoir yields and recharge of ground water aquifers making water resources difficult to manage and use. Good engineering design accommodates the climate change issues. This issue arises and results in disruption in smooth operation of water supply service with the Operator's disregard of these impacts. Along with this, the unsustainability of the completed works may result due to the issues that include; (i) Lack of Sense of ownership & Affordability; (ii) Lack of Institutional Capacity & Policy Compliance and (iii) Ineffectiveness in O & M.
- 357. The impact is indirect in nature, local in extent, medium in magnitude and long-term in duration.
- 358. The summary of impact matrix of adverse issues of the project is given in **Table 7-II**.

**Table 7-II: Summary of Impact Matrix of Adverse Issues of the Proposed Project**

Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
<b>A) Impacts on Physical Environment</b>					
<b>i) Design Phase</b>					
Soil Erosion & Slope Instability	D	M (20)	L (20)	ST (5)	Insignificant (45)
<b>ii) Construction Phase</b>					
Soil Erosion & Land Surface Disturbances	D	M (20)	L (20)	ST (5)	Insignificant (45)
Spoil Disposal & Gully Erosion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Air Pollution	ID	M (20)	R (60)	ST (5)	Very Significant (85)
Noise Pollution	D	H (60)	L (20)	ST (5)	Very Significant (85)



Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Generation of Solid Waste & Wastewater from the construction site & worker's camp	D	M (20)	L (20)	LT (20)	Significant (60)
Accidental Leakage or Spillage of Stored Fuel/Chemicals	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Land Use Pattern	D	M (20)	L (20)	LT (20)	Significant (60)
Disruption to Natural Drainage,	D	M (20)	L (20)	LT (20)	Significant (60)
Haphazard Disposal of Dismantled Debris	D	M (20)	L (20)	LT (20)	Significant (60)
<b>iii) Operation Phase</b>					
Impact on the proposed source	D	M (20)	L (20)	LT (20)	Significant (60)
<b>B) Impacts on Biological Environment</b>					
<b>i) Construction Phase</b>					
Impacts on Flora and Fauna	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impacts on Aquatic Life	D	M (20)	L (20)	ST (5)	Insignificant (45)
<b>ii) Operation Phase</b>					
Impacts on the proposed source	D	M (20)	L (20)	LT (20)	Significant (60)
<b>C) Impacts on Chemical Environment</b>					
<b>i) Construction Phase</b>					
Impacts on Water Quality of the nearby rivers	D	M (20)	R (60)	ST (5)	Very Significant (85)
<b>ii) Operation Phase</b>					
Impacts on Quality of Water Stored in Reservoir	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Water Bodies	D	M (20)	L (20)	LT (20)	Significant (60)
<b>D) Impacts on Socio-economic Environment</b>					
<b>i) Design Phase</b>					
Structural Instability	ID	M (20)	L (20)	LT (20)	Significant (60)
Health & Safety of Community & Workers	ID	M (20)	L (20)	LT (20)	Significant (60)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
<b>ii) Construction Phase</b>					



Adverse Issues	Impact Rating				
	Nature	Magnitude	Extent	Duration	Rating
Community Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Workers' Health and Safety Hazards	ID	M (20)	L (20)	ST (5)	Insignificant (45)
Traffic Congestion	D	M (20)	L (20)	ST (5)	Insignificant (45)
Public Protests	D	M (20)	L (20)	ST (5)	Insignificant (45)
Disruption to local vendor's business	D	M (20)	L (20)	ST (5)	Insignificant (45)
Mobilization of Child Labor	ID	M (20)	L (20)	LT (20)	Significant (60)
Impacts on the sustainability of works	D	H (60)	L (20)	ST (5)	Very significant (85)
Damage to the existing facilities	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Downstream Users	D	M (20)	L (20)	ST (5)	Insignificant (45)
<b>iii) Operation Phase</b>					
Occupational Health & Safety Hazards	ID	M (20)	L (20)	LT (20)	Significant (60)
Delivery of Unsafe Water	D	M (20)	L (20)	LT (20)	Significant (60)
Impact on Consumer's Health	D	M (20)	L (20)	ST (5)	Insignificant (45)
Impact on Downstream Users	D	M (20)	L (20)	LT (20)	Significant (60)
Non-Sustainability of Services or Completed Works	ID	M (20)	L (20)	LT (20)	Significant (60)

Source: National EIA Guidelines, 1993 & IEE Study 2018/019

**Note: Scoring is done based on following;**

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.**

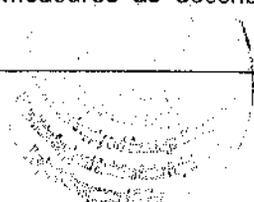
**Significance of Impact**

Total Score: More than 75 : Very Significant

50-75 : Significant

Less than 50 : Insignificant

359. The above given table shows that *Air Pollution, Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of works* are evaluated as "Very Significant". However, if the mitigation measures as described above for these impacts are properly



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adopted, these impacts would not be problematic for the project implementation. Apart of this, the **Table 7-II** also shows that some impacts are insignificant & some are significant. The best way to mitigate these impacts is to follow the proposed mitigation measures and to implement them effectively.

### 7.3 Significance of Impact Rating

360. The significance of impact rating as shown in the above table is that it helps to determine the severity of each anticipated adverse impact. This helps to recommend suitable mitigation measures for each impact on the basis of its severity. This also helps to allocate the budget required for the implementation of the proposed mitigation measures. As per the severity, the impact rating act as a means of making policy and legislations more rational, predictable and scientific. This also helps to establish close and routine monitoring requirement or criteria for mitigating impacts. This also helps to recommend the needs of adopting special checklists, if required. Moreover, this assists to advance towards the environmental auditing during construction and operation phase, as one of the most important environmental management tools. This auditing enables to assess the actual environmental impacts, accuracy of prediction, effectiveness of environmental mitigation measures adopted and functioning of monitoring mechanism.

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Ministry of Water Supply  
Kathmandu

## 8 MITIGATION & AUGMENTATION MEASURES

361. The anticipated environmental impacts discussed in the earlier chapter are either adverse or beneficial. To sustain the project, it is necessary to deal with these impacts properly. Hence, the IEE study has proposed the effective measures to cope with these impacts. Here, the proposed measures includes a) Mitigation Measures to reduce or eliminate or avoid the adverse impacts and b) Augmentation Measures to maximize the beneficial impacts. Both of these mitigation as well as augmentation measures are discussed below in detail.

### 8.1 Mitigation Measures

#### 8.1.1 Impact on Physical Environment

##### 8.1.1.1 Design Phase

##### a) Soil Erosion & Slope Instability

362. The mitigation measures can be as follows;

- Incorporate measures and sites for handling excessive spoil materials
- Incorporate drainage plan in final design

PMO, RPMO & DSMC are the main responsible bodies to carry out the above mentioned mitigation measures.

##### 8.1.1.2 Construction Phase

##### a) Soil Erosion & Land Surface Disturbance

363. During construction, precautionary measures will be taken, proper backfilling trenches will be done, and the excavated soil will be protected against erosion. The key elements to proper backfilling include:

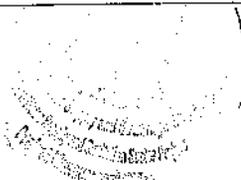
- Protecting the foundation from damage during backfilling
- Using the right backfill materials
- Compacting the backfill
- Final finishing the subgrade to ensure that water drains away from the foundation

364. During construction of Internal Access Road, Soil Erosion & Land Surface Disturbances will be mitigated through appropriate slope protection measures like Gabion Wall Construction, Retaining Wall Construction and Construction of Drainage Structures.

##### b) Spoil Disposal & Gully Erosion

365. Spoils should be safely disposed by adopting the following mitigation measures:

- Follow Spoil Management Plan as included in **Annex 2E**.
- Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible.
- Appropriate disposal of Spoil at the designated places.
- Spoils should not be disposed on natural drainage paths, canals and other infrastructures.
- Provision of toe walls and retaining walls to protect the erosion of disposed spoils.
- Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.



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Engineer



**c) Air Pollution**

366. The measures to mitigate the impacts on air quality include: (i) confining earthworks according to an Excavation Segmentation Plan that should be part of EMP; (ii) watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary; (iii) if re-surfacing of disturbed roads cannot be done immediately, spreading of crushed gravel over backfilled surfaces; (iv) during demolition, watering of exterior surfaces, unpaved ground in the immediate vicinity and demolition debris; (v) signage at active work sites in populated areas; (vi) requiring trucks delivering aggregates and cement to have tarpaulin cover; (vii) limiting speed of construction vehicles in access roads and work sites to a maximum of 30 kph; (viii) Strict Prohibition of open burning of solid waste by the workers; (ix) Use of Vehicles complying with NVMES, 2069 B.S., (x) Use of equipments/machinery that comply with the applicable ambient air quality standards of GoN i.e., NAAQS, 2012, (xi) Use of Diesel Generators complying with National Diesel Generator Emission Standard, 2012, (xii) Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market areas, school, hospital at least once in a month during dry working season (Jan-June) using medium Fine Particulate Sampler i.e., Envirotech APM 550 and comparing the determined pollutants with NAAQS, 2012 and (xiii) Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking by the concerned contractor.

**d) Noise Pollution**

367. The measures to mitigate the noise pollution include: (i) using equipment that emits the least noise, well-maintained and with efficient mufflers; (ii) restricting noisy activities to daytime and overtime work to avoid using noisy equipment; (iii) Prohibit the use of pressure horn by transportation vehicles; (iv) Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements; (v) limit engine idling to a maximum of 5 minutes; (vi) spread out the schedule of material, spoil and waste transport; (vii) minimizing drop heights when loading and unloading coarse aggregates; (viii) Avoid noise generating activities like excavation works, dismantling for excavation works, loading & unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any, (ix) Regular inspection & maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES, 2069 B.S., (x) Regular inspection & maintenance to ensure the use of equipments/machinery that comply with applicable ambient noise standards of GoN i.e., National Noise Standard Guidelines, 2012 and (xi) Regular inspection & maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard, 2012.

**e) Generation of solid waste & waste water from construction sites and worker's camp**

368. The mitigation measures for this impact is briefly described below:

**Construction Wastes:**

- Adopt 3R (Reduce, Reuse & Recycle) concept
- Ensure storage areas are secure, safe and weatherproof.
- Management of Reusable Wastes
- Sale of Recyclable wastes to Scrap Dealer
- Dumping of Biodegradable waste into a big pit and leaving them covered for a time period. During this, they will get decomposed and can be used as compost for agricultural purpose.

- If composting is not possible, dispose off these bio degradable solid wastes to the waste bins managed by the municipality.
- 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.

**Solid Wastes & Effluent from Worker's Camp:**

- Adopt Segregation of Solid Waste (3R Concept) on the basis of being biodegradable or non-biodegradable. It is because non-biodegradable wastes cannot be broken down by decomposers and their disposal poses a big problem.
- Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting. If this method is not possible then, the wastes shall be either managed by handing over these wastes to the municipality waste collectors 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 & Strict Prohibition on use of plastic materials to minimize the quantity of plastic wastes as much as possible.
- Construct the temporary latrines with temporary soak pits & septic tanks within the camp site 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 can not be ensured at the time of construction.

**f) Accidental Leakage or Spillage of Stored Fuel/Chemicals**

369. The mitigation measures for this impact is briefly described below:

- Provision of well managed storage site.
- Organize awareness programs for the workers responsible for handling fuel/chemicals prior to the construction works.
- Supervise workers to handle fuel/chemicals properly during transportation as well as storage.
- Use of spill kit materials to block flow and prevent discharge to nearby water bodies
- Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store.

Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical.

**g) Impact on Land Use Pattern**

370. The mitigation measures for this impact are as follows:

- 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.

**h) Disruption to Natural Drainage**

371. The mitigation measures for this impact are as follows:

- Avoid the natural drainage pathways for pipe laying works.
- Stockpile the excavated materials at safe but nearby place.
- Restore natural drainage system if the drainage system during construction is blocked.

**i) Haphazard Disposal of Dismantled Debris**

372. The mitigation measures for this impact are as follows:

- Immediate Response on handling of dismantled debris.
- Segregation of Dismantled Debris
- Adopt 3R (Reduce, Reuse & Recycle) concept to minimize the quantity of dismantled debris.
- Sale of Recyclable Wastes to Scrap Dealer
- Final Disposal of Dismantled Debris by handing over to the waste collector of the municipality.

**8.1.1.3 Operation Phase**

**a) Impact on Proposed Source**

373. The study shows that as per the design report, the quantity of water to be tapped from the proposed sources will be 26 lps from Girubari Khola, 5 lps from Betai Khola and 8 lps from Pathar Khola. Hence, the combined tapped discharge of these three rivers is 39lps. Similarly, there is also provision of pumping system from Girubari Khola with 11lps tapped discharge, to be extracted for the proposed system. Hence, it indicates that the proposed project is designed with safe yield and the tapped discharge does not exceed the source yield. This means withdrawal of water from the proposed sources does not have impact on the source yield. However, regular source yield monitoring is recommended.

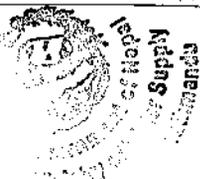
**8.1.2 Impact on Biological Environment**

**8.1.2.1 Construction Phase**

**a) Impacts on Flora & Fauna**

374. The mitigation measures for this impact include:

- (i) Replace the excavated top soil to its original position after the completion of pipe laying works
- (ii) Re-vegetating disturbed slopes and grounds, as applicable
- (iii) Awareness programs regarding the 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.
- (iv) Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned above in 8.1.1 d).



- (v) Regular Monitoring by DSMC & PMO

**b) Impacts on Aquatic Life**

375. The mitigation measures for this impact include: i) Strict Monitoring on the daily activities of workers ; ii) Provision of temporary but well equipped toilets; iii) Restriction to workers from fishing; iv) Adopt measures mentioned for the solid waste management

**8.1.2.2 Operation Phase**

**a) Impacts on Aquatic Life**

376. The mitigation measures for this impact are as follows:

- Direct discharge of the effluent to the water bodies will be discouraged through strict monitoring to the operators involved.
- Proper Implementation of Water Safety Plan (WSP).

**8.1.3 Impact on Chemical Environment**

**8.1.3.1 Construction Phase**

**a) Impacts on Water Quality of the nearby rivers**

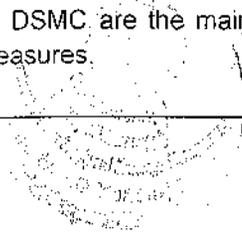
377. Mitigation measures will be implemented before the construction stage to prevent the contamination of drinking water source and other environmental receptors from worker camps and construction site toilets septage. The mitigation measures includes;

- Appropriate design of septage disposal will minimize the risks to public health. The appropriate 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. Septage disposal pit will be designed and constructed in accordance with international best practice and acceptable standards. This will include, locating disposal pits at least 300 m away from the nearest dwelling and 30 m downstream of the drinking water source, The pits will be installed on relatively flat land with no more than 8 % slope and sites selected for locating of pits will not be where food crops are grown. The sanitation condition will be maintained to deter flies, mosquito breeding, free from odor. The septage disposal site will ensure no disturbances to nearby community forests.

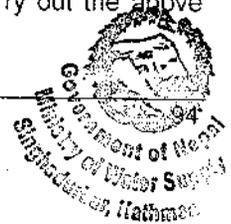
In additional to this, other mitigation measures include

- disposing of spoils or excess soils as free filling materials as soon as possible;
- locating temporary storage areas on flat grounds and away from main surface drainage routes;
- shielding temporary storage areas with sandbags
- implementing eco-friendly solid and hazardous waste management, disposing them promptly;
- providing adequate water supply and sanitation facilities at work sites.
- Strict supervision on the behaviour of workers for the waste management as well as sanitation behaviour and monitoring the workers to manage the wastes properly.
- Strict & Regular Monitoring during pipe laying works

The contractor, RMO & DSMC are the main responsible bodies to carry out the above mentioned mitigation measures.



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Engineer



### 8.1.3.2 Operation Phase

#### a) Impacts on Quality of Water Stored in Reservoir

378. The mitigation measures for this impact are as follows:

- Proper Implementation of Water Safety Plan (WSP).
- Removing of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.

#### b) Impact on Water Bodies

379. The mitigation measures for this impact are as follows:

- As the raw sludge contains inert materials, it cannot be used for agricultural purposes. Hence, Disposal of Raw Sludge is the ultimate choice to manage the raw sludge of the sedimentation tank. This is adopted through burial method in which the sludge is placed in a hole or trench and covered with at least 12 inches of earth. Here, the government barren land is chosen for the burial of the sludge.
- Avoid direct discharge of the raw sludge to the water bodies through strict monitoring to the operators involved.
- Proper Implementation of Water Safety Plan (WSP).

### 8.1.4 Impact on Socio-economic Environment

#### 8.1.4.1 Design Phase

##### a) Structural Instability

380. This impact can be mitigated through proper design of earthquake resistant structures as per standard and code of practice.

PMO, RPMO & DSMC are the main responsible bodies for the adoption of this mitigation measure.

##### b) Health & Safety of Community & Workers

381. The mitigation measure for this impact involves;

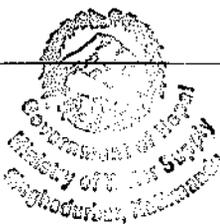
- Training on Community Health & Safety Hazards by DSMC by disseminating information in regard to this through training manuals, photographs & documents related to safety.
- PMO, RPMO & DSMC are the main responsible bodies to carry out the above mentioned mitigation measures.

##### c) Damage to the existing facilities

382. The mitigation measures for this impact includes;

- Coordinate with the concerned agencies to finalize the pipe network layout to avoid damage to the existing utilities.
- Design & Locate pipelines away from existing utilities during design as far as possible.
- Provide budget for restoration/replacement of damaged utilities.
- Photographs of construction sites before and after the construction to avoid the false claims.
- Prompt Reinstatement of paved as well as unpaved roads after completion of excavation works for pipe laying.

383. PMO, RPMO & DSMC/Contractor are the main responsible bodies to carry out the above mentioned mitigation measures.



#### 8.1.4.2 Construction Phase

##### a) Community Health & Safety Hazards

384. The mitigation measures for this impact include: (i) Contractor's implementation of EMP; (ii) adequate lighting, temporary fence, reflecting barriers and signage at active work sites; (iii) Contractor's preparedness in emergency response; and (iv) Adequate dissemination of GRM and Contractor's observance/implementation of GRM.

##### b) Worker's Health & Safety Hazards

385. The mitigation measures for this impact include:

- Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangement that includes minimum requirements for various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards & signage, Use of PPE, Accident & Emergency Response and Monitoring & Reporting.
- Comply Labor Act 2074 B.S.(2017 A.D.) of GoN
- Train all site personnel regarding environmental health and safety as like in design phase by DSMC & Contractors
- Provide Personal Protective Equipment (PPEs) to workers that includes protective clothing, helmets, goggles and other equipment designed to protect the wearer's body from injury or infection and ensure their effective usage
- Require workers to wear high visibility clothes
- Exclude public from worksites
- Maintain accident reports and records.
- Make first aid kits readily available
- Maintain hygienic accommodation in work camps
- Ensure uncontaminated water for drinking, cooking, and washing.
- Assure clean eating areas
- Make sure sanitation facilities are readily available
- Provide adequate space and light to the camp site
- Adequate supply of potable water to the camps and good sanitation within camps
- Provide medical insurance coverage for workers
- Provide orientation for guest visitors
- Ensure that visitors do not enter hazard areas unescorted;
- Ensure moving equipment is outfitted with audible backup alarms;
- Hearing protection equipment enforced in noisy environment
- Chemical and Material storage areas need to be marked clearly
- Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.

##### c) Traffic Congestion

386. This impact cannot be avoided because the structure of the bazaar area is very congested. However, this impact can be mitigated as follows;

- The trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately followed by compaction right after completion of pipe laying works.

  
\_\_\_\_\_  
Engineer



- Installation of signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions.
- Provision of access to shops and residences using simple wooden walkways.
- Provision of alternative way for vehicular movement and pedestrians if possible
- Follow the Traffic Management Plan especially at Bazaar Areas especially Jhyaalbaas Area, the sample of which has been attached in **Annex 2D**.

387. The contractor and DSMC are the main responsible bodies to mitigate this impact.

**d) Public Protests**

388. The mitigation measures for this impact include:

- Public Consultation should be carried out at various stages & locations as per requirement.
- Implement Grievance Redress Mechanism
- Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly

**e) Disruption to Local Vendor's Business**

389. The mitigation measures for this impact includes;

- Avoid delay in construction works and Prompt Backfilling accompanied by compaction right after completion of pipe laying works without delay.
- Provision of temporary access to the shops through provision of planks.

390. Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly.

**f) Mobilization of Child Labor**

391. The mitigation measures for this impact includes;

- As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor, should be made.
- During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules & Regulations, 2006, should be made.

**g) Impacts on Sustainability of Works**

392. The mitigation measures for this impact includes;

- After every flooding event if any, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately as a mitigation measure for this impact.
- Avoid construction works during monsoons
- Prepare & Follow Emergency Preparedness and Response Plan

**h) Damage to the existing facilities**

393. If during construction phase, the problem regarding damage to the existing facilities arises, then it will be the fault of the people involved in construction works as this problem will be considered during design phase. This problem will arise only if no carefulness is adopted by



the workers and if the pipeline layout drawings prepared during design phase is not strictly followed. Hence, the mitigation measure for this impact is to monitor construction workers to adopt carefulness and to strictly follow the layout drawings.

394. Similarly, during excavation works, damage to the existing paved as well as unpaved roads can be mitigated through reinstatement works. The proposed project has provision for this reinstatement works and the cost estimate has been included in the the detailed design cost estimate of this proposed project.

**i) Damage to the existing facilities**

395. The mitigation measures for this impact include:

- Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.
- Provision of temporary latrines with basic facilities

**8.1.4.3 Operation Phase**

**a) Occupational Health and Safety Hazards**

396. The mitigation measures for this impact include; (i) installation of clear, visible signage in premises on safety measures; and (ii) setting up a mechanism for the quick response to spills of chemical and hazardous substances.

**b) Delivery of Unsafe Water**

397. The mitigation measures for this impact include; (i) ensuring the correct operation of water treatment plant to meet satisfactory water quality; (ii) providing safe storage for chemicals; (iii) ventilation of Housed dosing unit for chlorine and (iv) train operators for handling chlorine for which Chlorine Use Guidelines as included in **Annex 5** will be followed.

**c) Impacts on Consumer's Health**

398. The mitigation measures for this impact are as follows:

- Regular Monitoring by the WUSC
- Removing of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.
- Monitoring & Proper Implementation of WSP.

**d) Impacts on Downstream Users**

399. Regarding this project, there will be no issue of insufficiency of water for the downstream users. It is because as per design report, the proposed sources that includes Girubari Khola, Betai Khola and Pathar Khola has more than 40 lps, 12 lps and 10 lps flow. The design report also explains that the quantity of water to be tapped from the proposed sources are 26 lps from Girubari Khola, 5 lps from Betai Khola and 8 lps from Pathar Khola. Hence, the combined tapped discharge of these three rivers is 39 lps. Similarly, there is also provision of pumping system from Girubari Khola with 11 lps tapped discharge, to be extracted for the proposed system. This shows that the tapped discharge from the proposed sources indicates safe yield and does not exceed the source yield. However, during operation, regular source yield monitoring is recommended.



**e) Non-sustainability of Services or Completed Works**

400. The following mitigation measures to avoid non-sustainability of services or completed works are as follows:

- Monitoring of source yield closely by WUSC especially in the dry season and during a climate-change-induced drought.
- After every seismic event, execution of engineering investigations of completed works and implementation of the necessary corrective actions without delay by WUSC. This involves preparation of Emergency Preparedness & Response Plan and Immediate Implementation of this plan after any seismic event.
- Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs
- Carrying out regular O & M with effectiveness through proper management of WUSC

**8.2 Augmentation Measures**

**8.2.1 Impact on Socio-economic Environment**

**8.2.1.1 Construction Phase**

**a) Employment Generation**

401. The augmentation measures for this beneficial impact will be as follows:

- 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.

**b) Skill Enhancement**

402. The augmentation measures for this beneficial impact will be as follows:

- 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

**c) Local trade and business opportunity.**

403. The augmentation measures for this beneficial impact will be as follows:

- 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.
- Provision of regular hands on training to the workers during the project construction period

**8.2.1.2 Operation Phase**

**a) Improved health and hygiene**

404. The augmentation measures for this beneficial impact will be as follows:

- Regular maintenance of the water supply components should be done so that the project operates smoothly and the benefits are intact.

b) **Increased economic opportunity**

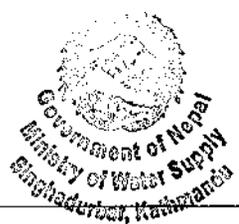
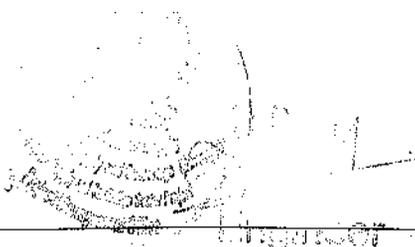
405. The augmentation measures for this beneficial impact will be as follows:

- Ensuring regular maintenance of the water supply components
- Promoting land development activities in the area.

c) **Social Empowerment**

406. The augmentation measures for this beneficial impact will be as follows:

- Priority will also be given to vulnerable groups in WUSC along with female groups.
- Involving underprivileged group of people especially women and poor people in various capacity building programs and project related community meetings



## 9 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

### 9.1 Stakeholder Consultation & Participation

407. Stakeholder consultation and participation is an essential process in project preparation. It is also a part of information disclosure. It will disseminate as well as collect information regarding the proposed project by involving various stakeholders that includes Key Informant Interviews, Stakeholders Meetings, Focus Group Discussions (FGD), On-site discussions with WUSC and Random Field Interviews. The checklists & findings of FGD has been included in **Annex 4** and the minutes of various meetings undertaken during field visits are also included in **Annex 3**.
408. This stakeholder consultation requires the analysis of stakeholders through the identification of the potential participants and the methods of their involvement. The table given below illustrates the concerned stakeholders of the proposed project that will have either primary or secondary.

**Table 9-I: Stakeholder Analysis & Mapping**

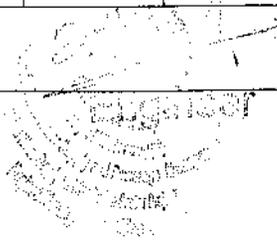
S.N.	Stakeholders	Primary <sup>4</sup>	Secondary <sup>5</sup>	Stakeholders' Role or Interest	Level of Influence
1.	Government of Nepal		✓	It is the executive and central body.	High
2.	Ministry of Water Supply (MoWS)		✓	It is the lead executive agency and is responsible for policy coordination, guidance, review of programs, ensuring that all aspects relevant to achieve the objective of the project and for sustaining the improved services to the required level.	High
3.	ADB		✓	It supports government of Nepal in improving and enhancing the existing water supply service.	Medium
4.	Department of Water Supply and Sewerage Management		✓	It is the lead-implementing agency and works under MoWS with the responsibility of planning, implementation, operation, repair & maintenance of the proposed project.	High

<sup>4</sup> Primary Stakeholders: people, groups and institutions affected positively (beneficiaries) or negatively (involuntarily resettled) by the proposed program

<sup>5</sup> Secondary Stakeholders: people, groups and institutions that are important intermediaries in the program delivery process



S.N.	Stakeholders	Primary <sup>4</sup>	Secondary <sup>5</sup>	Stakeholders 'Role or Interest	Level of Influence
5.	DWASH-CC		✓	It provides coordination in the preparation of local WASH plans with inputs from WASH sector actors and in the effective implementation of the local plans related to this project.	High
5.	UWSSP, PMO, RPMO & DRTAC		✓	It is responsible in successfully implementing the proposed project activities, establishing coordination with ADB & GoN and managing day to day activities at municipality levels.	High
6.	Town Development Fund (TDF)		✓	TDF will assist the project municipality conducting financial appraisal of the proposed project and advice DWSSM on its outcomes prior to the start of detailed design process.	High
7.	Local Bodies (DCC, Municipality & Ward Offices)		✓	It is responsible for establishing coordination with the implementing agency. Here, the municipality will be also responsible for policy compliance as well as for addressing public protests if any.	High
10	DSMC		✓	It will assist PMO & RPMO in the overall planning, implementation and monitoring of the project activities regarding environmental & social safeguards requirements.	High
11	WUSC		✓	It is responsible for O & M of the proposed project. It will also facilitate the concerned authorities during planning as well as construction phase.	High
12	Households (Families & Individuals)	✓		They are the main beneficiaries and are benefitted by the provision of adequate, safe, reliable & potable drinking	Low



S.N.	Stakeholders	Primary <sup>4</sup>	Secondary <sup>5</sup>	Stakeholders 'Role or Interest	Level of Influence
13	Contractors, Petty Contractors		✓	It is responsible for bidding for works and involved in the construction of the proposed project.	Low
14	Local Technicians/Plumbers	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
15	Unemployed Locals	✓		This group will be benefitted through the increased work opportunities related to construction works of the proposed project.	Low
16	Local Vendors	✓		This group will be affected by the pipe laying works at core bazaar areas interfering the access to their shops.	Low
17	Schools & Hospitals	✓		This group will be benefitted by the provision of enhanced and improved continuous water supply service.	Low
18	Commercial Establishments (Private Enterprises)	✓		This group is benefitted by enhancing their business by supplying items to the construction employees regarding their basic needs.	Low
19	Scrap Vendors	✓		This group will be benefitted by purchasing the recyclable wastes generated from the construction activities as well as from workers camp.	Low
20	Local Leaders		✓	This group will facilitate to establish strong coordination between the local people and the project authority.	High

Source: IEE Field Study 2018 and DEDR & DDR, 2019

409. The consultations were carried out on various dates at various locations within the project town for the discussion of the anticipated environmental impacts that may result from the construction of the proposed project. The consultations were undertaken with key stakeholders that includes Local Bodies, Beneficiaries Households, TDF, PMO, RPMO & DRTAC in line with ADB's requirements pertaining to environment and social considerations. The key concerns of the people related to the project that includes Implementation of the safeguard policy framework in field level, Delivering the information regarding safeguard activities to local level, Willingness to pay, 5% Upfront cash collection and People's

participation in project implementation were discussed. These consultations helped identify the needs/concerns of the communities related to the project and priorities of relevant stakeholders. The details of Major public consultation are tabulated below:

**Table 9-II: Major Public Consultations**

SN	Meeting Date	Fecilitator	Venue & Participation	Topic of Disemination/Discussion	Concerns/ Issues Raised	Recommended Measures
1.	21 June 2019	Rural Municipality Chairman, Project Director and Deputy Director Design engineer and Safeguard specialist	Mayur Community forest meeting hall Male: Female:	Estimated budget for project, 5% Up front cash collection from local user and overall project modality, Environmental Issues	Cost sharng from local and project implementation	All seems positive towards project implementation
2.	October 18, 2018	Social safeguard Specialist	Ward no.11 office, Ward chairman of 9, 6 and 11 WUSC chairman, local and existing water supply staff. Male: 9 all male Female: 0	Discussion about the required land for project and its approval no objection letter from ward office, public land in busy places and its approval site verification government/ municipality land and no objection letter.	Does Municipality and ward office have right to grant permission for any project related activities & issues	Ward chairman of different ward and municipality has recommended that all responsibility/guarantee permission letter shall be provided by Municipality.

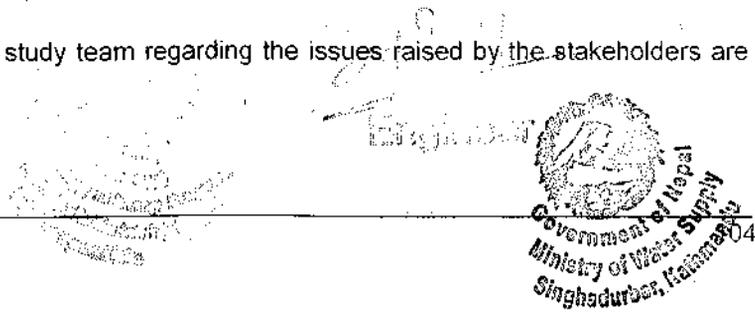
Source: DDR, 2019

**9.2 Major issues raised by the stakeholders**

410. The major issues raised by the key stakeholders during stakeholder consultation are as follows:

- i. The project town is in need of safe, reliable and potable water.
- ii. Water shortage problem is acute in the project town during dry season.
- iii. People of the project town are relying on intermittent water supply system. The downstream users have to wait for the upstream users to close their taps, to fetch water daily.
- iv. The operating system of the existing water supply system is good but the supply system is intermittent and there is no proper design of distribution system.
- v. The project should give priority to local people while hiring for the construction activities.
- vi. The project must consider solid waste management issues during construction period.
- vii. The proposed project must address the socioeconomic problems that may be observed during the construction period at market area like Traffic Congestion, Disruption to Local Vendors, Discomfort to the passerby, Noise Pollution, Air Pollution, Damage to the existing facilities etc.

411. The assurance made by the study team regarding the issues raised by the stakeholders are as follows:



- i. The proposed project will address the water shortage problem faced by people of the proposed town.
  - ii. The proposed project has provision of continuous water supply system. This will end the irregular and intermittent water supply service.
  - iii. The proposed project with water treatment facility and continuous water supply provision if effectively implemented will address the needs of Hupsekot Rural municipality residents regarding safe, reliable and potable water supply service.
  - iv. The socioeconomic problems raised by the stakeholders have been considered in IEE study, and this IEE study has proposed mitigation measures for these issues. Accordingly, for ensuring the effective implementation of the proposed mitigation measures, EMP will be prepared and the contractor will be enforced to consider, follow and implement the EMP during construction.
  - v. The solid waste management plan will be prepared, followed and implemented during the construction phase of the project that includes Spoil Management & Disposal, Disposal of Dismantled Debris and Management of Construction Wastes & Solid Wastes.
  - vi. Local workers of Hupsekot Rural Municipality will be given priority for employment to the extent possible however, it requires strong coordination with the concerned contractor.
412. The project envisages that stakeholder consultations will continue during the project period and concerned stakeholders will be invited and encouraged to participate. The PMO and ICG will maintain rapport with WUSC and the municipality. PMO, ICG, Contractors, and WUSC will be open to the public to discuss concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances. The stakeholder consultations in future will be as follows.
- i. During construction, if change in design, alignment, and location, the PMO and ICG will hold at least one public consultation to solicit perceived impacts, issues, concerns and recommendations from affected communities;
  - ii. Before construction, the PMO and ICG will conduct an information, education and communication (IEC) campaign among the affected communities about 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. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will be set up at strategic locations. The grievance redresses procedure and details will be posted at the offices of the ICG, WUSC and VDC;
  - 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. PMO and ICG will be responsible for designing and implementing such aspects on the ground.
413. The GoN-approved IEE Report (in English), will be available at the offices of PMO, ICG, and WUSC for the perusal of interested parties. Copies may be made available upon formal request. IEE and environmental monitoring reports will be disclosed on the ADB's and UWSSSP website. This will be also as a part of Information Disclosure.



## 10 GRIEVANCE REDRESS MECHANISM

### 10.1 Purpose of the Grievance Redress Mechanism

414. A project-specific grievance redress mechanism (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. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and (ii) their concerns are effectively and timely addressed.
415. A common GRM will be in place for social, environmental or any other grievances related to the project. The GRM will provide an accessible forum for receiving and facilitating resolution of affected persons' grievances related to the project. Project will publish the sample grievance registration form on its website, and publish it in local language, at the hoarding board of each of the participating WUA or municipalities' office. Every grievance shall be registered with careful documentation of process adopted for each of the grievance handled, as explained below. The environmental and social safeguards officer (ESO/SSO) at the project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Safeguards Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at the local level.
416. A municipal-level public awareness campaign will be conducted on a regular basis as shown in the Communication & Public Participation Plan (CAPP) of the project to ensure awareness on the project and its GRM. The social and environmental safeguards experts of the PMQAC and 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.

### 10.2 Proposed Set-Up

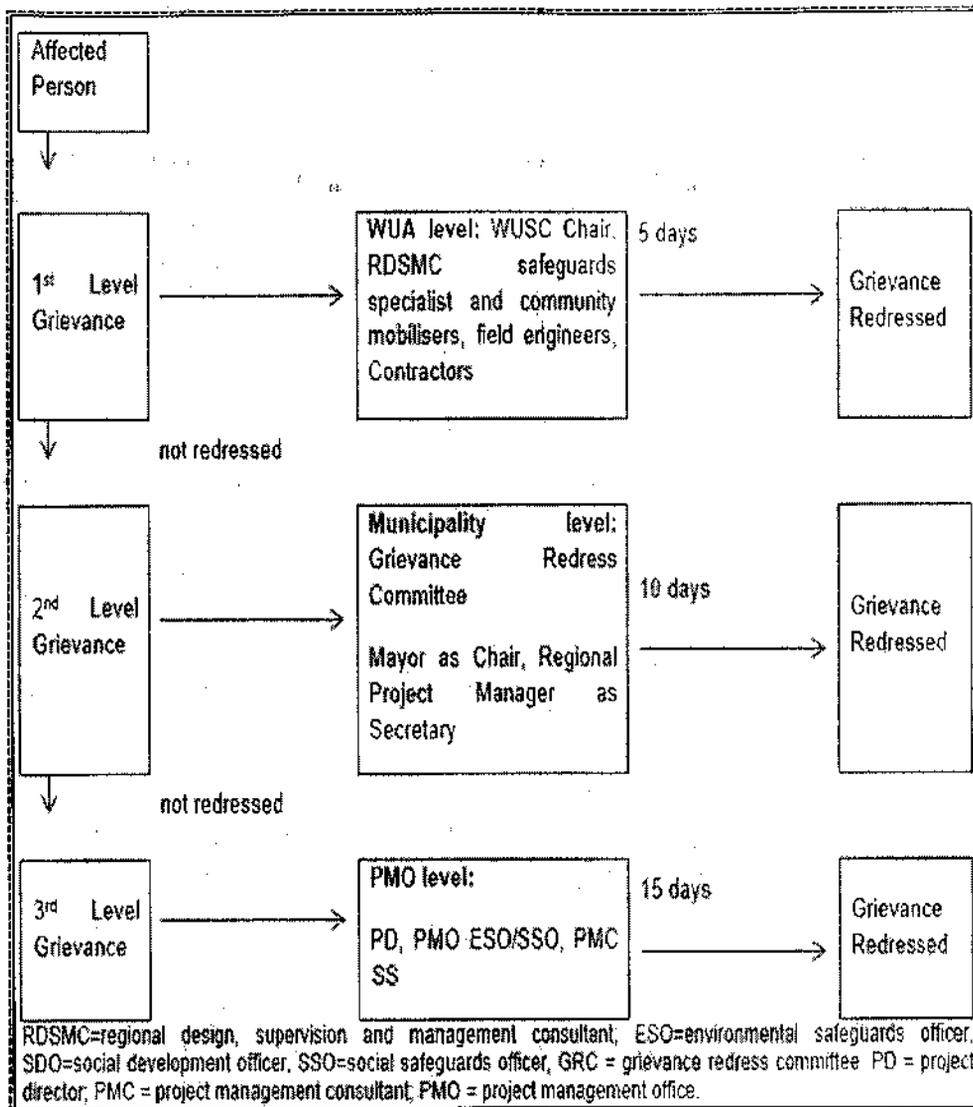
417. A Grievance Redress Committee (GRC) will be formed at the Municipality level, comprising the Mayor as Chairperson of GRC, and Regional Project Manager RPMO as Secretary. The GRC members will comprise of (1) WUSC Secretary; (2) RPMO Engineer; (3) RPMO social /environmental (as relevant) officer, (4) representative of affected persons, (5) RDSMC's safeguards specialist (social/environment as relevant), (6) a representative of reputable and relevant CBO/SHG/organization working in the project area as invitee<sup>6</sup>, 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 APs, civil society and eminent citizens can be invited as observers in GRC meetings.
418. 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 APs, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUA or local bodies; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

<sup>6</sup> If the complaints are related with IP/Dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities shall be involved.

419. The GRM procedure is depicted in **Figure 10-1**, 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:
- (i) **First Level of GRM (WUA level):** The first-level, which is also the most accessible and immediate venue for quick resolution of grievances will be the contractors, RDSMC field engineers and RPMO supervision personnel, who will immediately inform the WUA. Any person with a grievance related to the project works can contact UWSSP to file a complaint. The municipal-level field office of the RPMO, in WUA's building, will document the complaint within 24 hours of receipt of complaint in the field, and WUA or local bodies will immediately address and resolve the issue at field-level with the contractor, supervision personnel of RPMO and RDSMC field engineers within 5 days of receipt of a complaint/grievance. The assigned RDSMC's Social Mobilizer will be responsible to fully document: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved. 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 M 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. The PMO's Project Director (PD) will have special meeting to find solutions. Decision has to be made within 15 days of receipt of complaint by WUA. The PD will sign off on all grievances received by the PMO. The concerned Deputy Project Director (DPD) and environmental and social safeguards officers (ESO & 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.
420. The complainant will have to fill up Grievance Redress Form as shown in **Annex 2C** to file the complaint. All paperwork (details of grievances) needs to be completed by the WUA member secretary assisted by RDSMC and circulated to the WUA Chairperson and members. At Municipality level, the RPMO Engineer will be responsible for circulation of grievances to the Regional Project Manager, DWSS, Mayor and other GRC members, prior to the scheduled meetings. The RPMO's Engineer will be responsible for follow-through of all escalated grievances. All decisions taken by the GRC will be communicated to the APs by the RPMO's SSO.
421. 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.
422. 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 (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in any of the official languages of ADB's developing member countries (DMCs). The ADB's AM 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.

423. This GRM procedure is briefly depicted in **Figure 10-1** given below:



**Figure 10-1: Grievance Redress Mechanism (Formal Approach)**

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 Engineer



## 11 ENVIRONMENTAL MANAGEMENT PLAN

### 11.1 Introduction

424. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impacts of the project and in enhancing beneficial impacts; and (iv) ensuring that safety recommendations are complied with.
425. A copy of EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. 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.

### 11.2 Institutional Arrangement

#### 11.2.1 Executing and implementing agencies

426. The Ministry of Water Supply (MoWS) will be the executing agency with the responsibility of project execution delegated to the Department of Water Supply and Sewerage Management (DWSSM). Water User's and Sanitation Committees of the proposed towns are the implementing agencies.

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

##### a) Prior to construction:

- MoWS will depute a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- MoWS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS will be responsible for reviewing and approval of the IEE Report.
- DWSSM will review the IEE Report prepared by the Design, Supervision and Management Consultant Team's Environmental Safeguard Expert (DSMC-ESE) before forwarding this to MoWS.
- DWSSM will prepare the ToRs for the Environmental Safeguard Specialist that will engage to support PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the projects.

#### 11.2.2 Safeguard Implementation Arrangement

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

- (i) review and confirm existing IEEs and EMPs are updated based on detailed designs, that new IEEs/EMPs prepared by DSMCs comply to exclusion criteria and project selection guidelines as stipulated in the EARF and government rules; and recommend for approval to PMO;



- (ii) approve subproject environmental category;
- (iii) ensure that EMPs are included in bidding documents and civil works contracts;
- (iv) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by RPMOs and contractors;
- (v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- (vi) facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- (vii) supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
- (viii) review, monitor and evaluate effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken;
- (ix) consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
- (x) ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public;
- (xi) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner as per the IEEs;
- (xii) undertake regular review of safeguards-related loan covenants, and the compliance during program implementation; and
- (xiii) organize periodic capacity building and training programs on safeguards for project stakeholders, PMO, RPMOs, and WUAs.

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

- (i) prepare new IEEs and EMPs in accordance with the EARF and government rules;
- (ii) include EMPs in bidding documents and civil works contracts;
- (iii) comply with all government rules and regulations;
- (iv) take necessary action for obtaining rights of way;
- (v) oversee implementation of EMPs including environmental monitoring by contractors;
- (vi) take corrective actions when necessary to ensure no environmental impacts;
- (vii) submit monthly environmental monitoring reports to PMO; and
- (viii) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

430. **PMQAC:** The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas:

- (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.

431. **Regional DSMCs:**The RDSMCs will provide support to the RPMOs 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 RPMOs with the overall planning, implementation and monitoring of each subproject during all stages of implementation including adherence to all environmental and social safeguards requirements
- (iv) work closely with the Water User and Sanitation Committees (WUSCs), respective project municipalities and communities to ensure that the citizens are aware of project benefits and their responsibilities
- (v) ensure that poor and vulnerable groups will benefit equally from the project.

432.

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

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

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

435. **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 in accordance with both ADB and government requirements as specified below:

- (i) Environmental Safeguards
  - (a) sensitization on ADB's policies and guidelines on environment;
  - (b) introduction to environment and environmental considerations in water supply and wastewater projects;
  - (c) review of IEEs and integration into the project detailed design;
  - (d) improved coordination within nodal departments; and
  - (e) monitoring and reporting system. The contractors will be required to conduct environmental awareness programs and orientation to the workers prior to deployment to work sites.
- (ii) Social Safeguards
  - (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
  - (b) introduction to social safeguards assessment and document requirements;
  - (c) Consultation and participations requirements;
  - (d) Project GRM and ADB's Accountability Mechanism (AM); and



(e) monitoring and reporting system.

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

Before construction

- Facilitate public consultation and participation, information dissemination and social preparation.
- Provide available data to DSMC-ESS during the conduct of IEE
- Assist in securing the tree-cutting permit and/or registration of water source.
- Participate in the capacity development program.

During construction

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

During operation

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

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



27/10/19  
Engineer

11.3 Environmental Management Plan (EMP) Matrix

438. The table given below gives brief details on the Environmental Management plan (EMP) matrix that is to be implemented for the project implementation.

Table 11-i: Environmental Management Plan Matrix

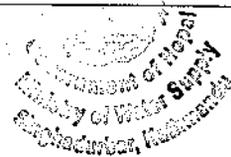
Field	Impacts	Mitigations / Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
<b>A. Beneficial Impacts</b>					
1. Impact on Socioeconomic Environment					
a) Construction Phase					
Income	Employment Generation	<ul style="list-style-type: none"> <li>Recommend contractor to employ local people by giving high priority to women and under privileged group as far as possible.</li> <li>Ensure equity in provision of wages to both male as well as female labors.</li> </ul>	DSMC, Contractor & WUSC	<ul style="list-style-type: none"> <li>Contractors' Workers Log Book</li> <li>Number of local labors employed in project</li> <li>Consultant Monitoring Report</li> </ul>	During Project Construction
Personal Skills	Skill Enhancement	<ul style="list-style-type: none"> <li>Making a proper work plan and code of conduct during the construction period.</li> <li>Provision of regular hands on training to the workers during the project construction period</li> </ul>	DSMC, Contractor & WUSC	<ul style="list-style-type: none"> <li>Contractors Work Schedule</li> <li>Hands on training Photographs</li> <li>WUSC monitoring report</li> </ul>	During Project Construction
Local trade & business opportunity	Enhanced Local trade & business opportunity	<ul style="list-style-type: none"> <li>Recommend contractor to give priority to the local products during procurement of construction of materials.</li> <li>Priority also will be given to local services like grocery stores, tea shops, hotel &amp; restaurants etc. during the entire construction period.</li> </ul>	DSMC, Contractor & WUSC	<ul style="list-style-type: none"> <li>Contractors' Materials Log Book</li> <li>WUSC monitoring report</li> </ul>	During Project Construction
b) Operation Phase					



Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Health & Hygiene	Improved health & hygiene	Regular maintenance of the water supply components should be done so that the project operates smoothly and the benefits are intact	WUSC	<ul style="list-style-type: none"> <li>Number of Site Inspection Visits</li> <li>Photographs of Inspection Visits</li> <li>WUSC monitoring report</li> </ul>	During O & M
Economy	Increase Economic Opportunity	<ul style="list-style-type: none"> <li>Ensuring regular maintenance of the water supply components</li> <li>Promoting urbanization through proper land development activities in the area</li> </ul>	<ul style="list-style-type: none"> <li>WUSC</li> <li>Local Authority</li> </ul>	<ul style="list-style-type: none"> <li>Number of Site Inspection Visits</li> <li>State of property &amp; legally planned land use</li> </ul>	During O & M
Social Status	Social Empowerment	<ul style="list-style-type: none"> <li>Prioritize the vulnerable groups in WUSC along with female groups.</li> <li>Involving underprivileged group of people especially women and poor people in various capacity building programs and project related community meetings</li> </ul>	WUSC	<ul style="list-style-type: none"> <li>Number of members of WUSC</li> <li>Photographs of capacity building programs</li> <li>Minutes of meetings</li> </ul>	O & M phase
<b>B. Adverse Impacts</b>					
<b>1. Impacts on Physical Environment</b>					
b) Design Phase					
Topography/Geology	Soil Erosion & Slope Instability	<ul style="list-style-type: none"> <li>Incorporate measures and sites for handling excessive spoil materials</li> <li>Incorporate drainage plan in final design</li> </ul>	PMO, RPMO, & DSMC	<ul style="list-style-type: none"> <li>Spoil Management Plan</li> <li>Final Design Documents</li> </ul>	Before award of contract, During Detailed Design Phase
b) Construction Phase					
Topography/Geology	Erosion & Land Surface Disturbance	<ul style="list-style-type: none"> <li>Protecting the foundation from damage during backfilling</li> <li>Using the right backfill materials</li> <li>Compacting the backfills</li> <li>Final finishing the subgrade to ensure that</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Contractor's Work Log Book</li> <li>Field Photographs</li> </ul>	Weekly During Construction Phase Basis

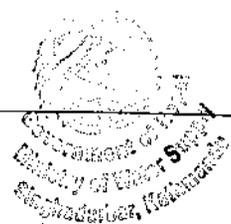
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Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Spoil Management	Inappropriate disposal of spoils from construction activities may result in gullying and erosion of spoil tips especially when it is combined with unmanaged surface water runoff.	<ul style="list-style-type: none"> <li>water drains away from the foundation</li> <li>Follow Spoil Management Plan as included in Annex 2E.</li> <li>Use of excess Spoil or Soil for filling depressed areas or borrow pits wherever possible.</li> <li>Appropriate disposal of Spoil at the designated places.</li> <li>Spoils should not be disposed on natural drainage paths, canals and other infrastructures.</li> <li>Provision of toe walls and retaining walls to protect the erosion of disposed spoils.</li> <li>Provision of proper drainage, vegetation and adequate protection against erosion at the Spoil Disposal Site.</li> <li>Strict Prohibition of open burning of solid waste</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Spoil Management Plan</li> <li>Photographs</li> <li>Location of Spoil Disposal Site</li> <li>Photographs</li> </ul>	During Construction Phase
				<ul style="list-style-type: none"> <li>Written Notice/Code of Conduct</li> <li>Visible Emission</li> <li>Number of complaints from sensitive receptors</li> <li>Number of water Tank/s</li> <li>Capacity of Water Tank/s</li> <li>Daily/Weekly Frequency/Timing of water spraying</li> <li>Locations of water spraying</li> <li>Contractors' Materials Log Book of Materials</li> </ul>	During award of contract Weekly Basis During Construction Weekly Basis During Construction
Air Quality	Air Pollution	<ul style="list-style-type: none"> <li>Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily, as necessary.</li> <li>if re-surfacing of disturbed roads cannot be</li> </ul>	Contractor		Weekly Basis During Construction



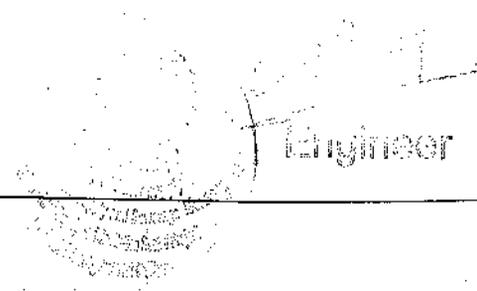
Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
 Air-Quality	Air Pollution	done immediately, spreading of crushed gravel over backfilled surfaces;	Contractor	to ensure the use of crushed gravel Photographs	Monthly Basis
		<ul style="list-style-type: none"> <li>Conduct Air Quality Test for dust nuisance (PM 10 and PM 2.5) at key settlement and market areas, school, hospital at least once in a month during dry working season (Jan-June) using medium Fine Particulate Sampler. i.e., Envirotech APM 550 and comparing the determined pollutants with NAAQS, 2012</li> </ul>		<ul style="list-style-type: none"> <li>Air Quality Test Reports</li> <li>Photographs</li> </ul>	
 Air-Quality	Air Pollution	<ul style="list-style-type: none"> <li>Use of Construction/ Transportation Vehicles complying with NVMES,2069</li> </ul>	Contractor	Number and Types of vehicles in use Certified documents for each vehicle used	Weekly During Construction
		<ul style="list-style-type: none"> <li>Regular inspection &amp; maintenance of construction/transportation vehicles</li> </ul>	Consultant & Contractor	Contractor's/Consultant's log book of vehicle inspection & maintenance	Daily Basis/During Construction
		<ul style="list-style-type: none"> <li>Supply of clean cooking fuel to workers instead of allowing them to use firewood for cooking.</li> </ul>	Contractor	Written Notice/Code of Conduct Type of fuel supplied to camps Quantity of fuel supplied to camps	Prior to construction Weekly Basis during construction Weekly Basis during construction
		<ul style="list-style-type: none"> <li>Restricting noisy activities to daytime and overtime work to avoid using noisy equipment;</li> <li>Prohibit the use of pressure horn by transportation vehicles</li> </ul>	Contractor	Written Notice	Prior to construction
Acoustic Environment	Noise Pollution		Contractor	Written Notice/Code of Conduct Number of vehicles fitted with pressure horns Maximum Sound Level of Pressure Horn	Daily Basis

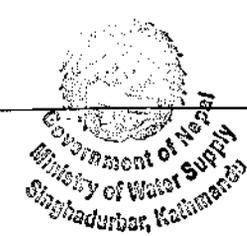
Field	Impacts	Mitigations/Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> <li>Conduct noise level test once a year during peak construction stage at location near school, hospital and settlements.</li> <li>Avoid noise generating activities like excavation works, dismantling for excavation works, loading &amp; unloading of construction materials, noise of material transportation vehicles etc. during school time and at hospital area if any.</li> <li>Regular inspection &amp; maintenance of construction/transportation vehicles to ensure the use of Vehicles complying with NVMES,2069 B.S.</li> <li>Regular inspection &amp; maintenance to ensure the use of equipment/machinery that comply with applicable emission standards of GoN i.e., National Noise Standard Guidelines, 2012</li> <li>Regular inspection &amp; maintenance to ensure the use of Diesel Generators complying with National Diesel Generator Emission Standard,2012</li> </ul>	<p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<ul style="list-style-type: none"> <li>Noise Level Test Reports</li> <li>Photographs</li> <li>Number of complaints from the sensitive receptors</li> <li>Contractor's Work Schedule</li> <li>Contractor's/Consultant's log book of vehicle inspection &amp; maintenance</li> <li>Contractor's/Consultant's log book of equipment/machinery inspection &amp; maintenance</li> <li>Contractor's/Consultant's log book of equipment/machinery inspection &amp; maintenance</li> </ul>	<p>Yearly Basis</p> <p>Monthly Basis</p> <p>Daily Basis</p> <p>Daily Basis</p> <p>Daily basis</p>
Solid Waste	Haphazard Disposal of Wastes	<p><b>a) Construction Wastes</b></p> <ul style="list-style-type: none"> <li>Adopt 3R (Reduce, Reuse &amp; Recycle) concept</li> <li>Ensure storage areas are secure, safe &amp; weatherproof.</li> <li>Management of reusable wastes</li> </ul>	<p>Contractor</p> <p>Contractor</p> <p>Contractor</p>	<ul style="list-style-type: none"> <li>Daily/Weekly quantity/volume of reusable/recyclable SW collected</li> <li>Locations of stockpiling sites</li> <li>Number of cases of</li> </ul>	<p>Daily basis</p> <p>Daily basis</p> <p>Daily basis</p>



*[Handwritten signature and date]*

Field	Impacts	Mitigations / Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> <li>• Sale of Recyclable wastes to scrap dealer</li> </ul>	Contractor	on-site reuses <ul style="list-style-type: none"> <li>• Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors</li> <li>• Frequency of sale to scrap vendors</li> </ul>	Daily basis
		<ul style="list-style-type: none"> <li>• Dumping of Biodegradable waste into a big pit and leaving them covered for a time period. During this, they will get decomposed and can be used as compost for agricultural purpose</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Field Photographs</li> </ul>	Weekly Basis
		<ul style="list-style-type: none"> <li>• If composting is not possible, dispose off these bio degradable solid wastes to the waste bins managed by the municipality</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Field Photographs</li> <li>• Contractor's Work Log Book</li> </ul>	Weekly Basis
		<ul style="list-style-type: none"> <li>• 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.</li> <li>• Use standard size &amp; quantity of construction materials.</li> <li>• Construct garland drains to reduce the runoff from the stockpiles.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>• Contractor's log book of construction materials</li> </ul>	Daily basis
Solid Waste	Haphazard	<b>b) Solid Wastes, Wastewater and Sewage</b>	Contractor	<ul style="list-style-type: none"> <li>• Location of construction sites</li> <li>• Photographs</li> </ul>	Daily basis

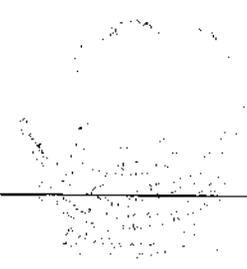

  
 Engineer


  
 Government of Nepal  
 Ministry of Water Supply  
 Singhadurbar, Kathmandu

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Disposal of Wastes	of Wastes	<p>from labour camp</p> <ul style="list-style-type: none"> <li>Adopt Segregation of Solid Waste (3R Concept) based on being biodegradable or non-biodegradable. It is because non-decomposers cannot break down non-biodegradable wastes and their disposal poses a big problem.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of Colored Bins to segregate wastes into biodegradable &amp; non-biodegradable wastes</li> </ul>	Daily basis during construction
		<ul style="list-style-type: none"> <li>Management of biodegradable wastes that includes food waste, paper waste, biodegradable plastic, etc. by any suitable processes that include Composting. If this method is not possible then, the wastes shall be either managed by handing over these wastes to the municipality waste collectors or by disposing those wastes to the burial pits at suitable place.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Daily/Weekly quantity/Volume of Biodegradable solid waste collected</li> <li>Site Photographs</li> <li>Contractor Work Log Book</li> </ul>	Daily basis during construction
		<ul style="list-style-type: none"> <li>Non-biodegradable wastes like glass, plastics &amp; metals shall be managed by reusing them for site use or selling them to scrap dealers instead of disposing them</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Daily/Weekly quantity/volume of such wastes sold to or given to scrap vendors</li> <li>Frequency of sale to scrap vendors/dealers</li> <li>Written Notice</li> </ul>	Daily basis during construction
		<ul style="list-style-type: none"> <li>Strict Prohibition on open incineration of solid wastes &amp; use of plastic materials to minimize the quantity of plastic wastes</li> <li>Construction of the temporary latrines with temporary soak pits &amp; septic tanks within the campsite for proper disposal of sewage</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Field Photographs</li> <li>Contractor's Monthly Progress Report</li> </ul>	Prior to Construction & During Construction  Daily basis

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Field	Impacts	Mitigations/Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
 Handling of Fuels/Chemicals  Engineer	Accidental Leakage or Spillage of Stored Fuel/Chemicals	<ul style="list-style-type: none"> <li>Provide temporary but proper drainage system for proper outlet of waste water generated from cooking practices adopted by the workers</li> <li>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 &amp; 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.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Field Photographs</li> <li>Contractor's Monthly Progress Report</li> <li>Contractor's Workers Log Book</li> </ul>	Daily basis
		<ul style="list-style-type: none"> <li>Provision of well managed storage site</li> <li>Organize awareness programs for the workers responsible for handling fuel/chemicals</li> <li>Supervise workers to handle fuel/chemicals properly</li> <li>Use of spill kit materials to block flow and prevent discharge to nearby water bodies</li> <li>Scatter the Sawdust, sand or dry soil over the area of spill and leave for few minutes to soak up the fuel/chemical. So, availability of saw dust, sand or dry soil should be ensured in the store</li> </ul>	Contractor DSMC & Contractor DSMC Supervisor of Contractor Contractor Contractor	<ul style="list-style-type: none"> <li>Location of storage site</li> <li>Records of awareness programs in the form of minutes, photographs</li> <li>Records of any accidental spillage/leakage</li> <li>Contractor's log book of materials procured for construction</li> <li>Frequency of use of saw dust, sand or dry soil</li> </ul>	Weekly Basis during construction Priorot construction Daily Basis During Construction Weekly Basis During Construction Weekly Basis During Construction

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> <li>Regular Inspection Visit to the storage site to inspect the leakage of the stored container of fuel/chemical</li> </ul>	DSMC Contractor	<ul style="list-style-type: none"> <li>Number of Site Visits</li> <li>Complaints of Leakage</li> </ul>	Weekly Basis During Construction
Land Use Pattern	Change in land use pattern in haphazard manner	<ul style="list-style-type: none"> <li>Selection of barren and public land only for the construction of project components</li> <li>Avoid the acquisition of private and agricultural land for the construction of project components.</li> </ul>	PMO & DSMC	<ul style="list-style-type: none"> <li>Details of land ownership</li> <li>Photographs</li> </ul>	During Design Phase
Drainage	Disruption to Natural Drainage	<ul style="list-style-type: none"> <li>Avoid the natural drainage pathways for pipe laying works.</li> <li>Stockpile the excavated materials at safe but nearby place.</li> <li>Restore natural drainage system if the drainage system during construction is blocked.</li> </ul>	DSMC Contractor	Pipe Layout plan	During Construction
		<ul style="list-style-type: none"> <li>Immediate Response on handling of dismantled debris</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Location of Spoil Disposal Sites</li> <li>Photographs of before and after restoration</li> </ul>	Daily Basis During Construction
Dismantled Debris	Haphazard Disposal of Dismantled Debris	<ul style="list-style-type: none"> <li>Segregation of Dismantled Debris</li> <li>Adopt 3R (Reduce, Reuse&amp; Recycle) concept</li> <li>Sale of Recyclable Wastes to Scrap Vendors/Dealers</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of complaints from the sensitive receptors</li> <li>Number of Colored Bins</li> <li>Contractor's Work Log Book</li> <li>Quantity/Volume of such wastes sold to or given away to scrap vendors</li> <li>Frequency of sale to scrap vendors</li> </ul>	Daily Basis After Construction and Prior to Operation
c) Operation Phase					
Source Yield	Deficiency of water at the	<ul style="list-style-type: none"> <li>The impact comes out to be insignificant</li> </ul>	WUSC	Monitoring Report	Monthly Basis



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Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	proposed source	however, regular source yield monitoring is recommended.			
<b>2. Impacts on Biological Environment</b>					
a) Construction Phase					
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	<ul style="list-style-type: none"> <li>Replace the excavated top soil to its original position after the completion of pipe laying work</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Photographs of before and after the replacement of top soil</li> <li>Contractor's Work Log Book</li> </ul>	Daily Basis During Construction
		<ul style="list-style-type: none"> <li>Re-vegetating disturbed slopes and grounds, as applicable;</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Photographs of revegetation of disturbed slopes and grounds</li> <li>Contractor's Work Log Book</li> </ul>	Weekly Basis During Construction
		<ul style="list-style-type: none"> <li>Awareness programs regarding policy related to the conservation of existing flora &amp; fauna, to the workers prior to the construction and the community during various meetings and discussion programs</li> </ul>	PMO, DSMC & Contractor	<ul style="list-style-type: none"> <li>Minutes &amp; Photographs of Awareness Programs</li> </ul>	Prior to Construction
Flora & Fauna	Loss of vegetation, Loss of habitat of faunas	<ul style="list-style-type: none"> <li>Adopt the suitable mitigation measures proposed to minimize noise pollution as mentioned earlier</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Written Notice</li> <li>Contractor's Work Schedule</li> </ul>	As mentioned earlier
		<ul style="list-style-type: none"> <li>Regular Monitoring</li> </ul>	DSMC & RPMO	<ul style="list-style-type: none"> <li>Contractor's Log Book</li> <li>Number of Monitoring Visits</li> </ul>	Daily Basis During Construction
Aquatic Life	Loss of habitat of aquatic life	<ul style="list-style-type: none"> <li>Strict Monitoring on the daily activities of workers and Prohibition on disposal of wastes to the water bodies during</li> </ul>	Contractor & DSMC	<ul style="list-style-type: none"> <li>Location of Labor Camp Site</li> <li>Photographs</li> </ul>	Weekly Basis


  
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Field	Impacts	Mitigations / Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		construction works at source area.		<ul style="list-style-type: none"> <li>Number of Complaints from the sensitive receptors</li> <li>Number of Monitoring Visits</li> <li>Monitoring Reports</li> <li>Written Notice to prohibit disposal of wastes</li> </ul>	
		<ul style="list-style-type: none"> <li>Provision of temporary but well-equipped toilets</li> </ul>	Contractor & DSMC	<ul style="list-style-type: none"> <li>Location of these temporary facilities</li> <li>Photographs of toilets constructed</li> </ul>	Weekly Basis
		<ul style="list-style-type: none"> <li>Restriction to workers from fishing</li> </ul>	Contractor & DSMC	<ul style="list-style-type: none"> <li>Written Notice</li> <li>Number of complaints from the sensitive receptor</li> </ul>	Daily Basis During Construction
		<ul style="list-style-type: none"> <li>Adopt measures mentioned above for the solid waste management</li> </ul>	Contractor & DSMC	<ul style="list-style-type: none"> <li>Number of Colored Bins to segregate wastes Daily/Weekly</li> <li>Quantity/Volume of Biodegradable solid waste collected</li> </ul>	Daily Basis During Construction
b) Operation Phase					
Aquatic Life	Pollution of water bodies endangering aquatic lives	<ul style="list-style-type: none"> <li>Direct discharge of the raw sludge to the water bodies will be discouraged through strict monitoring to the operators involved.</li> <li>Proper Implementation of Water Safety Plan (WSP)</li> </ul>	WUSC	<ul style="list-style-type: none"> <li>Number of complaints from the sensitive receptors</li> </ul>	Weekly Basis
3. Impacts on Chemical Environment					
a) Construction Stage					
<ul style="list-style-type: none"> <li>WUSC Monitoring Reports</li> <li>Water Safety Plan</li> </ul>					

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Water Quality	Pollution on surface water sources by crossing of pipelines over water bodies, poorly managed construction sediments and other wastes, poor sanitation practices by workers	<ul style="list-style-type: none"> <li>Provision of Septage Disposal through construction of toilets with septic tanks</li> </ul>	Contractor, DSMC	<ul style="list-style-type: none"> <li>Semi Annual Environmental Monitoring Report</li> <li>Photographs of toilets constructed</li> </ul>	Prior to Construction as well as During Construction
		<ul style="list-style-type: none"> <li>Disposing of spoils or excess soils as free filling materials as soon as possible</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Spoil Management Plan</li> <li>Location of Spoil Disposal Site</li> </ul>	During Construction
		<ul style="list-style-type: none"> <li>Locating temporary storage areas on flat grounds and away from main surface drainage routes;</li> <li>Shielding temporary storage areas with sandbags</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Photographs of temporary storage areas</li> </ul>	Monthly Basis
		<ul style="list-style-type: none"> <li>Adopt measures mentioned above for the solid waste management</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of Colored Bins to segregate wastes</li> <li>Daily/Weekly quantity/Volume of Biodegradable solid waste collected</li> </ul>	Daily Basis
		<ul style="list-style-type: none"> <li>Provision of adequate water supply and sanitation facilities at work sites</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of Complaints received from the workers</li> <li>Number of Water</li> </ul>	Weekly Basis



Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> <li>Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.</li> </ul>		Supplies to the workers  <ul style="list-style-type: none"> <li>Number of supervisions</li> <li>Reports on Supervision</li> </ul>	Weekly Basis
b) Operation Stage					
Water Quality	Degradation of Quality of water stored within the reservoir	<ul style="list-style-type: none"> <li>Proper Implementation of Water Safety Plan (WSP)</li> <li>Removal of Algae grown within the reservoir at regular intervals by the O &amp; M team deployed by the WUSC</li> <li>As the raw sludge contains inert materials, it cannot be used for agricultural purposes. Hence, Disposal of Raw Sludge is the ultimate choice to manage the raw sludge of the sedimentation tank. This is adopted through burial method in which the sludge is placed in a hole or trench and covered with at least 12 inches of earth. Here, the government barren land is chosen for the burial of the sludge.</li> <li>Avoid direct discharge of the raw sludge to the water bodies through strict monitoring to the operators involved</li> <li>Proper Implementation of Water Safety Plan</li> </ul>	WUSC O & M Team  WUSC O & M Team  WUSC O & M Team	Water Safety Plan of WUSC  <ul style="list-style-type: none"> <li>Photographs</li> <li>WUSC Monthly Reports</li> <li>Frequency of Burials</li> <li>Location of Burial Sites</li> <li>Field Photographs</li> <li>Quantity/Volume of Raw Sludge Scraped from sedimentation tank</li> </ul>	Monthly Basis  Monthly Basis  During Cleaning of sedimentation tank
	Impact on Water Bodies		WUSC O & M Team  WUSC O & M Team	<ul style="list-style-type: none"> <li>Written Notice</li> </ul>	During Cleaning of sedimentation tank  During operation entire phase.

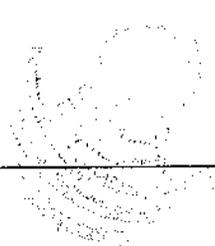
Field	Impacts	Mitigations /Enhancement Measures (WSP)	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
4. Impact on Socio-economic Environment					
a) Design Phase					
Structural Instability	Cracking of structure leads to public discomfort due to construction of water supply components in high earthquake zones	<ul style="list-style-type: none"> <li>Proper Design of each &amp; every component as per standard and code of practice.</li> </ul>	PMO, RPMO & DSMC	Detailed Design Documents	During detailed design phase
Health & Safety of Community & Workers	Lack of provision will have impact during construction	<ul style="list-style-type: none"> <li>Training on Community Health &amp; Safety Hazards by DSMC by disseminating information in regard to this through training manuals, photographs &amp; documents related to safety.</li> </ul>	PMO, RPMO & DSMC	Photographs & Minutes	During detailed design phase and Prior to Construction
Existing facilities	Disruption of services & False Claims by the People	<ul style="list-style-type: none"> <li>Coordinate with the concerned agencies to finalize the pipe network layout to avoid damage to the existing utilities.</li> <li>Design &amp; Locate pipelines away from existing utilities during design as far as possible.</li> <li>Provide budget for restoration/replacement of damaged utilities.</li> <li>Photographs of construction sites before and after the construction to avoid the false claims.</li> <li>Prompt Reinstatement of paved as well as unpaved roads after completion of excavation works for pipe laying</li> </ul>	DSMC, RPMO, PMO, Contractor	<ul style="list-style-type: none"> <li>List of affected utilities and operators;</li> <li>Pipeline Layout Plan</li> <li>Bid document</li> <li>Photographs before and after the construction sites</li> <li>Contractor's Work Log Book</li> </ul>	During detailed design phase



Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
b) Construction Phase	<ul style="list-style-type: none"> <li>Cross-cutting threats from construction's impacts on air and water quality, ambient noise level; mobility of people/goods/services; accesses to properties/economic activities/social services; service disruptions, etc.</li> <li>Communicable and transmittable diseases may potentially be brought into the community by construction workers</li> </ul>	<ul style="list-style-type: none"> <li>Contractor's implementation of EMP</li> <li>Adequate lighting, temporary fence, reflecting barriers and signage at active work sites;</li> <li>Contractor's preparedness in emergency response;</li> <li>Adequate dissemination of GRM and Contractor's observance/implementation of GRM</li> </ul>	<ul style="list-style-type: none"> <li>Contractor, RPMO, DSMC</li> <li>Contractor</li> <li>Contractor</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>EMP</li> <li>Photographs depicting lighting, temporary reflecting barriers and signage facilities.</li> <li>Quantity of lighting, temporary fence, reflecting barriers and signage</li> <li>Emergency Response Plan</li> <li>Monthly Reports of GRC</li> <li>Number of Grievance Redress Form received</li> <li>OHS Plan Submitted</li> </ul>	<ul style="list-style-type: none"> <li>During Construction Phase, Weekly Basis</li> <li>During Construction Phase, Monthly Basis</li> <li>During Construction, Weekly Basis</li> <li>During Construction, Monthly Basis</li> <li>Prior to the start of the construction</li> </ul>
Workers Health & Safety	Risk to worker's health & safety	Submission of Simple OHS plan for employer's approval that involves appropriate health & safety arrangements that includes minimum requirements for	Contractor		



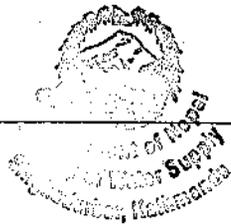
Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<p>various activities like Excavation works, Works within the confined spaces, Use of warning signs, boards &amp; signage, Use of PPE, Accident &amp; Emergency Response and Monitoring &amp; Reporting.</p> <ul style="list-style-type: none"> <li>Comply Labor Act (1992) of GoN</li> <li>Train all site personnel regarding environmental health and safety as like in design phase by DSMC &amp; Contractors</li> <li>Provide <b>Personal Protective Equipment (PPEs)</b> to workers that includes protective clothing, helmets, goggles and other equipments designed to protect the wearer's body from injury or infection and ensure their effective usage</li> <li>Require workers to wear high visibility clothes</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Site -Specific H&amp;S plan</li> <li>Record of H&amp;S orientation training like Photographs &amp; Minutes</li> <li>Availability of personal protective equipment at construction site</li> <li>Environmental Site Inspection Report</li> </ul>	<p>Visual inspection by RPMO (monthly) and DSMC-ESS on a weekly basis. Frequency and sampling sites to be finalized during detailed design and final location of project components</p>
		<ul style="list-style-type: none"> <li>Exclude public from worksites</li> <li>Maintain accident reports and records.</li> <li>Make first aid kits readily available</li> </ul>	Contractor	<p>Contractor's Visitors' Log Book</p> <p>Number of accidents as per site records</p>	<p>Weekly Basis during construction</p> <p>Weekly Basis during construction</p>
Workers Health & Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in	<ul style="list-style-type: none"> <li>Maintain hygienic accommodation in work camps</li> <li>Ensure uncontaminated water for drinking, cooking, and washing.</li> <li>Assure clean eating areas</li> <li>Make sure sanitation facilities are readily available</li> <li>Provide adequate space and light to the</li> </ul>	Contractor	<p>Contractor's Health &amp; Safety Log Book</p> <ul style="list-style-type: none"> <li>Location of Worker's Camp Site</li> <li>Number of Monitoring Visits</li> <li>Number of Complaints from the workers</li> </ul>	<p>Weekly Basis during construction</p> <p>Monthly Basis during construction</p>



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Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	urban areas. Workers need to be mindful of the occupational hazards, which can arise from working at height and excavation works.	<ul style="list-style-type: none"> <li>camp site</li> <li>Adequate supply of potable water to the camps and good sanitation within camps</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of water supplies</li> <li>Number of complaints from the workers</li> </ul>	Weekly Basis during construction
		<ul style="list-style-type: none"> <li>Provide medical insurance coverage for workers</li> <li>Provide orientation for guest visitors</li> <li>Ensure that visitors do not enter hazard areas unescorted;</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Medical Insurance Documents</li> <li>Record of Orientation training (Photographs &amp; Minutes)</li> <li>Contractor's Visitor's Log Book</li> </ul>	<ul style="list-style-type: none"> <li>Prior to the construction</li> <li>Monthly Basis during construction</li> </ul>
		<ul style="list-style-type: none"> <li>Ensure moving equipment is outfitted with audible backup alarms;</li> <li>Hearing protection equipment enforced in noisy environment</li> <li>Chemical and Material storage areas need to be marked clearly</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Contractor's Log Book of Machinery &amp; Equipment</li> </ul>	Weekly Basis during construction
		<ul style="list-style-type: none"> <li>Implementation of Emergency Preparedness Response Plan to mitigate the impacts of flooding problems that includes i) Reporting of Incidents; ii) Investigation of incidents and iii) Prepared for availability of Stretchers, Life buoys, first aiders, first aid kits etc.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Signage Board to make aware regarding Chemical Storage and Material Storage Area</li> <li>Investigation Reports</li> <li>Emergency Preparedness Response Plan</li> <li>Contractor's Materials Log Book</li> </ul>	<ul style="list-style-type: none"> <li>Monthly Basis during construction</li> <li>Monthly Basis</li> </ul>

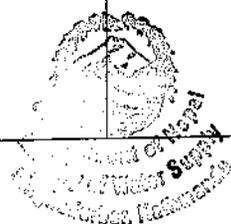


Field	Impacts	Mitigations/Enhancement Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring
Traffic Congestion	Interference in the daily activities of people	<ul style="list-style-type: none"> <li>The trench for pipeline should not be abandoned and the contractor should be recommended to backfill the trench immediately.</li> <li>The contractor will be accountable to provide signage at appropriate locations indicating available alternate access routes to minimize traffic disruptions.</li> <li>The contractor will have to ensure access to shops and residences using simple wooden walkways.</li> <li>Provision of alternative way for vehicular movement and pedestrians if possible</li> <li>The contractor shall follow the Traffic Management Plan especially at Bazaar Areas especially Jhyalbaas Area.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Number of Site Visit and Photographs of Sites</li> <li>Traffic Management Plan</li> </ul>	Daily Basis
Public Protests	Interruption in the construction activities	<ul style="list-style-type: none"> <li>Public Consultation should be carried out at various stages &amp; locations as per requirement.</li> <li>Implement Grievance Redress Mechanism</li> <li>Pre-notify the public regarding the construction works that may hinder their daily activities and Coordinate with them properly</li> </ul>	Contractor & DSMC	<ul style="list-style-type: none"> <li>Photographs</li> <li>Minutes of Consultation Programs</li> <li>Grievance Redress Mechanism Status</li> <li>Written Notice or Miking</li> </ul>	Prior to the construction
Local Vendor's Business	Discomfort to the customers to get access to the shops hampering the daily business activities	<ul style="list-style-type: none"> <li>Adopt "zero soil" approach through prompt backfilling right after completion of drain construction. In general, execution of excavation works is such that excavation will be done in a few meters length i.e., 50m at a time followed by pipe laying, backfilling over the pipe and removal of all surplus material from the site.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Field Visits</li> <li>Contractor's Work Schedule</li> </ul>	Weekly Basis

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Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> <li>Provision of temporary access to the shops through provision of planks</li> <li>Pre-notify the vendors regarding the construction works that may hinder their daily activities and Coordinate with them properly</li> </ul>	Contractor	Photographs	Weekly Basis
		<ul style="list-style-type: none"> <li>As the Child Labor Prohibition Act, 2000 states that "No Child having not attained the age of 14 years shall be engaged in works as a laborer" during mobilization, provision for the requirement of submission of the citizenship certificate of each labor, should be made.</li> </ul>	Contractor & PMO	Written Notice or Miking (Verbal Notice) Citizenship Certificate of the workers	Prior to the construction Prior to Construction
Deployment of Child Labor	Deprivation of Children's right to education, health, safety and moral development is deprived	<ul style="list-style-type: none"> <li>During contract agreement, the agreement by the contractor to follow Child Labor Prohibition Act, 2000 and Child Labour Prohibition Rules &amp; Regulations, 2006, should be made.</li> </ul>	Contractor & PMO	Contract Document	During award of contract
Sustainability of Works	Damage to unsettled/unfinished and/or completed structures and affecting their structural integrity by seismic event if any	<ul style="list-style-type: none"> <li>After every seismic event, the contractor must conduct engineering investigation of built structures and implement the necessary corrective actions immediately</li> <li>Avoid construction works during monsoons</li> <li>Prepare &amp; Follow Emergency Preparedness and Response Plan</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Monthly Progress Report</li> <li>Contractor's Log Book</li> </ul>	Construction Phase
Existing Facilities	Damage to the existing utilities creating	<ul style="list-style-type: none"> <li>Monitor construction workers to adopt carefulness and to strictly follow the layout drawings.</li> </ul>	Contractor, RPMO, DSMC	<ul style="list-style-type: none"> <li>Number of Complaints received at GRC</li> </ul>	During Construction Phase on Daily Basis



Field	Impacts	Mitigations/Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Health Downstream Government of Nepal Ministry of Water Supply Singhadurbar, Kathmandu	discomfort to the people	<ul style="list-style-type: none"> <li>Reinstatement Works</li> </ul>		<ul style="list-style-type: none"> <li>Pipeline Layout Plan</li> <li>Contractor's Bill of Quantities</li> <li>Photographs</li> </ul>	
	Health Hazards due to intake of contaminated water	<ul style="list-style-type: none"> <li>Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly.</li> <li>Provision of temporary latrines with basic facilities</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>Photographs</li> <li>Number of Complaints received from the downstream user's group</li> </ul>	During Construction Phase on Daily Basis
c) Operation Phase					
Occupational Health & Safety	Worker's exposure to, and/or mishandling of chemicals and other hazardous substances pose health and safety hazards.	<ul style="list-style-type: none"> <li>Installation of clear, visible signage in premises on safety measures</li> <li>Setting up a mechanism for the quick response to spills of chemical and hazardous substances.</li> </ul>	WUSC	<ul style="list-style-type: none"> <li>Number of Site Visits</li> <li>Site Visit Reports</li> <li>Photographs of location where signage are installed</li> </ul>	Weekly Basis
			WUSC	<ul style="list-style-type: none"> <li>Frequency of use of chemical hazardous substances</li> <li>Quantity of chemical/hazardous substances used for the proposed project</li> </ul>	Monthly Basis
Drinking water supply	<ul style="list-style-type: none"> <li>Extraction of raw water quality</li> <li>Delivery of</li> </ul>	<ul style="list-style-type: none"> <li>Ensure the correct operation of water treatment plant to meet satisfactory water quality</li> <li>Provide Safe Storage for chemicals</li> </ul>	PMO & RPMO	WUSC Monitoring Reports	Monthly Basis during operation
			Contractor	Location of Chemical Storage	Monthly Basis during operation

Field	Impacts	Mitigations /Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	unsafe water to the distribution system	<ul style="list-style-type: none"> <li>Ventilation of "Housed" dosing unit for chlorine</li> </ul>	Contractor, PMO & DSMC	<ul style="list-style-type: none"> <li>Detailed Drawings</li> <li>Design</li> <li>Contractor Working drawings &amp; Photographs of Dosing Unit Constructed</li> </ul>	During Construction
	<ul style="list-style-type: none"> <li>Inadequate protection of intake</li> <li>Health Hazards arising from inadequate design of facilities for receiving, storing and handling of Cl &amp; other chemicals</li> </ul>	<ul style="list-style-type: none"> <li>Train operators for handling chlorine</li> </ul>	RPMO, PMO & WUSC	<ul style="list-style-type: none"> <li>Minutes &amp; Photographs of Training</li> </ul>	Prior to operation after completion of construction
Consumer's Health	Irregularity in the supervision of the operation of distribution system may lead to excessive algae growth in service reservoir which may produce toxins causing serious illness in humans consuming water.	<ul style="list-style-type: none"> <li>Regular Monitoring by the WUSC</li> </ul>	WUSC	WUSC Monitoring Reports	Monthly Basis
		<ul style="list-style-type: none"> <li>Removal of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.</li> </ul>	WUSC	Frequency of Algae Removal	Monthly Basis
		<ul style="list-style-type: none"> <li>Monitoring &amp; Proper Implementation of WSP.</li> </ul>	WUSC	WUSC Monitoring Reports	Monthly Basis
Water Scarcity	Impacts on Downstream Users	The impact is found to be insignificant, however, regular source yield monitoring is recommended.	WUSC	Monthly Reports	Monthly Basis



Field	Impacts	Mitigations/Enhancement Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
 <p>Non-Sustainability of Services or Completed Works</p>	<p>Disruption in water supply service by sudden seismic events or climate change droughts</p>	<ul style="list-style-type: none"> <li>WUSC should monitor yield closely especially in the dry season and during a climate-change-induced drought.</li> </ul>	<p>WUSC &amp; the local body</p>	<ul style="list-style-type: none"> <li>Number of Human Resources Mobilized for monitoring</li> <li>Yield Monitoring Reports</li> </ul>	<p>During Dry Season and Immediate action during climate-change-induced drought.</p>
		<ul style="list-style-type: none"> <li>After every seismic event, WUSC should conduct engineering investigations of completed works and implement the necessary corrective actions without delay. This shall involve preparation of Emergency Preparedness &amp; Response Plan and Immediate Implementation of this plan after any seismic event.</li> </ul>	<ul style="list-style-type: none"> <li>WUSC</li> </ul>	<p>WUSC Monitoring Reports</p>	<ul style="list-style-type: none"> <li>Immediate after any seismic event</li> </ul>
		<ul style="list-style-type: none"> <li>Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs</li> </ul>	<p>WUSC</p>	<ul style="list-style-type: none"> <li>Photographs of capacity building programs</li> <li>Minutes of such programs</li> <li>WUSC Monitoring Report</li> </ul>	<p>During project construction and During initial stage of operation phase</p>
		<ul style="list-style-type: none"> <li>Carrying out regular O &amp; M with effectiveness through proper management of WUSC.</li> </ul>	<p>WUSC</p>	<p>WUSC Monitoring Report</p>	<p>Right after the completion of project construction period</p>

Source: IEE Field Study, 2018

11.4 Environmental Monitoring Program

439. Environmental monitoring will be done during construction at three levels:

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

440. In addition to regular monitoring onsite (at town level) by the ICG and DSMC-ESS on the EMP implementation of the mitigation measures, monitoring of key environmental parameters is proposed. **Table 11-II** presents the indicative environmental monitoring plan for the project which includes relevant environmental parameters, with a description of the sampling stations, the frequency of monitoring, applicable standards, and responsible agencies.

**Table 11-II: Environmental Monitoring Program**

	Field	Stage	Parameters	• Location	Frequency	Standards	Responsibility
1.	Air quality	<ul style="list-style-type: none"> <li>• Before construction to establish baseline</li> <li>• Construction phase</li> </ul>	PM10 SO2 NOx	<ul style="list-style-type: none"> <li>• Worksite locations</li> <li>• Along water transmission main 1-km interval from PTWs</li> <li>• Construction campsite locations</li> </ul>	• 24-hour monitoring once in a season (except monsoons) for the construction period	• National Ambient Air Quality Standards, 2003	Contractor
2.	Noise and vibration levels	<ul style="list-style-type: none"> <li>• Prior to construction to establish baseline</li> <li>• Construction phase</li> </ul>	Equivalent day and night time noise levels	<ul style="list-style-type: none"> <li>• PTWs location</li> <li>• Along water transmission main 1-km interval from PTWs</li> <li>• Construction campsite locations</li> </ul>	• Once in a season (except monsoons) for the construction period	• National Noise Standard Guidelines, 2012	Contractor
3.	Water quality	<ul style="list-style-type: none"> <li>• Prior to construction to establish baseline</li> <li>• Construction phase</li> </ul>	TDS, TSS, pH, hardness, BOD, fecal coliform, total nitrogen, total phosphorus, heavy metals, temperature, DO, hydrocarbons, mineral oils, phenols, cyanide, temperature	• Adjacent to construction sites (to be identified by the (DRTAC or DSMC))	• Twice a year (pre-monsoon and post-monsoon) for the entire period of construction	• National Drinking Water Quality Standards, 2006	Contractor
4.	Survival rate of landscaping, tree planting	• O&M phase	Survival rate	• In the areas where re-plantation/ landscaping proposed	• Twice a year for 2 years	• None	WUSC

Field	Stage	Parameters	• Location	Frequency	Standard s	Responsibility
on						

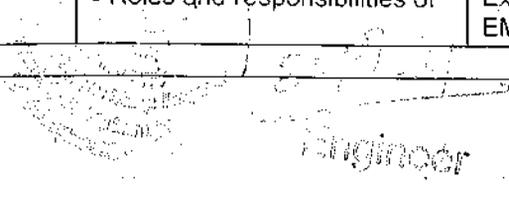
Source: IEE Study 2018/019

**11.5 Institutional Capacity Development Program**

- 441. 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.
- 442. WUSC cannot monitor the quality of supplied water as prescribed in NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSSM has five regional laboratories; however, some are not functioning fully due to lack of human resources. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with WUSC actively participating in developing its capacity. Water quality monitoring should be carried out in such a way that WUSC will be "learning by doing." After the engagement period, there should be continuing periodic training of new persons to ensure that the capacity of WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engaged in both the monitoring requirements and to train WUSCs. A Water Safety Plan is included in the project design and will oblige the operator to carry out water quality monitoring accordingly. The amount of NPR 500,000 will be provided annually to implement the Plan. There will be sufficient fund to include training by the licensed and accredited laboratory while monitoring water quality.
- 443. The contractors will be required to conduct environmental awareness programs and orientation to the workers before deployment to the work site. The proposed training project along with the frequency of sessions is presented in Table 49. The Environmental Safeguard specialist & EMP Field Monitoring Staff are responsible for organizing different training programs for Environmental Management.

**Table 11-III: Training Program for Environmental Management**

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and GON and how the project will meet these requirements	To build the capacity of the staff 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	<b>Module 1: Orientation</b>	• Roles and responsibilities of	Experiences on EMP


  
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Items	Pre-construction/prior to construction	Construction	
	<ul style="list-style-type: none"> <li>• ADB Safeguards Policy Statement</li> <li>• Government of Nepal Environmental Laws and Regulations</li> </ul> <p><b>Module 2: Environmental Assessment Process</b></p> <ul style="list-style-type: none"> <li>• ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements</li> <li>• Review of environmental assessment report to comply with ADB requirements</li> <li>• Incorporation of EMP into the project design and contracts</li> </ul>	<p>officials/contractors/consultants towards protection of the environment</p> <ul style="list-style-type: none"> <li>• Environmental issues during construction</li> <li>• Implementation of EMP</li> <li>• Monitoring of EMP implementation</li> <li>• Reporting requirements</li> </ul>	<p>implementation – issues and challenges</p> <p>Best practices followed</p>
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, PMO, and PMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

Source: IEE Study, 2018

### 11.6 Staffing Requirement and Budget

444. Staffing requirement will include the: (i) deputizing a DWSSM or PMO staff as the PMO environmental safeguards officer; (ii) deputizing WSSDO staff as RPMOS environmental engineers in each subproject town; (iii) engagement of a PMO-environmental safeguards specialist to provide technical assistance and guidance to the PMO and partly to the RPMOS and capacity development/training; and (iv) a DSC environmental safeguards specialist to conduct the IEEs and prepare the IEE reports according to the provisions of this EARF.
445. The 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.
446. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by PMO-ESS assisted by the PMO environmental safeguard officer. Therefore, no separate budget is required for PMO-ESS.



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447. The cost of mitigation measures and surveys during the construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The contractors will conduct the surveys.
448. The operation phase for mitigation measures are good operating practices to mitigate the environmental impacts of this phase & the responsibility remains to WUSC. WUSC will conduct all monitoring during the operation and maintenance phase. To ensure the delivery of safe drinking water from its catchment to the consumers, there is provision of Water Safety Plan (WSP) for the proposed project. If a licensed laboratory is engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan. The cost of awareness program & WSP during the contract period is NPR 500,000.00 under provisional sum.
449. The indicative costs of EMP implementation are shown in **Tables 11-IV**.

**Table 11-IV: Indicative Cost of EMP Implementation**

S. No.	Local Level Monitoring & Mitigation Measures	Mitigation & Monitoring Costs
<b>A.</b>	<b>Local Level Monitoring Measures</b>	
a)	Air quality Monitoring	200,000.00
b)	Noise levels Monitoring	50,000.00
c)	Water Quality Monitoring	50,000.00
<b>B.</b>	<b>Mitigation Measures</b>	
<b>a)</b>	<b>Impacts on Physical Environment</b>	
<b>i.</b>	<b>During Construction Phase</b>	
i.	Soil Erosion and Land Surface Disturbance	
	Proper Backfilling	No additional cost required, separately included under Miscellaneous Items
	Slope Protection Measures (Gabion Wall Construction, Retaining Wall etc.)	No additional cost required, separately included in Detailed Cost Estimate
ii.	Spoil Disposal	100,000.00
iii.	Air Pollution	
	Excavation Segmentation Plan	No additional cost required
	Watering of dry exposed surfaces and stockpiles of aggregates at least twice daily	
	Other mitigation measures as mentioned	No additional cost required
iv.	Noise Pollution	No additional cost required
v.	Generation of Construction Wastes & Solid Wastes	
	Waste Management	200,000.00
vi.	Accidental Leakage or Spillage of Stored Fuel/Chemicals	No additional cost required
vii.	Impact on Land Use Pattern	No additional cost required
viii.	Disruption to Natural Drainage	No additional cost required
ix.	Haphazard Disposal of Dismantled Debris	
	Segregation, 3R Concept, Sale to Scrap Dealers	No additional cost required as it has already been mentioned in v
x.	Regular Source Yield Monitoring	No additional cost required; it is borne by WUSC itself
<b>b)</b>	<b>Impacts on Biological Environment</b>	
<b>i.</b>	<b>Construction Phase</b>	
i.	Impacts on Flora & Fauna	
	Awareness programs to the construction workers	No additional cost required
	Revegetating disturbed slopes & grounds	100,000.00
	Others as mentioned in Sub Section 8.1.2.1 a)	No additional cost required

S. No.	Local Level Monitoring & Mitigation Measures	Mitigation & Monitoring Costs
ii.	Impacts on Aquatic Life	
	Strict Monitoring on the daily activities of workers	No additional cost required
	Provision of temporary but well-equipped toilets at worker's camp	200,000.00
	Solid Waste Management	No additional cost required as it has already been mentioned above in v.
ii.	Operation Phase	
i.	Impacts on Aquatic Life	
	Strict monitoring to the operators involved to discourage direct discharge of the effluent to the water bodies.	No additional cost required; it will be managed by WUSC itself
	Proper Implementation of Water Safety Plan (WSP).	No additional cost required; it will be covered by cost of Water Safety Plan
c)	<b>Impacts on Chemical Environment</b>	
I.	Construction Phase	
i.	Impacts on Water Quality of nearby rivers	
	Appropriate design of Septage Disposal with well-equipped temporary toilets	No Additional Cost Required as it has already been mentioned in
	Disposing of spoils or excess soils as free filling materials as soon as possible	No Additional Cost Required
	Locating temporary storage areas on flat grounds and away from main surface drainage routes	100,000.00
	Shielding temporary storage areas with sandbags	No Additional Cost Required
	Implementing eco-friendly solid and hazardous waste management, disposing them promptly	No Additional Cost Required as it has already been mentioned above in v.
	Providing adequate water supply and sanitation facilities at work sites.	No Additional Cost Required. It has to be managed by the contractor itself.
	Strict supervision on the behavior of workers for the waste management as well as sanitation behavior and monitoring the workers to manage the wastes properly	No Additional Cost Required
	Strict & Regular Monitoring during pipe laying works	No Additional Cost Required
II.	Operation Phase	
i.	Impacts on Quality of Water Stored in Service Reservoir	
	Proper Implementation of Water Safety Plan (WSP)	No Additional Cost Required
	Removing of Algae grown within the reservoir at regular intervals by the operating team deployed by the WUSC.	No Additional Cost Required
d)	<b>Impacts on Socioeconomic Environment</b>	
I.	Design Phase	
i.	Structural Instability	No additional cost required
i.	Health & Safety of Community & Workers	
	Training on Community Health & Safety Hazards by DSMC by disseminating information in regard to this through training manuals, photographs & documents related to safety	No additional cost required
ii.	Damage to the existing facilities	No additional cost required
II.	Construction Phase	
i.	Community Health & Safety Hazards	
	Contractor's implementation of EMP	No additional cost required
	Adequate lighting, temporary fence, reflecting barriers and signage at active work sites.	300,000.00

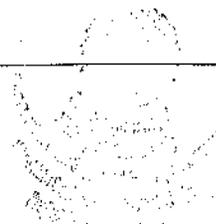


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S. No.	Local Level Monitoring & Mitigation Measures	Mitigation & Monitoring Costs
	Contractor's preparedness in emergency response	250,000.00
	Adequate dissemination of GRM and Contractor's observance/implementation of GRM	No additional cost required
ii.	Worker's Health & Safety Hazards	
	Provision of PPE to workers	200,000.00
	Other Mitigation measures	No Additional Cost Required
iii.	Traffic Congestion	No Additional Cost Required
iv.	Public Protests	No Additional Cost Required
v.	Disruption to Local Vendor's Business	
	Prompt Backfilling	No Additional Cost Required
	Provision of Planks to provide access to shops & homes	50,000.00
vi.	Mobilization of Child Labor	No Additional Cost Required
vii.	Impact on Sustainability of Works	
	Engineering Investigations after any seismic event, if any	100,000.00
	Emergency Preparedness Response	No additional cost required as it has already been mentioned above in xii)
viii.	Damage to the existing facilities	
	Monitor construction workers to adopt carefulness and to strictly follow the layout drawings.	No Additional Cost Required
	Reinstatement Works of the damaged existing paved roads if any	No Additional Cost Required. Its cost is separately included in Cost Estimate.
III.	Operation Phase	
i.	Occupational Health & Safety Hazards	
	Installation of clear, visible signage	No additional cost required; it will be managed by WUSC itself
	Setting up of mechanism for quick response to spills of chemical and hazardous substances.	No additional cost required; it will be managed by WUSC itself
ii.	Delivery of Unsafe Water	No additional cost required; it will be managed by WUSC itself
iii.	Impact on Consumer's Health	No additional cost required; it will be managed by WUSC itself
iv.	Impact on Downstream Users	No additional cost required; it will be managed by WUSC itself
v.	Non-sustainability of Services or Completed works	
	Source Yield Monitoring	No additional cost required; it will be managed by WUSC itself
	Engineering Investigations after every seismic event if any	No additional cost required; it will be managed by WUSC itself
	Preparation of Emergency Response Plan and Immediate implementation of this plan after any seismic event	100,000.00
	Strengthening Institutional Capacity and Policy Compliance through various project related capacity building programs	No additional cost required; it will be managed by WUSC itself
	Carrying out regular O & M with effectiveness through proper management of WUSC.	No additional cost required; it will be managed by WUSC itself
<b>Total Cost of Local Level Monitoring &amp; Mitigation Measures</b>		<b>2,000,000.00</b>

Source: IEE Study 2018/019

Note: The breakdown cost is based on past similar project experience however independent cost may alter without altering the total cost.



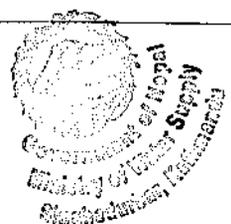
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450. The above given table shows that the total estimated cost for Local level Monitoring and Mitigation Measures i.e., the indicative cost for EMP implementation is 2,000,000.00. This has been included under provisional sum in General Works in BoQ that includes necessary environmental mitigation measures for the anticipated impacts during the entire construction period.
451. The environmental management will be implemented during the detailed design phase that will continue through the procurement, construction, and operation phases. **Table 11-V & 11-VI** presents the indicative timeframe of key EMP activities about project implementation schedule & the proposed topics for Capacity Building/Training respectively.

**Table 11-V: Environmental Management Implementation Schedule**

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

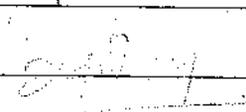
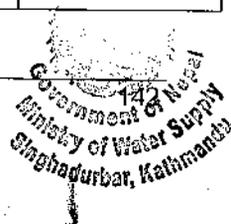


Activity	Indicative Time Frame
2. Submission of EMR	anytime between Q3 Y3 & Q1 Y4
- Monthly, by Operator	5 <sup>th</sup> day of the month following the effective month
- Quarterly, by Operator or (if applicable) by Licensed laboratory	3 <sup>rd</sup> day of the month following the effective quarter

Source: IEE Study 2018/019

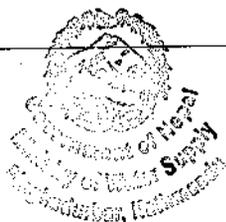
**Table 11-VI: Proposed Topics for Capacity Building/Training**

Topic	Target Participants	Timing
<b>1. By Environmental Specialists</b>		
1.1 Legal Framework	DWSSM, PMO,	Early stage
▪ Relevant national laws, regulations & standards on EA& management	WSSDO, ICG,	of Output 2
▪ ADB SPS 2009	RMSO, WUSC (15-18)	
▪ EA& review procedure under the Project		
1.2 Environmental Assessment		
▪ Rapid environmental assessment		
▪ Initial environmental examination		
1.3 Some Aspects of EA Process & Environmental Management		
▪ Meaningful consultation & info disclosure		
▪ Grievance redress mechanism		
▪ Environmentally responsible procurement		
▪ Occupational & community health and safety		
1.4 EMP Implementation, part 1	DWSSM, PMO,	Early stage
▪ Institution arrangements & responsibilities	WSSDO, ICG,	of Output 2
▪ Environmental quality monitoring	RMSO, WUSC,	
▪ Emergency response	(15-18)	
1.5 EMP Implementation, part 2		
▪ Performance monitoring & indicators		
▪ Environmental monitoring report		
<b>2. By External Experts</b>		
2.1 Other relevant topics, such as:	MOWS, DWSSM,	During
A Good engineering and construction practices as mitigation measures	PMO, ICG,	Project's
B Climate change adaptation (applicable to eligible activities/works under the Project)	WSSDO, RMSO, DSMC(30)	Capacity Devt. Program
B.1 Climate change impacts on infrastructure		
B.2 Climate-proofing of infrastructure		

  
 ENGINEER  


Topic		Target Participants	Timing
C	Strategic environmental assessment of WSS sector policy, development plans, and programs		
D	Other relevant topics that may be suggested by MoWS, DWSSM, PMO, ICG& WSSDO		

Source: IEE Study 2018/019



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## 12. MONITORING AND REPORTING

452. RPMO is the main monitoring agency of the proposed project that will monitor and measure the progress of EMP implementation with assistance from DMSC. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the subprojects. In addition to recording information on the work and deviation of work components from original scope, PMO, RPMOs & DSMC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Along with this, Ministry of Water Supply (MoWS) as well as Ministry of Forests & Environment (MoFS) under Government of Nepal will also undertake monitoring process through random field visits to review the project performance.
453. RPMOs will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. This report will be based on the Sample Semi-Annual Monitoring Report Template given in **Annex 2F** and Sample Environmental Site Inspection Report given in **Annex 2G**. The subproject budgets will reflect the costs of monitoring and reporting requirements.
454. For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO environmental safeguard specialist 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.
455. ADB will review project performance against the MoWS commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:
- (i) conduct periodic site visits for projects with adverse environmental or social impacts;
  - (ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
  - (iii) review the periodic monitoring reports submitted by PMO to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
  - (iv) work with PMO to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
  - (v) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

### 13. CONCLUSION

456. The IEE study indicates that:

- The proposed project, its components, are not within or adjacent to environmentally sensitive areas.
- The proposed project will fulfill the increasing water demand of the project town regarding the reliable water supply system. It will definitely address the issues raised by the hardship that people of the project town are facing for safe, reliable & potable water for years.
- The proposed project 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.
- Along with positive outcomes, the proposed project will also have negative impacts as discussed above in Chapter VI. As per our IEE study, four of the adverse impacts that includes *Air Pollution, Noise Pollution, Impacts on Water Quality of nearby rivers and Impact on Sustainability of Works* are evaluated as "Very Significant". However, these impacts would not be problematic for the project implementation if the activities that stimulate this impact to occur are properly controlled through the proposed mitigation measures.
- Some of the adverse impacts are also evaluated as *Significant*. However, these will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, will be commonly used at construction sites and the contractors will be aware about it. Hence, mitigation measures would not be difficult to implement.
- Similarly, Insignificant impacts can either be avoided or simply mitigated through the proposed mitigation measures.
- The environmental management plan (EMP) as mentioned above in *Chapter 11*, if duly considered, followed and implemented during project construction activities, then the environmental issues will not be issues to be worried about.
- If the responsible body mentioned in the EMP matrix shown in the *Table 11-1* properly takes up the responsibility for the implementation of mitigation measures for the likely impacts resulting from the various activities of the project, then, the environment of the project area will be safe and less affected from the project activities.
- Regular monitoring with good operation & maintenance service including prompt action on leaks and complying of the water supplied as prescribed in the National Drinking Water Quality Standards Directives will lessen the risks of the ineffective implementation of the proposed project and will sustain the system.
- Construction of public toilets within the project town will improve the public behaviour regarding safe & civilized sanitation practices.
- None of the anticipated environmental impacts of the proposed project is significant enough to go for either detailed EIA study or further especial study.
- As per ADB Categorization, the proposed project falls under "Category B". As per EPR 1997 (Latest Amendments 2017) Schedule H, this IEE study fulfills the requirements of IEE criteria. This IEE thus fulfills the policy requirements of both the ADB and the GoN. This indicates that IEE study is sufficient for the effective implementation of Deurali Hupsekot Water Supply & Sanitation Project.
- The IEE study shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning and management.



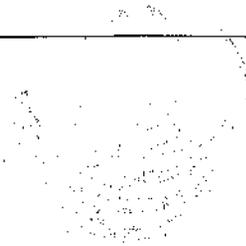
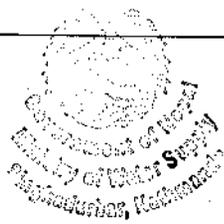
457. Based on the above findings, the classification of the Deurali Hupsekot Water Supply and Sanitation Project as "Category B" is confirmed, no further special study or detailed EIA needs to be undertaken and people of Hupsekot Rural Municipality will get rid of the hardship of safe, reliable & potable water they have been experiencing for decades.

Government of Nepal  
Ministry of Water, Electricity  
and Irrigation

11/11/2017

#### 14. LITERATURE REVIEWED

- ADB, 2003. *Environmental Assessment Guidelines*.
- Aquatic Animal Protection Act, 1961 with amendments*. [www.lawcommission.gov.np](http://www.lawcommission.gov.np)
- Constitution of Nepal (2015)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- Diesel Power Generation (2014). Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal*, The World Bank
- District Development profile of Nepal 2010/11 with VDC Profile. A Socio-Economic Development*
- Environmental, Health and Safety (EHS) Guidelines (2007)*. International Finance Corporation, World Bank Group
- Environment Protection Act, (1997)*. Ministry of Science, Technology and Environment Kathmandu
- Environment Protection Rules, (1997)*, Ministry of Science, Technology, and Environment, Kathmandu and Latest Amendments
- Environmental Standards and Collection of Concerned Informations, (2018)*. Ministry of Forests & Environment, Government of Nepal, Singhadurbar, Kathmandu
- Environment Statistics of Nepal, CBS, 2011*
- Environmental Impact Assessment Guidelines, (1993)*. National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal
- Final Feasibility Study of Deurali Hupsekot Water Supply and Sanitation Project, 2019*
- Detailed Engineering Design Report of Deurali Hupsekot Water Supply & Sanitation Project, 2019*
- Due Diligence Report of Deurali Hupsekot Water Supply & Sanitation Project, 2019*
- Environmental Assessment and Review Framework, (2017)*. Regional Urban Development Project (RUDP), Ministry of Urban Development (MoUD), Government of Nepal for ADB
- Environmental Assessment and Review Framework, (2018)*. Urban Water Supply & Sanitation (Sector) Project, Ministry of Water Supply, Government of Nepal for ADB
- Final Socio-Economic Profile of Deurali Hupsekot Water Supply & Sanitation Project, 2019*
- Forest Act, (1993)*. [www.lawcommission.gov.np](http://www.lawcommission.gov.np)
- Labor Act (1991)*, Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- Land Acquisition Act, 1977 and latest amendments*. [www.lawcommission.gov.np](http://www.lawcommission.gov.np)
- Local Government Operation Act, (2017)*. [www.lawcommission.gov.np](http://www.lawcommission.gov.np)
- National Drinking Water Quality Standards and Implementation Directives for National Drinking Water Quality Standards (2005)*, Ministry of Physical Planning and Works, Government of Nepal
- National Forest Policy, (2015)*. [dof.gov.np](http://dof.gov.np)
- National Transport Policy, (2001)*. Ministry of Physical Infrastructure and Transport, Government of Nepal, Nepal
- National Urban Policy (2007)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- National Urban Water Supply & Sanitation Sector Policy, Final Draft (2009)*. Ministry of Physical Planning & Works, Government of Nepal, Kathmandu
- National Water Supply & Sanitation Policy (Draft) (2014)*. Ministry of Urban Development, Government of Nepal, Kathmandu
- Nepal Disaster Management Reference Handbook (2017)*. Center for Excellence in Disaster Management and Humanitarian Assistance, <http://www.cfe-dmha.org>



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*Rural Water Supply and Sanitation National Policy,(2005) and Rural Water Supply and Sanitation National Strategy,(2005).Ministry of Physical Planning and Works, His Majesty's Government, Singhadurbar, Kathmandu, Nepal*

*Shrestha K 1998. Dictionary of Nepalese Plant names.Mandala Book Point, Kathmandu, Nepal.*

*Solid Waste Management Act (2011). Ministry of Science and Technology and Environment, Kathmandu*

*STATE of Nepal's FORESTS (2015).Ministry of Forests & Soil Conservation, Government of Nepal*

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

*Town Development Act (1998),www.lawcommission.gov.np*

*Uprety, B.K (2003). Safeguard the Resources Environmental Impact Assessment Process and Practice Kathmandu*

*Urban Water Supply & Sanitation Policy (2009)*

*Water Resource Act (1992). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu*

<https://cites.org/eng/disc/what.php>

<https://www.cbd.int/>

[www.mofald.gov.np](http://www.mofald.gov.np)

  
Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

# ANNEXES



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**ANNEX 1**  
**APPROVED TERMS OF REFERENCE (ToR)**

Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu



Government of Nepal  
Ministry of Water Supply  
Department of Water Supply and Sewerage Management  
Urban Water Supply and Sanitation (Sector) Project  
PROJECT MANAGEMENT OFFICE  
Panipokhari, Kathmandu

TERMS OF REFERENCE (ToR)  
for  
INITIAL ENVIRONMENTAL EXAMINATION  
of,  
DEURALI HUPSEKOT WATER SUPPLY AND SANITATION PROJECT  
NAWALPUR DISTRICT

Submitted To:	Submitted By:
Ministry of Water Supply, Singhadurbar, Kathmandu	Project Management Office, Urban Water Supply and Sanitation (Sector) Project, Department of Water Supply and Sewerage Management, Panipokhari, Kathmandu
Prepared by: TAEC Consult P. Ltd. – Integrated Consultants Nepal (P) Ltd. JV	

OCTOBER 2019

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Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

ToR for IEE of Deurali Hupsekot WSSP

List of Abbreviations

A.D.	Anno Domini
ADB	Asian Development Bank
B.S.	Bikram Sambat
BPT	Break Pressure Tank
CBD	Convention on Biological Diversity
CBS	Central Bureau of Statistics
c/c	Center to Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
DC	Direct Current
DCC	District Coordination Committee
DEOR	Detailed Engineering Design Report
DHM	Department of Hydrology & Meteorology
DI	Ductile Iron
DL	Distribution Line
DMA	District Metered Area
DRTAC	Design Review & Technical Audit Consultant
DSMC	Design Supervision and Management Consultant
DWSSM	Department of Water Supply & Sewerage Management
EA	Executing Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
ESA	Environmental Safeguards Assistant
ESE	Environmental Safeguards Expert
FDB	Fund Development Board
FGD	Focus Group Discussion
GI	Galvanized Iron
GoN	Government of Nepal
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HHs	Households
HP	Horse Power
IA	Implementing Agency
IBAT	Integrated Biodiversity Assessment Tool
IC	Interruption Chamber
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICG	Implementation Core Group
IEE	Initial Environmental Examination
IO	International Organization
IUCN	International Union for Conservation of Nature
LC	Least Concern
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard

TABC-ICGN/JF

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ToR for IEE of Deurali Hupsekot WSSP

NEA	Nepal Electricity Authority
NGO	Non-Governmental Organization
NRs.	Nepalase Rupees
O&M	Operation & Maintenance
OBA	Output-Based Aid
ODF	Open Defecation Free
PE	Polyethylene
PID	Proportional Integral Derivative
PLC	Programmable Logic Controller
PMO	Project Management Office
PN	Pressure Number
PPHA	Persons Per Hectare
QOL	Quality of Life
RCC	Reinforced Cement Concrete
REA	Rapid Environmental Assessment
RPMO	Regional Project Management Office
RVT	Reservoir Tank
SCADA	Supervisory Control and Data Acquisition
SPS	Safeguard Policy Statement
SSTWSSSP	Second Small Towns Water Supply and Sanitation Sector Project
STWSSSP	Small Towns' Water Supply & Sanitation Sector Project
TDF	Town Development Fund
TL	Transmission Line
ToR	Terms of Reference
UWSSP	Urban Towns' Water Supply & Sanitation (Sector) Project
VDC	Village Development Committee
VU	Vulnerable
WSSDO	Water Supply and Sanitation Division
WSSP	Water Supply & Sanitation Project
WTP	Water Treatment Plant
WUA	Water Users' Association
WUSC	Water Users' & Sanitation Committee

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ToR for IEE of Deurali Hupsekot WSSP

**WEIGHTS AND MEASURES**

°C	Degree Celsius/Centigrade
%	Percentage
m <sup>3</sup>	Cubic Meter
dia.	Diameter
HP	Horse Power
Kg/day	Kilogram per day
Kg/sq cm	Kilogram per square centimeter
km	Kilometer
kVA	Kilo Volt Ampere
lps	Liter per second
m	meter
mm	millimeter
nos	numbers
PPHA	Person per hectare
sq km.	Square Kilometer

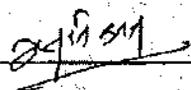
  
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- Annex IV: Photographs

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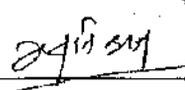
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1. INTRODUCTION

1.1 NAME AND ADDRESS OF THE PROPONENT

This Terms of Reference (TOR) has been prepared with reference to the Feasibility Study Report & Final Detailed Engineering Design Report to carry out the Initial Environmental Examination (IEE) of Deurali Hupsekot Water Supply & Sanitation Project in Nawalpur District. TOR for this IEE study of this project is needed as a reference to EPR 1997 (amendments 2007 & 2017).

Urban Water Supply and Sanitation (Sector) Project (UWSSP) of the Government of Nepal. The Department of Water Supply and Sewerage Management (DWSSM) is the project proponent (Implementing Agency). The Ministry of Water Supply (MoWS) is the approval agency.

**Name of the Proponent:**

Project Management Office  
Urban Water Supply and Sanitation (Sector) Project  
Department of Water Supply and Sewerage Management

**Address of the Proponent:**

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

**Name of the Approval Agency:**

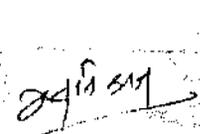
Ministry of Water Supply  
Government of Nepal

1.2 CONSULTANT PREPARING THE REPORT

TAEC Consult P. Ltd. Joint Venture with Integrated Consultants Nepal Pvt. Ltd. is responsible for preparing this IEE report.

**Address of the Consultant:**

Shankhamul, Kathmandu  
Tel: 977 1 5242846  
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2 BACKGROUND AND DESCRIPTION OF THE PROJECT

2.1 Project Background

Prior to three projects (STWSSSP), (SSTWSSSP) & TSTWSSSP, currently, ADB and GoN are working together to provide water supply and sanitation services to selected urban municipalities of Nepal through Urban Water Supply Sanitation (Sector) Project (UWSSP) in accordance with the updated 15-year Development Plan for Small Towns and the National Urban Development Strategy. The Project will support Nepal in expanding access to community managed water supply & sanitation in 20 project municipalities by drawing on experiences and lessons from three earlier projects funded by ADB. UWSSP will be implemented over a five-year period (Indicative implementation period is 2018 to 2023) and will be supported through ADB financing using a sector lending approach. This project has the following outputs: i) Improved Water Supply and Sanitation Infrastructure in Project Municipalities and ii) Strengthened Institutional and Community Capacities.

Department of Water Supply and Sewerage Management (DWSSM) is the implementing agency whereas the Ministry of Water Supply is the executing agency. The project will assist in implementing a part of the 15-year Development Plan for Small Towns Water Supply and Sanitation Development in the country and about 20 Small Towns will be covered by this project.

In this context, the Eastern Regional Design Supervision and Management Consultants (ERDSMC), joint venture of TAEC Consultants P. Ltd. and Integrated Consultants Nepal (P.) Ltd. has been assigned to provide services on detailed design of seven towns namely, Birendranagar (Chitwan), Katarahiya (Rautahat), Laibandi (Sarlahi), Katari (Udaipur), Diktal (Khotang), Bhojpur Bazaar (Bhojpur) and Charikot (Dolakha) Town Projects. In addition, Ilam (Ilam), Brihat Bharu (Tanahun), Sunkoshi Panchkhal (Kavre), Kanchanrup (Saptari), Rampurta (Okhaldhunga) and Deurali Hupsekot (Nawalpur) are assigned for the preparation of DEDR report.

The project has many stakeholders such as the WUSC, Project Management Office/ DWSSM, DRTAC, Town Development Fund (TDF), and Regional Design Supervision and Management Consultants (RDSMCs), RPMO. There is a need for effective co-ordination among the various stakeholders. In this context, the consulting team especially the major members of the Consultants' Team including the Team Leader, socio-economist and design engineer responsible for detailed design has been responsible for maintaining co-ordination with all the stakeholders involved in the project.

Both the GoN and ADB policies require that the environmental implications of individual developments needs to be taken into account in the planning and decision-making process, and that action is taken to reduce the adverse 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.

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ToR for IEE of Deurali Hupsekot WSSP

**2.2 Relevancy of the Project**

The existing water supply system is intermittent and is limited to only certain parts of the proposed area. Similarly, there is no provision of treatment system in the existing water supply system of the proposed town.

Considering the water demand and condition of the existing system, there is a need for a project to upgrade the existing water supply situation in the service area to meet the growing demand for private connections and to make drinking water available to the people of service area throughout the year.

**2.3 Rationale of the Project & IEE**

*Rationale of the Project*

The rationale of the project is based on the increasing demand of the reliable project, hardship of people for safe drinking water, willingness to pay, affordability, public health impacts, policy commitments and various other aspects.

*Rationale of the IEE*

As per TOR issued to DSMC, it is stated that the Project needs to be studied from the environmental point of view as per EPA 1997 and EPR 1997 (Amendments 1999, 2007 & 2017). The proposed water supply and sanitation project is intended to serve the water demand of areas of wards 1, 2, 3 & 4 Hupsekot Rural Municipality, Kavrepalanchowk District. It is expected that after the implementation of this project, the users of the area will be able to avail adequate amount of safe drinking water.

The project needs to go through the IEE process as stipulated in EPR 1997 (Amendments 1999, 2007 & 2017). The proposed project shall be using surface water sources. The Project does not involve the construction of any tunnels; relocation of people or households & there is no need to settle any households. The project is expected to benefit a design population of about 45,768 (2040).

As the proposed project falls within the definitions provided in the EPR 1997 (Amendments 1999, 2007 & 2017) Schedule 1 (Pertaining to Rule 3) (Clause H) for drinking water projects; only an IEE shall be necessary. The regulation stated in Schedule 1 (Clause H) shall only be applicable if the proposal does not fall under the category "A" through (Clause H) of Schedule 2. The following given table gives the brief details on fulfillment of the criteria for the requirement of IEE as per Schedule 1 (Pertaining to Rule 3) (Clause H) and Schedule 2 (Pertaining to Rule 3) (Clause H) of Environmental Protection Regulations 1997 with amendments 2017 by the proposed project.

**Table 1 : Criteria for requirement of IEE for Drinking water supply Projects**

Condition described in the Act and Regulations	Status for the proposed town project
Surface water sources with safe yield up to 1 cusec and utilizing up to 50% of the available quantity.	Up to 1 cusec and utilizing up to 50 % of the available quantity
Treatment process of water at the rate more than 25 liters per second.	The proposed project requires 50tps discharge for



ToR for IEE of Deurali Hupsekot WSSP

Condition described in the Act and Regulations	Status for the proposed town project
Supply of drinking water to a population ranging between 10,900 and 100,000 upon connecting new sources.	the treatment process. Within the limit as the present population is 21,601 and the targeted population is 32,168 up to design year 2040.

2.4 Objective of TOR

The main objective of the TOR is to guide the subsequent IEE study and to produce a comprehensive and coherent IEE Report. It also ensures that the resulting IEE study will fulfill the environmental assessment requirements of the project. It means that ToR shall ensure that IEE is sufficient for the proposed project.

The specific objectives of ToR include;

- Delineates the scope of IEE study
- Serves as a standard document against which the subject matter covered by the IEE report will be evaluated.
- Describes the existing environment of the proposed project town
- Delineates the specific project activities to be undertaken
- Identifies the existing policies, plans, strategy, rules, acts and various legal frameworks related to the proposed project
- Sets out time frame, with the required human resources to carry out IEE study along with the required estimated budget
- Identifies and List out the anticipated environmental impacts that can be either adverse or beneficial
- Emphasizes the most significant aspects of the study

2.5 Objective of the IEE study

The main objectives of the TOR is to guide the subsequent IEE study, to produce a comprehensive and coherent IEE Report as per the Environmental Protection Act, 1997 and Environmental Protection Rules, 1997 (with amendments 2007 & 2017).

The specific objectives of the proposed IEE study include:

- Identify the major issues that may arise as a result of proposed works on biophysical, socio-economic and cultural environment of the project area,
- Recommend practical and site-specific environmental mitigation and enhancement measures, prepare and implement environmental monitoring plan for the project,
- Provide information on the general environmental setting of the Hupsekot Town area as baseline data. Make sure that IEE is sufficient for the proposed water supply project.



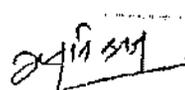
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**2.6 Description of the Project**

**2.6.1 Location and Accessibility of the Project Area**

The Project area of Deurali Hupsekot Water Supply and Sanitation Project lies in Hupsekot Rural Municipality, Nawalpur District, a hilly region in the Gandaki Province (Province 4) of Nepal. The municipality lies between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude. The town is located about 8 km away from Danda bazaar (near Kawasoti) east-west highway. The distance from Kathmandu to Kawasoti 178 km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) 3 km and Sahid Chowk to WUSC office/ Jhyalbas 8km. The location of the project area is depicted in the figure given below:

  
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Deurali Hupsekot WSSP

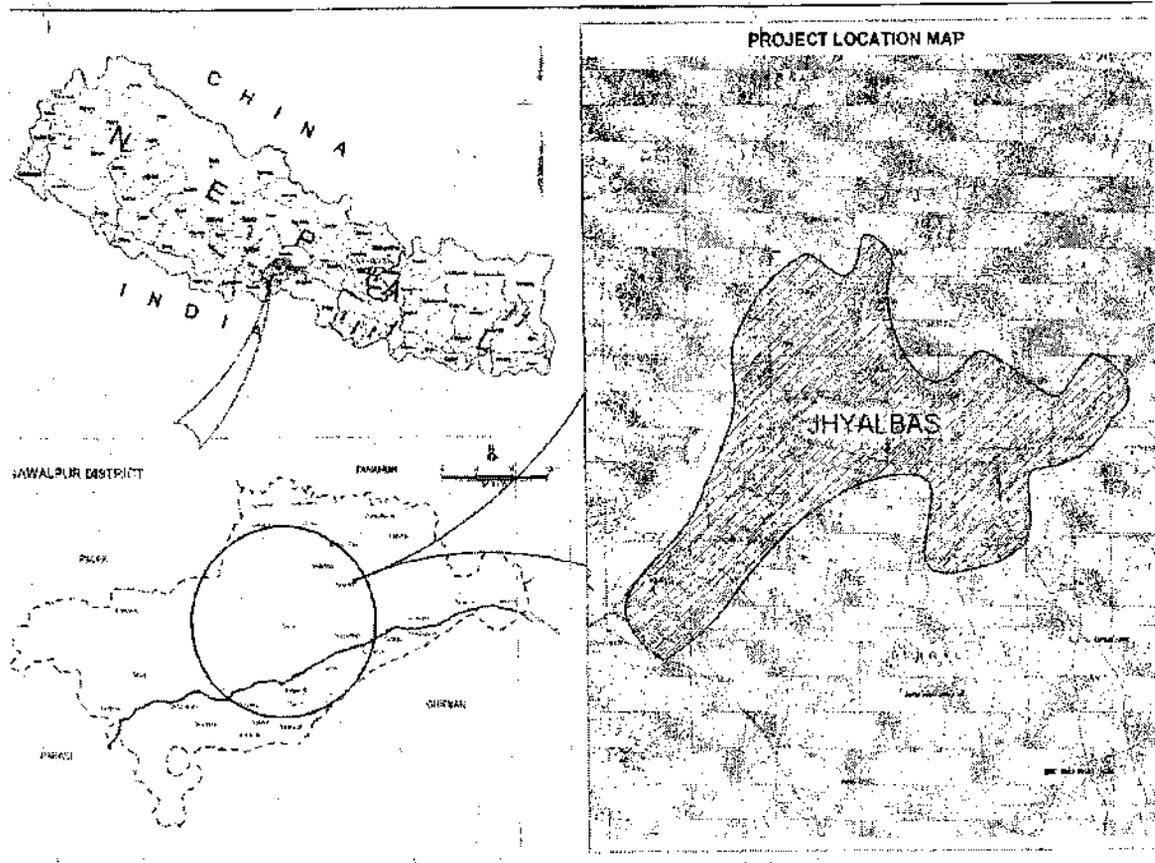


Figure 1: Location Map of the Project Area

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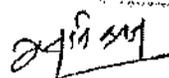


ToR for IEE of Deurali Hupsekot WSSP

**2.6 Description of the Project**

**2.6.1 Location and Accessibility of the Project Area**

The Project area of Deurali Hupsekot Water Supply and Sanitation Project lies in Hupsekot Rural Municipality, Nawalpur District, a hilly region in the Gandaki Province (Province 4) of Nepal. The municipality lies between 27° 74' 0" N Latitude and 83° 98' 0" E Longitude. The town is located about 8 km away from Danda bazaar (near Kawasoti) east-west highway. The distance from Kathmandu to Kawasoti 178 km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) 3 km and Sahid Chowk to WUSC office/ Jhyalbas 8km. The location of the project area is depicted in the figure given below:

  
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Deurali Hupsekot WSSP

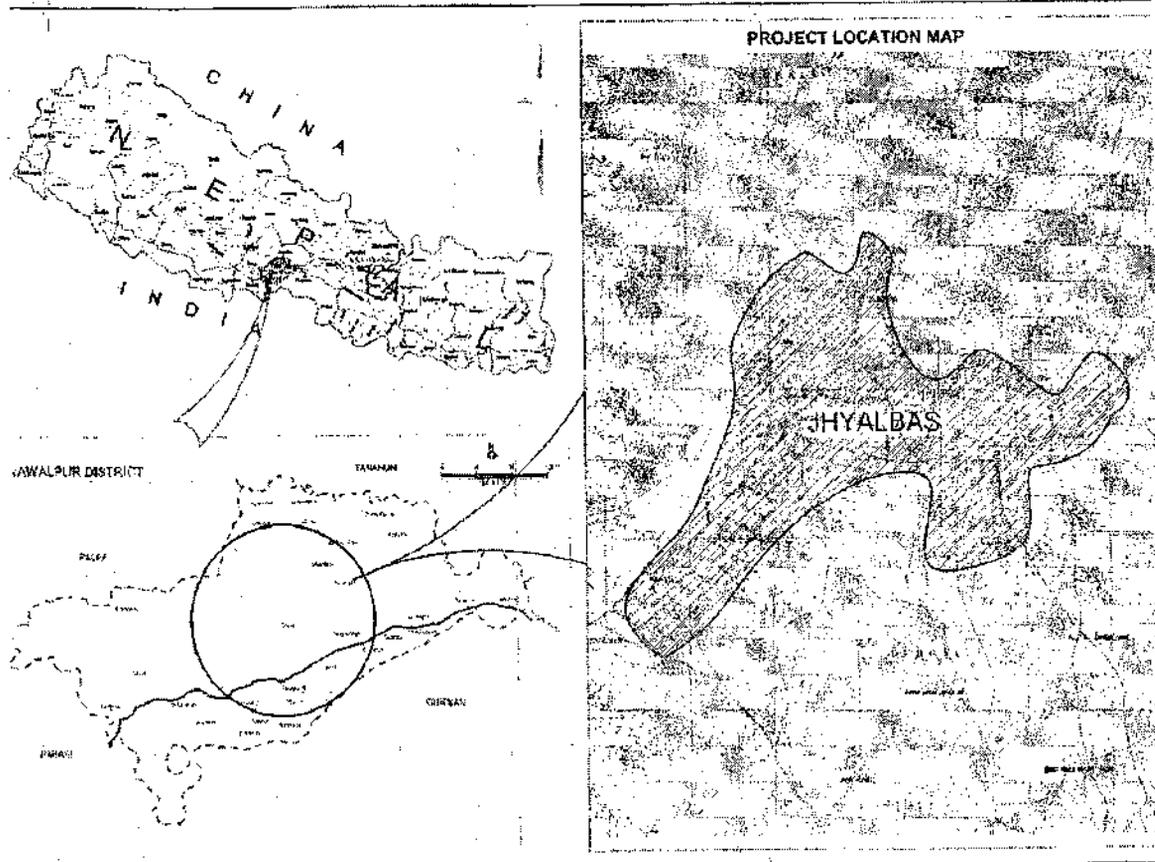


Figure 1: Location Map of the Project Area

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This figure 1 given above shows that the project area belongs to Hupsekot Rural Municipality of Nawalpur District of Gandaki Province of Nepal. The project town is bounded by Bungdikali Rural Municipality & Palpa District (Nisdi Rural Municipality) in the north, Bulingtar Rural Municipality in the north east, Kawasoti & Devchuli Municipality in the east, Kawasoti & Madhyabindu Municipality in the south and Madhyabindu Municipality & Palpa District (Nisdi Rural Municipality) in the west. Out of 6 wards of the project town, the proposed project area covers areas of wards 1,2,3 & 4.

The project town was declared as Rural Municipality by the Government of Nepal, Ministry of Federal Affairs and Local Development from Council of Ministers on September 20, 2015. The then VDC which were merged are Deurali, Dhaubadi & Hupsekot to form a Nawalpur Municipality with total of 6 wards covering area of 189.21 sq. km. The following table gives brief details on the ward profile of Hupsekot Rural Municipality:

Table 2: Hupsekot Rural Municipality Ward Profile

Present Ward Municipality	Former VDC/Municipality	Former Ward No.
1	Deurali VDC	WN 5
	Dhaubadi VDC	WN 2
2	Deurali VDC	WN 1,2 & 9
3	Deurali VDC	WN 3 & 4
4	Deurali VDC	WN 6 & 7
	Dhaubadi VDC	WN 7
5	Deurali VDC	WN 8
6	Dhaubadi VDC	WN 1,3,6,8 & 9
	Hupsekot VDC	WN 1 to 9

Source: Final District 1-75 Connected List for Rajpatra ([www.mofald.gov.np](http://www.mofald.gov.np))

The Table 2 shows that the reformed Hupsekot Rural Municipality has been divided into 6 wards. The current ward 1 of Hupsekot Rural Municipality belong to ward 5 of former Deurali VDC. Similarly, the current ward 2 belong to ward 2 of former Deurali VDC, ward 3 belong to wards 3 & 4 of the former Deurali VDC, ward no. 4 belong to wards 6 & 7 of Deurali VDC and ward 7 of former Dhaubadi VDC, the ward 5 belong to ward 8 of former Deurali VDC and ward 6 belong to wards 1,3,6,8 & 9 of former Dhaubadi VDC & ward 1 to 9 of former Hupsekot VDC.

The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2 °C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari. The required data from this station is used for the project.

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The salient features of the project area is briefly included in the table given below:

Table 3: Salient Features of the Project

SN.	Items	Description
1	Name of Project	Deurali Hupsekot Water Supply and Sanitation Project
2	Type	Both gravity and pumping system (use of 3 existing gravity sources and one new pumping source and gravity water supply in distribution system)
3	Study Level	Final Detailed Engineering Design
4	Location Area	
	Province	Gandaki (4)
	District	Nawalpur
	Rural Municipality/Municipality	Hupsekot Rural Municipality
	Service Area Ward and settlement	Hupsekot Rural Municipality: Ward no. 1: Beluwa and Jukepani Ward no. 2: Koliya and Guheri (water to be supplied from RVT without pumping) Ward no. 3: Girubari and Belhari Ward no. 4: Jhyalbas and Talto Dihi
5	Available Facilities	
	Road	Kathmandu to Kawasoti is 178km, Kawasoti to Danda Bazaar (bifurcating junction called Sahid Chowk) is 3km and Sahid Chowk to WUSC office/ Jhyalbas is 8km.
	Water Supply System	Limited supply for few hours operated by WUSC
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
6	Social Status	
	Present HHs Numbers (2018)	3,652
	Present Population (2018)	21,601 (incl rental 2,254)
	Base Year Population (2021)	22,786 (rental population kept constant)
	Design Year Population (2040)	32,168 (rental population kept constant)
	Average HHS size	5.3
	Population Growth Rate % (PGR)	2.00
	Projected HHs in Design Year (based on GR)	5,647
7	Water Demand (MLD)	
	Base Year (2021)	2.88 (2,882,429 ltr per day)
	Design Year (2040)	4.07 (4,069,252 ltr per day)
8	Source Characteristics	
	Source Name	Girubari Khola at 2 locations (one gravity, other pumping), Palhar Khola and Betai Khola
	Source Type	Stream
	Source Location	Hupsekot (Ward 5 Girubari gravity at Salakon), Ward 4 Girubari pumping), Palhar Khola Ward 4, Betai Khola Ward 2
	Source discharge (lps)	Plenty (more than required) Girubari 40 lps, Betai 10 lps Palhar khola 12 lps & Sunjwell

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SN.	Items	Description
		(seepage of Girubeni khola, plenty)
	Tapped discharge (lps)	50 lps (Girubari gravity 26lps, Girubari pumping-20hr a day 11lps, Patharkhola 8lps, Betai khola 5lps)
8	Type of Structures	
	Proposed intakes	Stream Intake - 1 (Girubari existing rehab) Stream/ seepage water - 1 (Girubari Khola; sumpwell well) Stream intake - 1 (Pathar khola, existing rehab.) Stream intake - 1 (Betai khola, existing rehab)
	Water treatment plant	Rapid mixture - Flocculator-Sedimentation-Roughening - Slow sand filter-Desinfection Rapid mixture - 2 location (Dihidanda & Shivalaya) Flocculator- 2 locations (Dihidanda & Shivalaya) Sedimentation tank - 1 location (Dihidanda) + existing 2 location (rehab) Roughening filter - 1 location (Dihidanda) + existing 2 location (rehab) Slow sand filter - 1 location (Dihidanda) + existing 2 location (rehab) Disinfection - 2 locations
	Pumping Details	Single stage 25HP submersible pump to pump 11lps from Girubari Sumpwell/ intake. Transformer 50KVA and generator-50KVA
	Ground Reservoir (No and Capacity in CUM)	RVT1: 400cum - 2 nos. (Dihidanda) RVT 2: 400cum - 1 no. (Shivalaya) (Total capacity 1,200 cum)
	Pumping Chamber/Sump for pumping	
	Valve Chamber (Bricks/ RCC)	45 Nos
	Pipe valve box	62 Nos
	IC/BPT	
	Office Cum GH (O1) /Guard House (G 1) / Small Guard House (G2) /Dosing House (DS), Generator House, Boundary wall	WUSC office-1 no (bazaar area land to be provided by WUSC) Guard house (GH1) - 1 no (at sump well site) Guard house with store room (GH2) - 2 nos (RVT-1 Dihidanda and RVT-2 site Shivalaya) Dosing station- 2 nos (RVT-1 and RVT-2 site) Generator house - 1 no. (sump well site) Boundary wall - 4 locations
	Fire Hydrant (Nos)	5
	River crossing (Nos)	16
	Length of pipe in transmission main (from various intake to WTP/ RVT), (m)	13,453.00
	Length of Distribution Mains (m)	149,964.00
	Number of DMAs	7
	Number of HH connection	3,652
	Number of connections for institution	39
9	Total Cost of WS Component (Inclusive of all) NRs.	889,958,368.07
10	Cost Sharing Arrangement (NRs)	

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SN.	Items	Description
	GON Component (70 %)	622,970,857.65
	TDF Loan (25 %)	222,489,592.02
11	WUSC's upfront contribution 5% (Cash)	44,497,918.40
12	Tariff	
	Up to 6 cum/monthly (NRs)	35
	7 to 10 cum/monthly (NRs)	45
	11 to 20 cum/monthly (NRs)	55
	21 to 30 cum/monthly (NRs)	65
	>30cum	75
	Institutional cum/month (NRs/cum)	75
	Weighted av. Tariff (NRs./HH/month)	989 (NRs. 60.93/cum)
13	Financial Indicators	
	EIRR (Base case), %	23.50
	FIRR (Base case), %	21.50
	AIFC (Base case), NRs per cum	21.11
	AIEC (Base case), NRs per cum	28.25
14	Environment	
	ADB Category	B, Only IEE necessary
	IEE finding	No significant adverse impacts
15	Per Capita Cost for W/S component	
	Per Capita Cost (for base year pop.), NRs	39,057.24
	Per Capita Cost (for design year pop.), NRs	27,665.95
16	Total cost of Sanitation Component (including all), NRs	12,255,156.81
	GON Component (85 %)	10,416,883.29
	Local Authority (15 %)	1,838,273.52
17	Total cost of Water Supply and Sanitation Component, NRs	902,213,524.88

Source: Final DEDR, 2019

2.6.2 Water Supply Components

The following sections describe the proposed water supply components.

i) Source/Intakes

Supply Water from Three Gravity Sources and One Pumping Source

The surces have enough water than tapped discharge and depletion of source discharge are not envisaged. The three gravity sources Girubari khola (26lps), Betal khola (5lps) and Pathar khola (8lps) have combined tapped discharge 39lps and Girubari khola/ sumpwell pumping will have 11lps tapped discharge to be extracted

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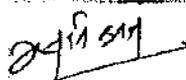
for the new watersupply system. The designed discharge will be brought to proposed WTP site – Dehidanda and existing WTP site Dehidanda and Shivalaya then treated water comes to RVTs Dehidanda and Shivalaya and distribute the water to the distribution system by gravity.

The Girubari khola intake will be rehabilitated with gabions works at downstream and the sides of existing cutoff wall, placing of course gravel and boulder on river bed at the upstream of cutoff. The PE pipe of 140mm dia will be perforated on top half diameter and hole of (7-10)mm dia will be made. There will be 16 numbers of perforated pipe of each 20 m length. These pipes will be placed in between gravel and connected to collection chambers. Also, direct supply of river water to each collection chamber have been provisioned. This will be functioned, if perforated pipe cannot extract enough water at design volume or will be used during maintenance of perforated pipes clogged.

The Betai khola intake will be newly constructed with RCC cutoff wall, gabions works at downstream and the sides of cutoff wall. The small chamber will be constructed with the intake cutoff wall. The strainer has been provisioned to extract the water from chamber and two pipe will run upto existing collection chamber. The existing collection chamber will be rehabilitated.

The Pathar khola intake will be rehabilitated with gabions works downstream and sides of existing cutoff wall, placing of course gravel and boulder on river bed at upstream of cutoff. The PE pipe 140mm dia will be perforated on top half dia and 7-10mm dia hole will be made. There will be 7 numbers of perforated pipe of each 7 m length. This pipe will be connected at existing collection chamber. The existing collection will be rehabilitated. These perforated pipes will be placed in between gravel and connected to collection chambers. Also, direct supply of river water to collection chamber has been provisioned. This will be functioned, if perforated pipe cannot extract enough water at design volume or will be used during maintenance of perforated pipes clogged.

The proposed location of the sumpwall is in between Badahare kholsi and Chepari Gaira. The exact location of sump well at Girubari khola will be finalized during implementation after test drilling at site. If the soil starta at proposed site has layer of rock, the location will be shifted or altered nearby proposed location. Based on drilling, the sumpwell site will be finalized with minor modification in design, if necessary. There is only one sumpwell designed in the system. The perforated pipes are designed to flow the water from the filter media to sump well. The retaining wall at hill side and river side have been designed to protect the structures. The river side RCC retaining wall will be constructed to prevent the flood into the intake/ sump well site. It is envisaged that sump well will collect water more than 11 lps. Accordingly, the perforated pipes 10 number of each 7 m length are arranged considering the possibility of clogging of perforation in pipes. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system will be based on quality of water of the source. The sources supplies total 50lps water for the project.



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ii) Electrical System

The system has only one stage pumping that will pump 11lps water for 20hours daily, during design year. All other three sources are gravity system and there is no need of pumping. The sub meter would be enough for electrical works for building and dosing house at each RVT location.

The electrical system is designed as new together with overhead transmission line. It is envisaged that only one pump will run at a time and other will be an additional. Accordingly, the transformer, generator and other components are designed. The capacity and number of pumps are provided in **Table 4**.

**Table 4:Capacity and Number of Pumps**

Location	Number and capacity of pump	Remarks
Stage I (at sumpwell/ source)	2 nos x 25 HP	Only one pump will run at a time.

In addition, spare pump is arranged at the store as standby for the immediate replacement, if any of the pump does not function properly. There will be also provision of generator for backup to pump the water during NEA power failure. The transformer and diesel generator are designed as following in **Table 5**.

**Table 5:Transformer and Diesel Generator**

Pum ping stage	Description	Pump uses				Remarks
I stage	Pump 1 OR	25	HP	18.75	KW	Only one pump will run at a time
	Pump 2	25	HP		KW	
	Other load			4	KW	
	Total load			22.75		
	Safety factor			1.25		
	Net total load			28.43		
	Capacity of Transformer			35.55	KVA	
	Adopt :Capacity of transformer -1no			50	KVA	
	Capacity of generator					
	1.25times the capacity of transformer					
	Size of Generator			44.43		
	Keep generator 1 no ( rated power)			50	KVA	

**Distribution System:** The power cables from control panels to each load is calculated to satisfy the following criterions:

- Current carrying capacity of the cable is enough to carry the full load current continuously.
- Maximum voltage drop in the cable is less than 2% of the system voltage.

The control panels at pump house are provided with the Star-Delta starter to reduce the high starting current drawn by the pump-motors.

iii) Transmission Main & Pumping

Transmission line is the pipe line length from various intakes to reservoirs. The transmission line passes via road, barren land and public land. The site for intakes and transmission route seems stable. But it is reported by WUSC that the



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transmission route of Girubari khola (gravity) may be susceptible to landslide occasionally at some locations. Hence, to overcome this problem, the Girubari sump well has been provisioned though the Girubari intake site has enough discharge. The single stage pumping is designed for Girubari sumpwell.

The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari sumpwell at Dehidanda and Shivalaya WTP/ RVT site is about 13,453.00m. The separate transmission line is provisioned for each source due to their location, elevation and topography. The transmission main of Betai has to cross Girubari khola. The existing suspension bridge, that is still in use in the existing system, will be used for pipe crossing for the proposed project also.

iv) Thrust Blocks, Saddle Blocks and Thrust Beam

Thrust blocks have been proposed for DI pipes (transmission and distribution mains for both alternatives) from being moved by forces exerted within the pipes arising from the internal pressure of the pipeline or the flow of water hitting bends, tapers and closed or partially closed valves. Typical thrust blocks have been designed for a pressure of 24 kg/sq. cm for both transmission lines and distribution line.

Similarly, there is also provision of Thrust Beam & Saddle Blocks for DI pipes that will be laid up in sloppy areas and un-buried portions. All saddle blocks are proposed to be anchored with concrete at the center of each pipe to prevent movement. Provision of RCC support for the stretches of buried & un-buried DI pipe line has also been made to prevent pipe movement which are laid-up in sloppy area.

v) Water Treatment Plant and Chlorination

The water quality of the streams/ river varies from time to time. At every rainfall event, they carry suspended solid, other organic and inorganic impurities. The water quality of the sources has been tested during rainy and summer season. It is reported by the WUSC and community that water becomes turbid during frequent rain and flash flood events and hence, it has been requested to include the treatment plant for the worst condition of surface water. The treatment plant is generally provisioned for the worst water quality though the water quality is tested safe. This quality would not be same for all over the year to throughout the design period of the project.

Based upon the water quality, secondary data available and discussion with community in the surrounding of the service area, the system is designed with water treatment process having rapid mixture, flocculator, sedimentation tank, roughening filter, slow sand filter and disinfection are designed for surface water source.

There are existing treatment plants at two locations (Dihidanda & Shivalaya) for each Girubari, Betai and Pathar Khola sources. These treatment plants are of 5lps capacity. This will be used in the proposed system with necessary rehabilitation works, washing and placing of filter media with addition of deficit filter media. In addition, other components that includes Rapid Mixture and Flocculator have been included in the existing treatment plant. New treatment plant has been designed for the remaining discharge 40 lps,

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Small Rapid Flash Mixture one unit of size 2.0m x 2.0m x 2.0m at each Dihidanda and Shivalaya, Baffle Wall Flocculator 2 unit of each 8.50m x3.00m x 1.20m at Dihidanda and one unit of 3.0m x1.00m x 1.20m at Shivalaya will be constructed new.

Sedimentation tank of 4 units of each 13.75m x 4.75m x 3.00m is designed taking surface loading 600 ltr/hr/m<sup>2</sup>. And, roughening filter 4 units of each 7.10m x 1.60m x 1.5m is designed taking rate of filtration 2700 ltr/m<sup>2</sup>/hr. Slow sand filter with 6 units of each 17.80m x 7.20m x 2.90m designed taking rate of filtration 190 ltr/m<sup>2</sup>/hr. This filtration rate is taken as quite high due to limitation of the land provided by the WUSC and would be enough for the tested water quality. The scrapping/ replacement of sand from slow sand filter will be increased, if the quality of water is worse than the treated quality. The entire new treatment plant will be constructed at Dihidanda before/ beside existing treatment plant. The bypass arrangement from each filter inlet/ outlet is also provisioned for the repair and maintenance of the structures.

An emergency feeder line consisting of a solution tank connected with feeding tank having a constant level is proposed for the chlorination. Bleaching powder 9.61kg / day and 13.56kg / day required during base and design year respectively. After disinfection some part of the lime will be settled at the bottom of the ground reservoir as residue. This residue shall be removed through washout. The washout pipe will be connected with the drain.

vi) Service Reservoir

The whole system is divided into seven DMAs. The system is designed by using multi reservoir concept. There are three reservoirs of capacity 400 cum proposed that includes a) RVT1 - 2 nos each 400cum, at Dihidanda and b) RVT 2 - 400cum, 1 no. at Shivalaya for Jhyalbas area. The service area has been separated due to topography of the town. There are two existing reservoirs at each location having capacity of 250 cum and 150 cum respectively. These reservoirs are very old and not considered in the new system. In RVT-1 location, the first RVT of 400 cum capacity shall be constructed and this will supply water to the existing system. Then, only another RVT of 400 cum capacity shall be constructed.

The total storage requirement for the system at the end of the design period shall be about 1200 m<sup>3</sup>. This capacity is split and will be constructed at various locations. The reservoirs will supply water in the proposed service area.

vii) Distribution Main and District Metering Area

Distribution system comprises a pipe network, which is designed in loop network system by using EPANET-2.4 software. EPANET software is used for the analysis of the water supply network. The base demand, elevation of each node, reservoir head and distance from node to node are the basic input data for the software. Socio economic survey data is used to determine the nodal/ base demand considering the demand for rapid settlement growth. The engineering survey data is used for the length of the pipe and elevation of the nodes. The software works for unlimited



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nodes. The input data should be given directly in the software after constructing the model. The software works for both loop and dead-end system.

There are three different methods for the determination of the head loss. But two methods can be used for the determination of head loss in pipe. The Hazen-Williams formula is the most commonly used to determine the head loss in pipe for water only. The Darcy-Weisbach formula is the most theoretically correct formula for all flow regimes and for all liquids. Hence, Hazen-Williams formula is used in pipeline design.

The roughness coefficient in Hazen-Williams formula for the use of GI, DI and PE pipes is taken 110, 120 and 130 respectively. The new distribution system has been designed by using PE-100 pipe and DI pipes.

The PE-100 pipes of outer dia 50mm to 200mm and DI 150mm to 300mm dia have been used in the design. The minimum pipe size used in the design is PE100-50mm, which governs the velocity. PE100 pipe above 4 kg/cm<sup>2</sup> pressure are proposed in the distribution network design as per technical requirement. But, PE100 PN 6 pipe of 50mm and 63mm pipes are not used in the design due to technical difficulties to join the pipe with electrofusion technology. Instead of these, PN10 pipes are used. All PE pipes will be joined using electrofusion technology. The washout and air valve have been arranged in the distribution system in control valve/ pipe valve chamber, where possible. In some nodes the residual head is considered high to maintain the residual head in the downstream node.

The flow at each line has been calculated based on the socioeconomic survey data and the possibility of rapid increment of settlement in the near future. Pipe valve box/ valve chamber have been proposed at suitable junction to regulate the design flow in each pipe line and to stop the flow in the particular area without affecting the other area during repair and maintenance. All distribution line pass along the road network and public land. The distribution lines have been proposed in core bazaar area, along the blacktopped road and DMA boundary on both sides. While, the pipeline on only one side has been designed in the remaining areas. Due to undulations/ irregular topography, two pipes are designed along one road, in which one pipe will supply water at the highest level without distributing water to the households and then only water will be distributed to the households up to bottom from the next pipe laid together. The distribution pipe for DMA-1 has to cross Girubari khola. The existing suspension will be used for pipe crossing.

The pipeline is designed by adding 10% extra length of actual one. The estimated distribution pipe is taken as 10% more than the actual one for PE pipe up to 90mm dia. and 5% more than the actual one for remaining all pipes. The length of pipe is 149,964.00m.

The distribution system is designed in consideration with District Metering Area (DMA). Each DMA will have bulkmeter to determine the flow into respective service area. There are 7 DMAs in total service area to supply water from service reservoir.

  
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DMA boundary is fixed depending upon the elevation difference, location and easy for operation and maintenance is presented in the figure given below:

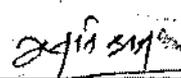


Figure 2: District Metering Area (DMA) of the Proposed System

viii) Household Connections

The household shall connect the tap to their households directly from the main distribution pipe. The average 15m length of 20mm dia. PE 100-PN16 pipe with ferrule, compression joint, joined with GI fittings and valves up to meter for each HH connection. There will be 3,664 connections including individual and institutional connections in the system during base year. The meter shall be kept near and at the adjoining location of the compound of the houses. After meter, each HH should extend the pipe themselves as they desire. The necessary fittings have also been designed. Electrofusion saddle has been proposed to join the HH connection at main pipe to connect ferrule in the saddle. Likewise, GI and DI saddle clamp are proposed to join the HH connection at main pipe to connect the ferrule for GI or DI pipes.

Two types of tap stands have been designed for the project. At the end of the design period, it is anticipated that about 89.80% of the total households shall have fully plumbed and 10.20% of the total households shall be served through yard connection. The poor households will connect tap at free of cost through OBA. There will be total 5,071 fully plumbed and 576-yard taps will be connected during design year. In total, there will be 5,659 connections including institutional 12 connections during design year.

  
  
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ix) Appurtenances

- **Bulk Water Meter:** The bulk water meter is designed at various locations in the transmission and distribution system to ascertain flow and leakage in the system. The bulk meter is designed at each intake outlets, at the outlet of service reservoirs, DMA outlets. Each bulk meter will provide the quantity of water supplied in the particular area, water consumed by the consumers and leakage in that area can be determined calculating the difference of HH consumption water volume and bulk meter water supplied water volume. Accordingly, the repair and maintenance works can be carried out, if the leakages more than the permissible range in such areas.
- **Types of Connections:** Consumers have been classified in three categories depending on their income level. The consumers having high level of income requiring more consumption of water are placed in fully plumbed category, consumers having medium income at medium consumption level and consumers of low-income group and who can't afford tariff of fully plumb connections and use less water through tap connection at their household will be benefitted through yard connection. The social survey has been carried out. The poor household will get tap free of cost with OBA programme. However, WUSC has to reconfirm the poor household during implementation of the scheme.

The cost estimate of the taps for all households and institutions has been included in project cost estimate. During execution of the project, the poor household shall connect tap from OBA facilities with the recommendation of WUSC.

- **Wash out Valve:** The washout valves have been arranged at transmission, distribution and every water retaining structures to remove the slush/ debris. Washout valves have been provided at depressions points in the pipeline and dead ends, where necessary. The purpose of the valve is to clean the debris collected in the pipeline. Sometimes the valve can also be used for the maintenance of the pipe line without closing the whole distribution system. There are 26 washout valves provided in the whole system.
- **Air Valve:** The air valves are provided in intake outlet, transmission and distribution mains. Air valves have been designed to release the air accumulated in the pipes. The water flowing through pipes always contain some air. This air tries to accumulate at the highest points and may interfere in the flow by narrowing pipe opening area. Air relief valve is provided in the distribution pipe near the outlet of service reservoir to provide the exit for such accumulated air. Also, the automatic air release valve is provided in distribution system at several locations. There are 20 air valves provided in the whole system.
- **Control Valve:** The valves are placed in required location of the structures, transmission main and distribution main. The purpose of the control valve is to

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regulate the required flow at each distribution main from the junction/ node. Sometimes, it can be used for the maintenance of distribution system in particular area without closing whole distribution system. A control valve is provided in the system where there are more than two branches from one junction or where it is necessary. Control valves have been designed in suitable distribution junctions having more than two mains and in required places to regulate the design flow in the main. The design flow in each pipe line is based on design population, non-domestic demand and system wastage and leakage. The future demand in the main may fluctuate and the control valve/ regulating valve shall be useful to deliver the required flow in pipe line. In total, there are 129 gate valves, 62 nos. pipe valve box and 45 nos. washout/ air release/ control valve chambers are designed in the distribution system.

- **Pressure Relief Valve:** The pressure relief valve is a safety valve that keeps the pressure within safety limits to prevent equipment failure, mishaps or other undesirable outcomes. Pressure relief valves will be designed with controls to increase or decrease the level of pressure in a pressure vessel. This type of valve will be installed at each pumping stage.
- **SCADA Valve:** This type of valve is operated by SCADA (Supervisory Control and Data Acquisition) system. This SCADA system is a control system that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices such as Programmable Logic Controller (PLC) and Discrete PID controllers to interface with the process plant or machinery.

A collection of equipment that will provide an operator at remote location with enough information to determine the status of a particular piece of a equipment or entire substation and cause actions to take place regarding the equipment or network.

Supervisory Control and Data Acquisition (SCADA) achieves this requirement collecting reliable field data through remote terminal units (RTUs), Intelligent Electric Devices (IEDs) and presenting them to user requirement. The user interface or the man machine interface (MMI) provides various options of data presentation according to specific application and user needs. There are many parts of a working SCADA system. A SCADA system usually includes signal hardware (input and output), controllers, networks, user interface (HMI), communications equipment and software. All together, the term SCADA refers to the entire central system. The central system usually monitors data from various sensors that are either in close proximity or on-site.

Basic SCADA is proposed/ designed for Deurali Hupsekot town. The outlet management system (OMS) from sump well outlet and reservoirs outlets and each gravity intake outlets, Reservoir management system (RMS) at each inlet of reservoirs. SCADA control valves are also provisioned at the outlet of each DMA to monitor and control the designed flow. The Outlet Management System(OMS) is to Uniform Distribution of Water to the Reservoirs



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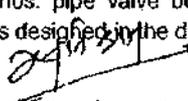
irrespective of its location and distance from the source of supply, system is able to avoid the overflow of Reservoirs, also should be enabled to measure, monitor and control the flow Delivered to the RVT without any external Electric Energy and no high recovery cost for Energy/Communication Cost such as GSM/GPRS/RADIO etc.

The automation to link all the components through hSCADA (Hydraulically Supervised Control and Data Acquisition) and all the mentioned components which shall be capable to enable to control and monitor the parameters from SCADA room/ master control center for submersible pumps of all for main and one small stages, Water level sensors for all RVTs , Online Chlorine Monitors, AMS, RMS, WMD, and zonal PFCMDS etc are provided. The Reservoir Management System (RMS) to enable to avoid the overflow of Reservoirs, pressure controlling system Also system should be enabled to measure, monitor and control the flow Delivered to the RVT without any external Electric Energy and no high recovery cost for Energy/Communication Cost such as GSM/GPRS/RADIO etc.

Likewise, water supply system operation and maintenance, one-year operation and maintenance for SCADA is also provisioned. The proposed system shall work under Wi-Fi coverage area, on the GPRS network or on a given radio frequency. The radio frequency is a free of cost communication media, but the limitations it has are, eye visibility of two connecting devices and the distance between them. Similarly, it would be difficult to reach all equipment within Wi-Fi coverage also. The other way out is the GPRS which shall work with the 3g and above cell phone network area. The services of the network providers having a full network in the given area can be used.

x) Valve Chambers

- Two type of Chambers have been proposed in the project to control or regulate the flow of the proposed water supply system. The chambers constructed by brick masonry have been provided in non-vehicular areas and rural area. In other vehicular carriageway and city area, chambers constructed with RCC has been provided.
- The chambers shall serve as housing, protection and convenient access to these pipe appurtenances. Inside the concrete chambers, necessary supports shall be provided for pipes and valves at appropriate locations. Access to the valve chamber will be given via lockable cast iron covers with frames. Manhole covers of the heavy-duty type have been recommended in RCC chambers. Covers for manholes in paths may be proposed of medium duty type.
- In total, there are 62nos. pipe valve boxes and 45 washout/ air release/ control valve chambers designed in the distribution system.

  
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- **Fire Hydrants:** Fire hydrants will be provided at major road junctions. These fire hydrants shall also be used for flushing of the system as required. Fire hydrants, namely, stand post type, conforming to IS908 is recommended.

xi) **Generator House**

A Generator house is designed at Girubari sump well site. The generator supplies power mainly for the pump installed at sump well, when there is no regular power from NEA. The generator of 50kVA (rated power) shall be used to pump the water during power failure at the town.

xii) **Laboratory Building cum WUSC Office Building, Guard House and Dosing House**

A two storied laboratory building cum WUSC office building has been designed and proposed to be built in Jhyalbas bazaar. WUSC will provide the land for the construction of office. The Guard House of type -2 will be at WTP/ RVT-1 and RVT-2 sites, Guard House of type- 1 will be at sump well site. The preliminary water quality test kits are arranged for regular water quality monitoring. It is included in the project components of the system.

xiii) **Boundary Wall & Retaining Wall**

The retaining wall has been proposed at new WTP site. In some cases, boundary wall will be above the retaining wall and in some cases, boundary wall will be built from the foundation. The metal post with chain-link fencing above brick masonry wall has been proposed to protect the structures such as sump well/ intake, office building, reservoir sites, generator house, WTPs etc. as necessary.

**2.6.3 Sanitation Components**

The sanitation component is considered as an integral part of the water supply project so as to minimize the coverage gap between water supply and sanitation components. The main issues that need to be addressed in the sanitation components as they would have consequential impacts on all the activities are:

- Toilets/Septage/Sludge Management
- Drainage System
- Solid Waste Management
- Institution Building/Strengthening
- Raising Awareness

The sanitation practice is directly related with their hygiene consciousness. The socioeconomic survey shows that there is no separate sewerage system within the proposed service area. But almost, all the households in the urban areas as well as in rural areas have their own latrines with septic tanks. The survey revealed that out of 4024 households, about 95.90% (3858) households have water sealed latrines whereas, 2.10% (84) households have pit latrines. About 0.5% (22) HHs have ventilated pit latrines whereas 0.1% (3) of total households are using cistern flush



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type of pit latrine. Similarly, minimal percentage i.e.s 1.4% (57) of total households do not have latrines.

The survey also revealed that there are not any public toilets or institutional toilets within the project town. Hence, the basic sanitation requirement of the proposed project is the construction of public toilets for institution as well as general public for the betterment of facilities in this area. The thrust point will be to avail basic sanitation facilities and declare the whole municipality as ODF. The aim of sanitation is universal coverage. ODF, based on multiple approaches like basic sanitation package, School sanitation and hygiene education program, Community-led total sanitation, School-led total sanitation, Local body-led total sanitation, is considered as the bottom line for program intervention.

There is provision of two public toilets under the sanitation components of this proposed project. The location for these proposed public toilets includes (i) Ward no. 1 at Jukepani (ii) Ward no. 4 -Jhyaalbas Bazaar. Similarly, there is also provision of two institutional toilets viz., one at health post and location of other shall be finalized during implementation.

There is also provision of tractor to collect and dispose the waste of the project town. The waste of each household shall be collected nearby house and then tractor will collect this waste at regular interval and dump in safe place. The dumping site should be managed by WUSC by either buying the land or taking the land in lease at safe location. It is envisaged that the rural municipality will support to WUSC for solid management of the town.

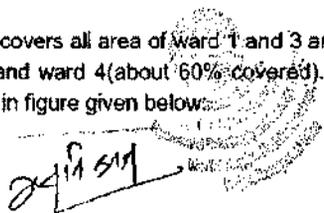
These sanitation components will contribute towards the betterment of sanitation facilities in this area. These facilities also inculcate behavior of toilet use as well as of effective solid waste management among students and the general public. Hence, the proposed project also will address basic sanitation issues through the provision of toilets and solid waste management.

**2.7 Proposed Service Area;**

Discussion was held with WUSC for the service area of new project. The initial discussion was held with water users and sanitation committee members and Hupsekot Rural Municipality officials and Chairman. The names of the major settlements of the service area of Hupsekot Rural Municipality are as follows:

- Ward no 1: Beluwa and Jukepani
- Ward no 2: Koliya and Guheri (water to be supplied from RVT to settlements without pumping)
- Ward no 3: Girubari and Belhani
- Ward no 4: Jhyalbas and Tallo Dihi

From the above, the service area covers all area of ward 1 and 3 and majority of area of ward 2 (about 80% covered) and ward 4 (about 60% covered). The service area and proposed sources are shown in figure given below:



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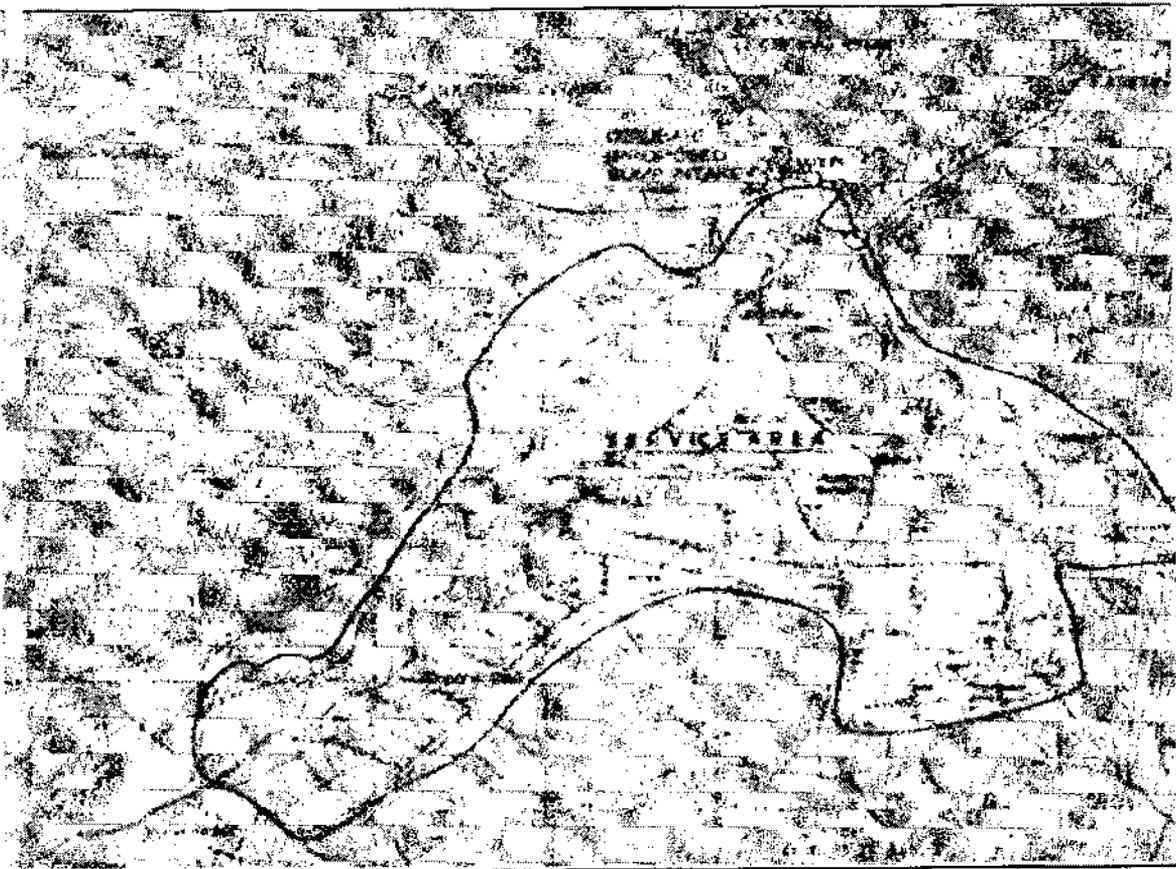


Figure 3: Proposed Service Area

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2.8 Population and Demographic Characteristics

The project area has been delineated in consultation with WUSC, the local community, Chairman of Rural Municipality. As per social survey, total HHs and population are 3,652 and 21,601 (permanent 19,347 and rental 2,254) respectively in 2018 with average family size of 5.3.

The service area comprises of merging Hupsekot VDC, Deurali VDC's ward and Dhaubadi VDCs wards. Based on the available record and census data, the growth rate of the service area is ranging from -1.2% to 1.93% based on the population between 2001 to 2011 of the VDCs. Whereas, the population growth of Nawalparasi district is 1.35% between 2001 and 2011 and is in decreasing order. Based upon these figures, the average growth rate of the service area is taken as 2.0%. The population and growth rate of Nawalparasi District and Hupsekot Rural Municipality are shown in Table 6 and Table 7.

Table 6: Population and Growth Rate

SN	District	2011		2001		Growth Rate
		POP	HHs	POP	HHs	
1	Nawalparasi	643508	128793	562870	98340	1.35

Table 7: Population and Growth Rate of Hupsekot Rural Municipality

SN	NEW WARD	COMBINED VDC/MUNICIPALITY(NEW)	2011		2001		Growth Rate
			POP	HHs	POP	HHs	
1	1	Deurali (5)	2099	493	1734	323	1.93
2		Dhaubadi (2)	1944	374	1661	304	1.59
3	2	Deurali (1, 2, 9)	4392	828	3805	646	1.45
4	3	Deurali (3, 4)	4721	937	3903	675	1.92
5	4	Deurali (6, 7)	3092	542	2798	385	1
6		Dhaubadi (7)	2514	447	2177	323	1.45
7	5	Deurali (8)	1095	175	1113	138	-0.16
8	6	Dhaubadi (1, 3-6, 8, 9)	1527	240	1723	214	-1.2
9		Hupsekot (1-9)	3681	552	3464	505	0.61
TOTAL			25065	4588	22378	3513	1.14

Source: CBS, 2001 and 2011

As per socioeconomic survey (2018), the present population in the proposed service area is 21,601 in 3,652 HHs. Out of the total 19,347 permanent population, there are 9783 male and 9,564 females living in 3,652 HHs. The forecasted populations of the town are 22,786 and 32,168 in 2021 and 2040 respectively with growth rate of 2.00 % in permanent population. The rental population has been kept flat throughout the project period and is included in above figures

The population growth rate percentage of the project area is determined based upon population census 2001 AD, 2011AD of the Nawalparasi district, former Deurali VDC, Dhaubadi VDC and Hupsekot VDC and proposed service area. This has been consulted with WUSC.

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**2.9 Settlement pattern**

The settlement pattern of project area is mixed type. The core bazaar area (Jhyalbas) which is located in ward no. 4 is quite dense and populated than other wards of the Hupsekot Rural Municipality. Similarly, settlement pattern of the other wards (1, 2 and 3) are semi urban type and is quite scattered. However, the settlement pattern is gradually changing and rural cluster are developing as market. The rate of migration into service area from surroundings villages and from other districts is increasing during few years.

**2.10 Ethnicity and caste**

The composition of community by caste/ethnic is heterogeneous in nature. So, diversity of culture, custom, tradition, norms and values exists in this project area. The household survey of the sub project area has also reflected the cross section of major ethnic groups of the country.

The survey revealed that out of total 3652 households, Janajati/ethnic (Tamang, Danuwar, Magar, Newar, etc.) are major group comprising of 64.20% (2346) households in the service area. Similarly, Brahmin/Chhetri are the second largest group comprising of only 19% (695) of total household whereas, Dalit comprises 16.30% (595). And, the minimal percentage i.e., 0.4% (16) belong to other castes groups (Musalman, Madhesi). Details of information are presented in the table given below:

**Table 8: Distribution of Households and Population by Ethnic Composition**

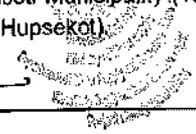
S.N.	Caste/Ethnic composition	Ward #				Total	%
		1	2	3	4		
1	Brahmin/Chhetri	124	91	439	41	695	19
2	Janajati	902	206	932	306	2346	64.2
3	Dalit	185	131	259	20	595	16.3
4	Others (Musalman, Madhesi)	4	4	7	1	16	0.4
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100</b>

Source: Socio-economic Survey, 2018

**2.11 Education and Health**

**Education:** There are various educational institutions in the project town. According to the institutional data obtained from the survey, 8 educational institutions including higher secondary schools, secondary schools as well as primary schools in service area with 2,858 people including students (Total: 2,698, Male: 1,292, Female: 1,406), staffs (Total: 15, Male: 8, Female: 7) and teachers (Total: 145, Male: 58, Female: 87). Almost of all educational institutions are relying on boring water, tap water and other sources. All of these educational institutions have water sealed latrines.

**Health:** General medical facilities are available in the service area. There is one health post named Deurali Health Post available within the service area. Similarly, small pharmaceutical stores are also available in Jhyalbas Bazaar. For further medical services, most of the people prefer going to Kawasoti Municipality (15.9 km from Hupsekot) and Narayanghat, Chitwan (41.90 km from Hupsekot).

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**2.12 Waterborne and Communicable Diseases**

The survey also collected cases of water born diseases such as diarrhea, dysentery, stomach ache and skin disease etc. within the service area. It was found that cases of mortality by water related diseases are nil. The information related to water borne and communicable disease was crossed checked by visiting hospital and health posts within the service area. According to the obtained information, about 5.13% (1221) were observed to be suffered from diarrhea where as 4.74% (1128) were observed to be suffered from dysentery. Simialrly, about 5.23%(1245) were found to be suffered from other diseases such as skin, stomach pain, fever etc. In total, about 15.10 %(3594) of populations are known to be suffered from the water related diseases.

**2.13 Economic Activities**

The survey shows that there are various banks, cooperatives, hotels & lodges within the project area that have been boosting the economic activities of the project town. During the course of household survey of project area, the detailed information on the major occupation and economic activities of all household head has been collected. The survey shows that out of total 3652 households, the highest number of population i.e., 70.29% (2567) are engaged in agriculture, whereas 5.15% (188) population depend on business and 4.98% (182) of population in service. And, only 0.3% (11) are invoved in industrial sector. Similarly, about 15.99% (584) and 2.71% (99) are dependent upon remittance and labour respectively. Then, only 0.58% (21) are found to be engaged in other sectors.

**2.14 Income Level and Poverty Conditions**

The survey revealed that main sources of household income of the service area are agriculture, service, remittance and wage labour, respectively. Among the total 3652 households, 45.45% (1660) have monthly income of more than Rs. (20,001-50,000) and about 30.64% (1119) have monthly income of Rs. (10,876 - 20,000). Likewise, 8.21% (300) are earning ore than Rs. 50,000. The study shows that only 4.52%(165) falls under poor category that covers the households with income less than Rs 7,500 per month. The monthly income of HHs in the service area is given in table below:

Table 9: Income Level of Households by Ward

S.N.	Income Level Range	Ward #				Total	%
		1	2	3	4		
1	< NRs. 7,500	64	5	70	26	165	4.52
2	NRs. 7,501-10,875	95	43	241	29	408	11.17
3	NRs. 10,876-20,000	267	200	545	107	1119	30.64
4	NRs. 20,001-50,000	665	177	630	188	1660	45.45
5	> Rs. 50,000	124	7	151	18	300	8.21
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100.00</b>

Source: Socio-economic Survey 2018

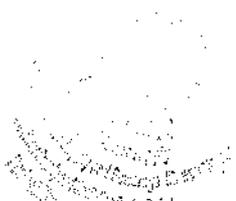
**2.15 Existing Water Supply & Sanitation Situation**

**2.15.1 Existing Water Supply**

a) Source to House Connections

Initially, two water supply systems were there, namely Deurali and Soli Khola. After joining together, the WUSC named as Deurali Soli Khola WUSC and later on it

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became Deurali Hupsekot Water Supply and Sanitation Project. There are several sources used in the service area. The system was implemented on 2040 BS and completed on 2047BS with 21 numbers of public tap stands. The system handed over to WUSC on 2055BS. The WUSC had received NRs 25,000.00 during receiving the project from GoN. The system has been expanded several times depending upon the budget available at each time from GoN / or other various agencies. The system is gravity water supply system from intake/ source to WTP/ RVT and distribution system.

Because of the fund availability, there are several pipes laid parallel from each source to reservoirs. The water treatment plants (sedimentation, 11.25m x 4.25m x 2.16m), roughening (12.60m x 7.0m x 1.32m) and slow sand filter (11.80m x 10.62 X 2.8m)) are constructed recently at two locations ( one for Soti Khola system at Shivalaya and another for Deurali system, Dihidanda) which can be used in new system with some repair works has to be carried out. The one chamber of slow sand filter of Sotikhola system has leakage needs to be repaired. The valves have to be replaced and filler material to be washed and placed again. But the sizes are inadequate for the new system. The size for the new system has to be determined and deficit size has been included in the new system.

The private tap distribution has been started on 2060 BS. At present, there are 2,337 private taps in the service area. GI pipes and HH water meter are used in the house service connection. The system supplies water for 24hour from reservoir but each house will get water only 1-2 hour in a day. The upstream house hold closes the tap and downstream house will fetch water though system supplies 24 hours in a day through service reservoir. This is mainly due to less discharge from sources, less capacity of storage reservoir and small sizes of pipes are used in the distribution system without any design consideration.

The WUSC has 10 regular staffs to regulate the system. They are enjoying with provident fund, medical facilities, overtime payment, Dashain allowance, gratuity, payment against balance leave etc. The WUSC has implemented progress water tariff. Minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. They have implemented computer billing system for 5-6 years. Currently, WUSC has about NRs 423 lakhs in their bank account. That amount is deposited in Muktinath Bank, NCC Bank, Prabhu Bank and Rastriya Banijya Bank. Currently, WUSC shall collect monthly about NRs 5-6 lakhs from water tariff bill.

Currently used source not used in new system:

1. Rohini Khola/ Rohini Ghari Water Supply System: It is located in ward no 4. The length of pipe is about 2.5 km from intake to WTP/ RVT. 90mm pipe has been used. It is reported that the water has lime content and source will drying up during summer. Hence, this source is not used for the new system.
2. Soti Khola Water Supply System: It is located in ward no 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 75mm and 32mm pipe have been used. The source will get dry during summer. Hence, this source is not used for the new system.



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3. **Ramkot Kholsi Water Supply System:** It is located in ward no. 4. The length of pipe is about 3.0 km from intake to WTP/ RVT. 75mm dia 2 nos parallel pipe have been laid. The water has lime content and source will drying up during summer. Hence, this source is not used for the new system.
4. **Badahare Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The water has lime content and source will drying up during summer. Hence, this source is not used for the new system.
5. **Chepari Gaira Kholsi Water Supply System:** It is located in ward no 4. The length of pipe is about 1.50 km from intake to WTP/ RVT. 40mm dia pipe have been laid. The source will get dry up during summer. Hence, this source is not used for the new system.

Currently used sources used in new system

1. **Girubari Khola Water Supply System:** It is located in ward no 5, Satakon. The length of pipe is about 8.0km from intake to WTP/ RVT (Dehidanda). The low height dam (about 2m height) having gabion and RCC cutoff wall constructed across the river to divert the water into collection chamber. 4 pipes of each 110mm dia HDPE perforated at upper half are laid to receive the water from filter/ gravel and allow into collection chamber. The collection chamber has 140mm dia 2 nos HDPE pipes. One pipe is used and another pipe is kept spare. The transmission pipe has 90mm dia and has leakage at several locations and pipe is sliding at kholsa crossing. The pipes are very old and exposed on the ground. Currently, it is supplying about 4-5lps water. This can be increased with proper construction of intake, addition of collection chamber and resizing the transmission pipe. The source has more than 40 lps discharge. About 26lps will be withdrawn from the source in new system.

During inception visit, it was observed that the height of RCC wall is enough and existing gabion wall needs to repaired and added. The water will be collected upstream of the low height dam. The additional collection chamber will be constructed and number and perforated pipe will be increased to extract the water into new and existing collection chamber.

The transmission pipe will be replaced by new to cater the designed discharge. The transmission pipe size has been chosen to supply water for rainy and summer season to decrease the pumping cost.

2. **Pathar Khola Water Supply System:** It is located in ward no. 4. The length of pipe is about 2.50 km from intake to WTP/ RVT (Shivalaya). The low height dam (about 2m height) having gabion and RCC wall constructed across the river to divert the water into collection chamber. 3 pipes of each 140mm dia HDPE perforated at upper half are laid to receive the water from filter and allow into collection chamber.

The collection chamber has 140mm dia. HDPE pipes that is split into smaller pipe diameter i.e., 90 mm and 63mm dia. pipes to reach water into WTP/ RVT. Currently, the perforated pipe is clogged and water is directly supplied into collection chamber. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more than 12 lps

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discharge. About 8 lps will be withdrawn from the source in new system with proper rehabilitation of intake and replacement of pipe in the transmission main.

During inception visit, it was observed that the height of RCC wall is enough. The exiting collection chamber will be rehabilitated and number and perforated pipe will be increased to extract the water into collection chamber. The transmission pipe will be replaced by new to cater the design discharge. The transmission pipe size will be chosen slightly higher to supply more water during rainy season and summer season to decrease the pumping cost.

3. **Betai Khola Water Supply System:** It is located in ward no. 2. The length of pipe is about 2.50 km from intake to WTP/ RVT (Dehidanda). The intake is safe and need RCC cutoff wall, some gabion works for side protection. 3 pipes of each 63mm, 63mm and 75mm pipes are laid parallel in transmission main. The pipes are exposed above ground and crossing from suspension bridge of Girubari Khola to reach water into WTP/ RVT. The transmission pipe has leakage at several locations. The pipes are very old and exposed on the ground. The source has more about 10 lps discharge. About 5lps is withdrawn from the source in new system with reconstruction of intake and replacement of pipe in the transmission main.

The survey revealed that largest numbers of household about 81.4% (3277) and 12.4% (500) are fetching water from private taps and public taps from existing water supply system respectively. Whereas minimum numbers of households rely on well/ spring/ stream/ rain water harvesting etc. All households reported that they use same source of water for all purposes as drinking, cooking, bathing, washing clothes, watering in kitchen garden etc. There is treatment plant in existing systems but it is not well functioning and size is not enough. Hence, the water is directly supplied into RVTs and distributed in the service area.

b) Consumption Level

The survey team has collected the information related to water consumption level during dry and wet season in the service area. Due to use of water from private/ public tap and well, spring, dhungedhara, consumption pattern and quantity do not vary between two seasons.

The survey revealed that the water consumption level of each household is found to be 199 liters per day and spent total time of about 42.4 minutes (per trip about 8.5 minutes) to fetching water. Similarly, total trips for collections of water are about 7.1 trips daily. The per capita per day consumption is about 37 liters per day.

c) Operation costs and current Tariff

There is existing piped water supply system. In addition, the communities are dependent in hand pump, tube well, kuwa, pond etc. The communities are ready to pay handsome amount for piped water for the proposed water supply and sanitation project. They are aware of the quality of supplied water and economic in comparison to the water rate of vender. Hence, the communities are ready to pay the water tariff reasonably fixed by the committee.

Now, they are fetching water through khola, hand pump, kuwa, where the tapped aquifer is easily susceptible to pollution and contamination. As there is hardship of



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water during dry season, quality of water is not good and found polluted, they are ready to pay whatever may be the tariff only they need water in sufficient quantity.

Currently, the WUSC is collecting minimum water tariff for the consumption of first 10cum is NRs 150.00, then after 10-20 cum consumption apply NRs 17 per cum, 20-30cum consumption apply NRs 20 per cum and more than 30cum consumption apply NRs 28 per cum. This shows that the community is familiar with water tariff and ready for that.

d) Problems of the Existing System

The problems of the existing water supply system in Hupsekot Rural Municipality are as follows:

- The existing water treatment components requires repair and maintenance.
- The intermittent supply system of the existing water supply system is not sufficient to meet the water demand of the increasing population;

**2.15.2 Existing Sanitation Situation**

a) Sanitary Facilities

The survey shows that out of total 3652 households, about 95% (3469) have water sealed latrine where as 2.3% (25) of total households have pit latrines. About 0.7% (25) have ventilated pit latrines whereas, 0.1% (2) of total households are using cistern flush type of latrine. The table below gives the information regarding the availability of the latrine facility within the project area.

**Table 10: Coverage of sanitary facilities**

S.N.	Type of Toilet	Ward #				Total	%
		1	2	3	4		
1	Pit Latrine	55	6	15	7	83	2.3
2	Ventilated Pit Latrine			17	8	25	0.7
3	Water Seal/Pour Flush	1149	422	1553	345	3469	95.0
4	Cistern Flush Latrines	1			1	2	0.1
5	Others	1				1	0.0
6	No Toilet	9	4	52	7	72	2.0
	<b>Grand Total</b>	<b>1215</b>	<b>432</b>	<b>1637</b>	<b>368</b>	<b>3652</b>	<b>100.0</b>

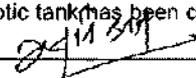
Source: Socio-economic Survey 2018

b) Drainage Facilities

There is provision of storm water drain along the main market area at both side of road. The service area is located in mild slope terrain, hence, there is no water logging problem foreseen. The WUSC has not prioritized to construct storm drainage at this stage.

c) Wastewater Management Practices

Almost all households in the urban areas have their own latrine with septic tanks. Similarly, private toilet with septic tank has been constructed in some households

*24/11/2018*  
  
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in rural area also. Such toilet with septic tank has been constructed in more than 61% HHs of service area. Hence, it is concluded that the people of the service area are much more aware in sanitation.

d) Solid Waste

The sampled survey among 210 households revealed that 63.80% (134) are disposing domestic solid waste in the pit near to the house while none of them are disposing their wastes by private collector. Similarly, it is also observed that 36.20% (76) are disposing waste in the waste bin managed by the local authority. It was observed that the respondent have sufficient knowledge about the solid waste management issues that may affect the public health and surrounding environment. The detailed information are given in the table below:

Table 11: Existing solid waste management practices

S.N.	WASTE MANAGEMENT	Ward				Total	%
		1	2	3	4		
1	Pit Near to House	13	60	46	15	134	63.8
2	Private Collector	0	0	0	0	0	0
3	Waste Bin Managed by VDC/Municipality	9	3	45	19	76	36.2
4	Other	0	0	0	0	0	0
	Grand Total	22	63	91	34	210	100

Source: Socio-economic Survey 2018

2.16 Poverty Alleviation Aspects

The socio-economic survey shows that 4.52% of the total 3652 HHs in the project area is below the poverty line. The wardwise distribution has been given in the socio-economic profile of the proposed project.

2.17 Description of the Environment

a) Hydrology and Climate

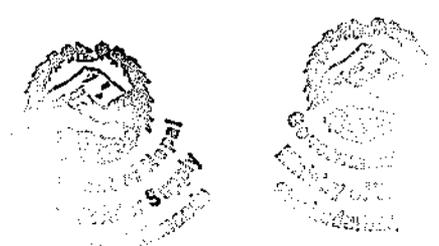
The climate of the project area is mild and generally warm and temperate. In winter, there is much less rainfall in Nawalpur than in summer. This location is classified as Cwa by Köppen and Geiger. The average annual temperature at Nawalpur is 24.2 °C. In a year, the average rainfall is 1811 mm, which is higher than 1400 mm, the average precipitation of Nepal. The nearest climatological station no. 0704 is situated at Beluwa, Girubari. The required data from this station is used for the project.

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 is also very low. Due to a similar reason, noise levels in the project area are expected to be within permissible standards prescribed by the Ministry of Environment of the GoN.

b) Flora & Fauna

The major plant life forms species available in the project area are given in Table 12 below.

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ToR for IEE of Deurali Hupsekot WSSP

Table 12: Plant Life Forms Found in the Project Area

Local name	English Name	Botanical Name	Life Forms
Aank	Giant Milkweed	<i>Caloptis gigantea</i>	Shrub
Amala	Indian Gooseberry	<i>Phyllanthus emblica</i>	Tree
Bakaino	China Berry	<i>Melia azedarach</i>	Medium Sized Shrub or Tree
Barro	Bedda Nut Tree	<i>Terminalia bellirica</i>	Tree
Bayer	Indian Plum	<i>Zizyphus mauritiana</i>	Tree
Bot Dhaiyanro	Small Flowered Crape Myrtle	<i>Lagerstroemia parviflora</i> Roxb.	Tree
Bhalayo	Charoli Nuts	<i>Busbanania latifolia</i>	Tree
Bhimsenpati Jhar	Three Leaf Isodon	<i>Isodon ternifolia</i>	Shrub
Chhatiwan	Blackboard Tree	<i>Astonia scobolaris</i>	Tree
Dabdabe	Garuga	<i>Garuga pinnata</i>	Tree
Damaikath	Colicwood	<i>Myrsine sp.</i>	Tree
Dhatrung	Chamror	<i>Ebretia laevis</i>	Tree
Dhursell	Indian Squirrel Tail	<i>Colebrookea oppositifolia</i>	Shrub
Dudhkhirro	Indrajao	<i>Holanbena pubescus</i>	Tree
Harro	Chebulic Myrobalan	<i>Terminalia chebula</i>	Tree
Jamun	Black Plum	<i>Syzygium cumini</i>	Tree
Kadam	Burflower-Tree	<i>Anthocephalus chinensis</i>	Tree
Khayer	Cutch Tree	<i>Acacia catechu</i>	Tree
Kumbhi	Slow Match Tree	<i>Careya arborea</i>	Tree
Kuro	Cristed Philippine Violet	<i>Barleria cristata</i>	Shrub
Kutmiro	Meda	<i>Litsea monopetala</i>	Tree
Kyamun	Rai Jamun	<i>Cleistocalyx operculatus</i> ( <i>Syzygium nervosum</i> )	Tree
Lahare gayo	Spinous Kino Tree	<i>Bridelia retusa</i>	Tree
Latikath	Oblong-Petal Dogwood	<i>Swida oblonga</i>	Tree
Nim	Indian lilac	<i>Azadirachta indica</i>	Tree
Palans	Bastard Teak	<i>Butea monosperma</i>	Tree
Rajbrikshya	Golden Shower	<i>Cassia fistula</i>	Tree
Sal	Sal	<i>Shorea robusta</i>	Tree
Sandan	Chariot Tree	<i>Desmodium oojainense</i>	Tree
Satsal	Indian Rosewood	<i>Dalbergia latifolia</i>	Tree
Saj	Indian Laurel	<i>Terminalia alata</i>	Tree
Sindure	Monkey Face Tree	<i>Mallotus philippensis</i>	Tree



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Local name	English Name	Botanical Name	Life Forms
Sisau	North Indian Rosewood	<i>Daibergeria sissoo</i>	Tree
Tantari	Karmal (Dog Teak)	<i>Dillenia pentagyna</i>	Tree

Source: IEE Field Study, 2018/019

Some species of mammals available in the project area is given below. The status of these mammals are as per IUCN & IBAT reports.

Table 13: Mammals in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Herpetas auro-punctatus</i>	Small Indian Mongoose	Nyauri Musa	LC
2	<i>Macaca mulatta</i>	Rhesus Monkey	Rato Badar	LC
3	<i>Felis Chaus/Prionailurus bengalensis</i>	Jungle Cat	Ben Dhade	LC
4	<i>Funambulus Pennantii</i>	Five Stripped Palm Squirrel	Paanch Dharke Lokharke	LC
5	<i>Canis lupus</i>	Gray Wolf	Bwanso	LC
6	<i>Panthera pardus</i>	Common Leopard	Chituwa	VU*
7	<i>Rattus Rattus</i>	House Rat	Musa	LC
8	<i>Vulpes Bengalensis</i>	Bengal Fox	Fyauro	LC
9	<i>Canis aureus</i>	Golden Jackal	Syaal	LC
10	<i>Cynopterus sphinx</i>	Greater Short Nosed Fruit Bat	Chamera	LC

Source: Field Survey, 2018/019

According to the local people, local and migratory birds are found within the project area. However, none of these are protected or endangered. Species The commonly found species of birds are given in the table given below:

Table 14: List of Birds in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Aethopyga Siparaja</i>	Crimson Sun Bird	Sipraja Bungechara	LC
2	<i>Amaurornis Phoenicurus</i>	White Breasted Water Hen	Sim Kukhura	LC
3	<i>Anas penelope</i>	Eurasian Wigeon	Sindure Haans	LC
4	<i>Anas platyrhynchos</i>	Mallard	Hariyo Tauke	LC
5	<i>Anas strepera</i>	Gadwall	Khackhade Haans	LC
6	<i>Anthracoceros albirostris</i>	Oriental Pied Hornbill	Kaalo Dhanesh	LC
7	<i>Alibene Brama</i>	Spotted Owl	Kochalgaade Latokoshero	LC
8	<i>Columba Livia</i>	Rock Dove (Blue Rock Pigeon)	Malewa	LC
9	<i>Corvus macrorhynchos</i>	Large Billed Crow	Kaalo Kaag	LC
10	<i>Corvus Splendens</i>	House Crow	Kaag	LC
11	<i>Lophura leucomelanos</i>	Kalij Pheasant	Kalij	LC

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S. No.	Scientific Name	English Name	Local Name	Status
12	<i>Cuculus Canorus</i>	Common Cuckoo	Cuckoo Koili	LC
13	<i>Cuculus Micropterus</i>	Indian Cuckoo	Kafal Pakyo	LC
14	<i>Dendrocopus Majori</i>	Fulvous breasted Woodpecker	Kaasthakut	LC
15	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	Silsile	LC
16	<i>Egretta Garzetta</i>	Little Egret	Sano Seto Bakula	LC
17	<i>Eudynamis Scopopaceus</i>	Western (Asian) Koel	Koili	LC
18	<i>Francolinus Francolinus</i>	Black Francolin	Titra	LC
19	<i>Hirundo Rustica</i>	Barn Swallow	Ghar Gauthali	LC
20	<i>Megalaima haemacephala</i>	Coppersmith Barbet	Milchara	LC
21	<i>Megalaima lineate</i>	Lineated Barbet	Kuiturke	LC
22	<i>Merops Leschenaulti</i>	Chestnut Headed Bee Eater	Katus Tauke Murali Chara	LC
23	<i>Milvus Migrans</i>	Black Kite	Kalo Chil	LC
24	<i>Passer Domesticus</i>	House Sparrow	Ghar Bhangera	LC
25	<i>Passer Montanus</i>	Eurasian Tree Sparrow	Rukh Bhangera	LC
26	<i>Psittacula cyanocephala</i>	Plum headed Parakeet	Tuisi Suga	LC
27	<i>Streptopelta orientalis</i>	Oriental Turtle Dove	Dhukur	LC
28	<i>Upupa epops</i>	Common Hoopoe	Fapre Chara	LC

Source: IEE Field Study, 2018/019

As per Wikipedia - List of Butterflies of Nepal based on the list prepared by Colin Smith in 2006, there are 690 species or sub species of butterflies in Nepal. The project area also provides habitats for a variety of butterflies, and during the walkover surveys, various types of butterflies were observed.

The commonly found Herpito-fauna (reptiles & amphibians) observed in the project area are shown in Table 15 given below:

Table 15: List of Herpito-Fauna Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Ptyas mucosus</i>	Rat snake	Dhaman	LC*
2	<i>Atractum Schistosum</i>	Olive Keelback Water Snake	Pani Sarpa	LC
3	<i>T. albolabris</i>	Green Pit Viper	Hariyo Sarpa	LC*
4	<i>Varanus Bengalensis</i>	Common Indian Monitor	Bhainse Gohoro	LC
5	<i>Calotes versicular</i>	Garden Lizard	Chheparo	LC*
6	<i>Hemidactylus Flaviviridis</i>	House Lizard	Mausull	LC*
7	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Common toad/Himalayan Toad	Khasre Bhyaguto	LC
8	<i>Rana cyanophylectis</i>	Stream Frog	Bhyaguto	LC*

Source: IEE Field Study, 2018/019

c) Aquatic Life

Similarly, the list of common fishes found in the project area is given below in Table 16. These species are found in the nearby water bodies of the project area that includes Girubari Khola, Betai Khola, Pathar Khola, Gaida Pakha Khola and Kahi Khola.

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Table 16: List of Fishes Found in the Project Area

S. No.	Scientific Name	English Name	Local Name	Status
1	<i>Amblyceps mangois</i>	Indian Torrent Catfish	Bokshi Machho	LC
2	<i>Amphipnous cuchia</i>	Blind Fish	Andha Bam	LC
3	<i>Barilius barna</i>	Barna Baril	Titar Kani Phaketa	LC
4	<i>Chagunius chagunio</i>	Chaguni	Jarua	LC
5	<i>Channa Gachua</i>	Dwarf Snakehead	Hile	LC
6	<i>Clarias batrachus</i>	Walking Catfish	Mangur	LC
7	<i>Clupisoma garua</i>	Garua Bachcha	Jalkapoor	LC
8	<i>Garra Annandalei</i>	Stone Roller	Chuche Buduna	LC
9	<i>Heteropneustes fossilis</i>	Stinging Catfish	Singhi	LC

Source: IEE Field Study, 2018

There will be no significant effects on the lives of fish species as well as fisheries by the proposed project activities.

\*Note:

(LC= Least Concern; VU= Vulnerable)

\*Note: Though some species fall under VU category, the project activities will not affect the habitat of these species as the construction area does not interfere their habitats.

LC\* are the status of the species according to IUCN Red List of Threatened Species however it is not included in IBAT report

d) Protected Areas

The project area is not located in or near any national park, wildlife reserve, conservation area, hunting area, including a buffer zone area, world heritage site, and other protected areas. Hence, there is no possibility of intervention into any of the protected areas by the construction activities of the proposed project.

e) Community Forests

Major project components does not encroach into any of the community forests of the project area. The study shows that there is no requirement of cutting trees. There will also be requirement of clearing of some bushes and shrubs, only along the proposed pipeline alignment. Hence, there will be no such significant effect on any of the forest areas.



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f) Educational Institutions

Hupsekot Rural Municipality has well managed education facilities. There are about 8 public and private educational institutions such as schools and colleges. This includes Shree Janta Adharbhut School, Shree Bal Kalyan Primary School, Shree Ghumti Devi Bright Future English Boarding School, Arpan English Secondary Boarding School, Jyala Adharbhut School, Shree Naya Esmriti Primary School, Bhu.Pu Sainik Pravat Academy and Sri Nepal Santi Primary School.

g) Quality of Life Values

The Project is not expected to affect any cultural or recreational resources adversely instead it will increase the existing quality of life due to the improvement in personal, household and community hygiene practices and community health through provision of safe & reliable water supply service and public latrine facilities.

**2.18 Resettlement, Relocation and Compensation Issues**

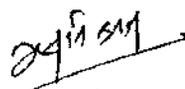
The proposed Project does not have any issues related to resettlement, relocation, and compensation.

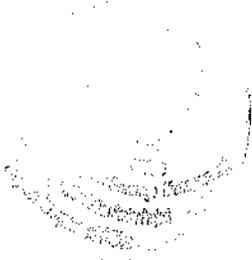
**2.19 Project Impact Area**

The project impact area refers to the area of the project town which is susceptible to either significant or insignificant impacts by the proposed project. This impact areas is delineated by demarcating the geographical boundary of the impact area on the topographical map. The impact area has been delineated on the basis of proximity of the construction site to the nearby surrounding areas. This area is divided into 'Core Area' and 'Surrounding Area' on the basis of vicinity and magnitude of the impacts due to construction and operation of the proposed project.

Here, the Core Area refers to the area required permanently as well as temporarily for the proposed project activities. This area includes service area of the project town which comprises of areas of wards 1, 2, 3 & 4.

The Surrounding Area refers to the area within the immediate surroundings of the proposed project. It includes the area of the project town which is not covered under the service area of the proposed project. It comprises the adjoining wards that includes wards 5 & 6.

  
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### 3 PROCEDURES TO BE ADOPTED FOR THE STUDY

This ToR will explain various approaches, methodologies and procedures adopted to prepare a comprehensive IEE report which should follow the provisions of the EPA & EPR and related national and sectorial guidelines. The IEE study should focus on impact identification, prediction and finally evaluating the extent and weight of the impact. The Consultant should follow the following methodology for preparation of the report:

#### 3.1 Literature Review/Desk Study

Available primary and secondary literature in the form of reports and maps; topographic maps, land use maps, aerial photographs, cadastral survey maps, etc. will be collected and reviewed. Feasibility Study Report and Detailed Engineering Design Report of the proposed project will be the key documents to determine the nature and scope of activities of the project that influences the environmental conditions of the proposal area. Rainfall & Other Meteorological data of the project town will be collected from the concerned authority. Similarly, published and unpublished reports about environmental policies, laws, rules, standards, Acts, Regulation and other legal provisions will be also collected and reviewed. Published and unpublished literature of the project area about biological, social, chemical, physical, and cultural environments in the form of maps, and reports, etc. will be collected from various sources and reviewed to get information on the coverage of the studies and fulfill the data gaps.

#### 3.2 Impact Area Delineation

The possible areas where the anticipated impacts have either significant or insignificant effects will be delineated. To specify the area that would be covered by the assessment, the geographical boundary of the influence area will be delineated on the topographical map. This delineating methodology is called Impact Area Delineation. The impact areas will be delineated on the basis of proximity of the construction site to the nearby surrounding areas. The impact areas has 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.

**Core Area:** Here, 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 construction of the project components will be carried out.

**Surrounding Area:** Here, the Surrounding Area 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.

#### 3.3 Field Study

Field studies will be carried out in the project site areas in an extensive manner by a multidisciplinary team comprising a) an Environmental Specialist; b) Water Supply & Sanitation Engineer; c) Sociologist; d) Geo-hydrologist and e) Botanist. During the visit, baseline information on physico-chemical, biological, and socio-economic & cultural conditions of the core area and surrounding areas of the project area will be collected through simple checklist method and Survey Questionnaire method. During field study, Rapid Environmental Assessment (REA) Checklist (Refer Annex-1) as



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recommended by ADB as per SPS, 2009 will be duly followed and filled up. This checklist should include the data regarding physico-chemical, biological, socio-economic & cultural environment. Various approaches and methodological tools that should be used for the data collection of various environmental aspects during this field study are described below:

**3.3.1 Physico-Chemical Environment**

An extensive physical & chemical environment survey will be carried out by delineating the project impact area to collect the baseline information. Topographic and geomorphological features that include Landforms, Geology & Soil, Land use pattern, Landslide susceptibility etc. will be observed and documented. The data regarding Climate & Rainfall of the project town will be collected from the concerned authority. Similarly, information on air quality and noise quality condition will be collected through field observation and expert's judgment. Information on rivers and aquatic ecology will also be collected to assess the existing condition. Various consultations programs with the local communities and interviews with few government officials, schools & representatives of the local bodies will be also conducted.

**3.3.2 Biological Environment**

The baseline information regarding biological environment will be collected through walkthrough survey throughout the core & surrounding areas of the project area by adopting simple checklist method (*Refer Annex II*), through professional judgment and local interaction. Under this baseline information in regard to the biological environment, types of vegetation and forests will be identified based on the species composition. The protected vegetation (rare, endangered, indigenous, etc.) of the project area as per IUCN Red Book, CITES Appendices, IBAT Report generated by ADB and GoN list species will be enumerated based on consultation with the local people and the expert judgment.

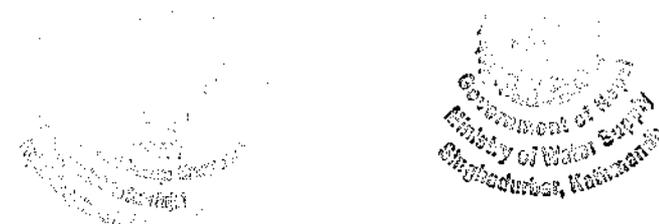
Information on rivers of the project area and aquatic ecology will be also collected through the interaction with the locals, the expert judgment and field observation.

The data on the existing wildlife/mammals, birds, herpetofauna (Reptiles/Amphibians) will be collected through field observation and interaction with the locals. The checklists as given in *Annex II* will be filled up accordingly. The status of each of these species will be identified as either threatened or near threatened or endangered species or least concern as per IUCN Red Book, IBAT Report of ADB, CITES Appendices and GoN list species. This will be affirmed by the expert review.

**3.3.3 Socio-Economic & Cultural Environment**

Household surveys will be conducted through interviews by simple questionnaire method to obtain information on the socio-economic & cultural environment that primarily includes demography, ethnicity, education, health & sanitation, drinking water condition of the project area, irrigation facility, local traditions, religions, land use patterns, incomes & expenditures and to acquire their perception towards the proposed project, etc. Information on Migratory patterns of the local people and the Impact of river on settlements & agriculture will also be collected. Information on the

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people residing within the core area of the proposed project town will be collected through socio-economic survey. The sample of Household Survey Questionnaire that should be filled up during household survey has been included in **Annex II**.

Focused Group discussions (FGD) will be conducted to obtain suggestions and comments from all the potential stakeholders. Direct observation (Transect Walk Method) will be 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 elites, Meetings and Group discussions shall be done to assess the current situation of the project area community.

**3.4 Public Notice**

As the **Sub Rule 2 under Rule 7 of Chapter 1** of EPR 1997 with Amendments 2017 states that "Whilst preparing the report, the proponent shall, in the cases of initial environmental examination affix a notice in the concerned Village Development Committee or Municipality, Office of the District Development committee school, hospital, and health post requesting the Village Development committee or Municipality and District Development Committee or concerned individuals or institution to offer their written opinion and suggestions within Fifteen days with regard to the possible impact of the implementation of the proposal on the environment where the proposal is to be implemented and prepare a deed. The said Fifteen days' notice shall also be published in a national level daily newspaper. After the publication of such notice the opinions and suggestions so received in relation to the same shall also be included in the report."

Hence, here 15 days public notice should be pasted at the concerned authorities that include Municipality Office, DCC and other related institutions like Schools, Health Posts, and Hospitals etc if any. Accordingly, this 15 days public notice will be published in a national daily newspaper. The main aim of the notice is to seek written opinions from the concerned people and institutions regarding the possible impacts that may result from the implementation of the proposal.

**3.5 Public Consultation**

The **Sub Rule 2 under Rule 7 of Chapter 1** of EPR 1997 with Amendments 2017 also states that "The proponent shall organize a public hearing about the proposal at the area of Village Development Committee or Municipality where the proposal is to be implemented and collect opinions and suggestions". Hence, the public consultation program will be conducted to collect reviews from the concerned stakeholders after the completion of 15 days of public notice. This public consultation program should include Public Hearing Programs, FGD, Meetings and Various Discussion Programs.

**3.6 Collection of Muchulkas (Deed of Inquiry) and Recommendation Letters**

Each copy of deed of inquiry (Muchulka) from each concerned authority, where 15 days public notice shall be pasted, will be included in IEE report. Similarly, the recommendation letters from the local authority (Municipality) will be collected after the completion of 15 days from the date of publication of public notice.



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3.7 Impact Identification, Prediction & Evaluation Methods

The information regarding Physico-chemical, Biological and Socio-economic & Cultural aspects as mentioned above will be collected to identify the susceptibility of these aspects to be affected by the proposed project activities. This will help to identify the anticipated environmental impacts of the proposed project. For this, Simple Checklist method shall be adopted for the impact identification. This will be carried out by using Rapid Environmental Assessment (REA) Checklist prepared by ADB (Refer Annex I) and by using simple household survey questionnaire (Refer Annex II) prepared during the desk study. These checklists will explain the environmental features or factors that need to be addressed when identifying the impacts of projects and activities.

Once all the important impacts will be identified, their potential characteristic will be predicted. The baseline data on physico-chemical, biological, socio-economic and cultural aspects will be used to estimate the likely characteristics and parameters of impacts that includes Nature, Magnitude, Extent and Duration.

The nature of each predicted impact will be classified into Direct (D) and indirect (ID). The magnitude of the impact will be classified into High (H), Medium (M) and Low (L). The extent will be classified into Site-Specific (SS), Local (L), and Regional (R). Similarly, the duration of impact will be classified into Short Term (ST), Medium term (MT), and Long term (LT).

Impact predictions will generally be made against a baseline established by the existing environment. Hence, during our field study, the baseline data will be used as reference point against which the characteristics and parameters of impact related changes will be analyzed. Impact predictions will also be made by considering the future state of the environment. This also requires professional judgment for accuracy.

After the impact identification and prediction method, these impacts may require evaluation to assess the adversity of adverse impacts and efficiency of beneficial impacts within the project core & surrounding areas. The impacts will be evaluated regarding the significance of the predicted impacts. This will be done by following the National EIA Guidelines 1993 according to which scoring for each likely parameter of the impacts will be carried out and the level of significance will be assessed as recommended by these guidelines. The scoring of impacts as per National EIA Guidelines 1993 is tabulated below:

Table 17: Scoring of Impacts

S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines, 1993
1.	Nature	Direct	No Scoring Required
		Indirect	
2.	Magnitude	High (H)	60
		Medium/Moderate (M)	20
		Low (L)	10
3.	Extent	Regional (R)	60
		Local (L)	20

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Government of Nepal  
Ministry of Water Supply  
Singha Durbar, Kathmandu

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S. No.	Likely Parameters of Impacts	Type	Scoring as per National EIA Guidelines, 1993
		Site Specific (SS)	10
4.	Duration	Long Term (LT)	20
		Medium Term (MT)	10
		Short Term (ST)	5

Source: National EIA Guidelines 1993

Then, the significance level of Impact rated will be assessed as per the following table:

Table 18: Significance of Impacts

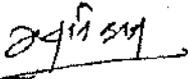
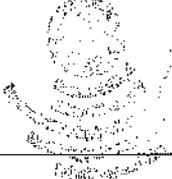
S. No.	Scoring as per National EIA Guidelines, 1993	Level of Significance as per National EIA Guidelines, 1993
1.	Less than 50	Insignificant
2.	50 to 75	Significant
3.	More than 75	Very Significant

Source: National EIA Guidelines 1993

This evaluation will be done as per the professional judgment by the key expert team involved in the IEE study.

3.8 Report Preparation

An IEE report shall be prepared in two different formats that include ADB Format & GoN Format (as per EPR 1997 & 2017). The outline of the report is given in Chapter 10 of this TOR. The draft report shall be presented to MoWS & ADB. Following to this, a final report will be prepared as soon as comments & suggestions on this draft report are received.

  
 Engineer 



#### 4 POLICIES, LAWS, RULES, DIRECTIVES, AND GUIDELINES

The consultant shall describe the pertinent regulations, standards that govern environmental quality, health and safety, protection of sensitive areas and endangered species, etc. at international, regional, district, municipality and Ward levels. Nepal is a signatory to many international conventions, including those concerning habitat, biodiversity, cultural heritage protection. These issues shall be considered during IEE, and their avoidance/mitigation measures shall be identified. The IEE should also be conducted in compliance with the following Laws, Acts, Rules & Regulation, Standard, Manuals, and Strategies:

a) **Constitution of Nepal**

b) **Plans, Policies & Strategies**

- ADB's "Safeguard Policy Statement (SPS)", 2066 B.S. (2009 A.D.)
- Fifteenth Plan Approach Paper (2076/77-2080/81)
- Fourteenth Plan (FY 2073/74-2075/76)
- Land Use Policy, 2072 B.S. (2015 A.D.)
- National Forest Policy, 2075 B.S. (2019 A.D.)
- National Urban Development Strategy, 2074 B.S. (2017 A.D.)
- National Urban Water Supply & Sanitation Sector Policy, 2065 B.S. (2009 A.D.)
- National Urban Policy, 2063 B.S. (2007 A.D.)
- National Water Plan-Nepal, 2062 B.S. (2005 A.D.)
- National Water Supply & Sanitation Policy, 2071 B.S. (2014 A.D.)
- National Environmental Policy and Action Plan (NEPAP), 2050 B.S. (1993 A.D.)
- Rural Water Supply and Sanitation Sectoral Strategic Action Plan (Unofficial Translation), 2060 B.S. (2004 A.D.)
- Rural Water Supply and Sanitation National Policy and Rural Water Supply and Sanitation National Strategy, 2060 B.S. (2004 A.D.)
- Urban Water Supply & Sanitation Policy 2066 B.S. (2009 A.D.)
- Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector, 2066 B.S. (2009 A.D.)
- Water Resources Strategy, 2059 B.S. (2002 A.D.)

c) **Laws & Acts**

- Essential Goods Protection Act, 2012 B.S. (1955 A.D.)
- Aquatic Animal Protection Act, 1961 A.D.
- Child Labour Prohibition and Regulation Act, 2056 B.S. (2001 A.D.)
- Environmental Protection Act 2053 B.S. (1997 A.D.) with latest amendments (2007 A.D. & 2017 A.D.)
- Forest Act, 2049 B.S. (1993 A.D.)
- Labour Act 2048 B.S. (1992 A.D.)
- Land Acquisition Act, 2049 B.S. (1993 A.D.)
- Local Government Operation Act, 2074 B.S. (2017 A.D.)
- Nepal Water Supply Corporation Act, 2046 B.S. (1989 A.D.)
- Solid Waste Management Act, 2068 B.S. (2011 A.D.)
- Town Development Act 2045 B.S. (1988 A.D.)
- Water Resources Act 2049 B.S. (1992 A.D.)



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- Water Tax Act 2023 B.S. (1966 A.D.)
- Water Supply Management Board Act, 2063 B.S. (2006 A.D.)
- d) **Rules & Regulations**
  - Drinking Water Regulations 2055 B.S. (1998 A.D.)
  - Environmental Protection Rules 2054 B.S. (1997 A.D.) with Amendments
  - Forest Regulation 2051 B.S. (1995 A.D.)
  - Labour Rules, 2075 B.S. (2018 A.D.)
  - Solid Waste (Management & Resource Mobilization), Rules, 2044 B.S. (1987 A.D.) & Amendments 2049 B.S. (1992A.D.)
  - Solid Waste Management Rules, 2070 B.S. (2013 A.D.)
  - Water Resources Regulations 2049 B.S. (1993 A.D.)
- e) **Standards, Manuals, Directives & Guidelines**
  - Guidelines for Community Noise by WHO, 2055 B.S. (1999 A.D.)
  - Implementation Directives for the National Drinking Water Quality Standards 2062 B.S. (2005 A.D.)
  - National EIA Guidelines 2049 B.S. (1993 A.D.)
  - National Noise Standard Guidelines, 2068 B.S. (2012 A.D.)
  - WHO Air Quality Guidelines, Global Update, 2061 B.S. (2005 A.D.)
  - WHO Guidelines for Drinking-water Quality, Fourth Edition, 2073 B.S. (2017 A.D.)

f) **Conventions & Treaties**

Nepal is a signatory to many international agreements and conventions related to environmental conservation. However, all of those conventions are not interrelated to the proposed project. The conventions related to the proposed project are as follows:

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973
- Convention on Biological Diversity (CBD), 1992
- International Covenant on Economic, Social and Cultural Rights (ICESCR), 1976
- Worst Forms of Child Labour Convention, 1999



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**5 REQUIRED TIME, ESTIMATED BUDGET AND SPECIALISTS REQUIRED FOR PREPARING THE REPORT**

This includes the schedule, estimated budget and appropriate human resources (experts) for conducting the IEE study.

**5.1 Time Schedule**

Considering the time limitations, the study will have to be completed within about 9 weeks. The work schedule is presented in **Table 19** given below:

**Table 19: Proposed Work Schedule**

Activity / Work	Weeks								
	1	2	3	4	5	6	7	8	9
Literature Review/Desk Study	■								
Preparation and Approval of TOR		■							
Field Study			■	■	■				
Public Notice					■	■	■		
Public Consultation & Collection of Deed of Inquiry & Recommendation Letters							■		
Impact Identification through Data Evaluation /Preparation of Draft IEE Report				■	■	■	■	■	
Submission of Final IEE Report								■	■

**5.2 Estimated Budget**

The total estimated budget for conducting IEE study for the proposed project is approximately NRs.500, 000.00. This cost will not be included in detailed engineering design report as it is a separate study.

**5.3 Human Resources Required**

As the IEE requires different personnel for specific tasks, the following inter-disciplinary team will be required. A team leader will be required to coordinate the different tasks of the personnel involved. The Team will consist of:

- a) Team Leader
- b) Environmental Specialist
- c) Water Supply and Sanitation Engineer
- d) Sociologist
- e) Geo-hydrologist
- f) Botanist/Forester

Three to four enumerators will also be required to help the team. The IEE team will also benefit from the inputs provided by the design team.

*[Signature]*  
Engineer



## 6 ANTICIPATED IMPACTS OF THE PROPOSED PROJECT ON ENVIRONMENT

The anticipated environmental impacts are mainly categorized into two viz., Beneficial Impacts and Adverse Impacts on the basis of its negative and positive significance. This is then further categorized into four impacts that includes i) Impact on Physical Environment, ii) Impact on Biological Environment, iii) Impact on Chemical Environment and iv) Impact on Socio-economic Environment, based upon the effects on the existing environment. These impacts are sub divided into three categories based upon the project phase that includes i) Design Phase, ii) Construction Phase and iii) Post Construction (Operation & Maintenance) Phase. These impacts are discussed below in detail .

The impacts shall be characterized as (i) low, high & medium regarding magnitude, (ii) long term, short term & medium term regarding duration and (iii) site-specific, local & regional/national regarding extent. The anticipated impacts are stated below:

### 6.1 Beneficial Impacts

#### 6.1.1 Impact on Socioeconomic Environment

##### a) Construction Phase

- i) Employment Generation
- ii) Skill Enhancement
- iii) Local Trade & Business Opportunity

##### b) Operation Phase

- i) Improved Health & Hygiene
- ii) Increased Economic Opportunity
- iii) Social Empowerment

### 6.2 Adverse Impacts

#### 6.2.1 Impact on Physical Environment

##### a) Design Phase

- i) Soil Erosion and Slope Instability

##### b) Construction Phase

- Soil Erosion and Land Surface Disturbance
- Spoil Disposal & Gully Erosion
- Air Pollution
- Noise Pollution
- Generation of Solid Wastes & Wastewater from the construction sites and worker's camp
- Accidental Leakage or Spillage of Stored Fuel/Chemicals
- Impact on Land Use Pattern
- Disruption to Natural Drainage
- Haphazard Disposal of Dismantled Debris



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**6.2.2 Impact on Biological Environment**

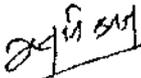
- a) Construction Phase
  - (i) Impact on Flora & Fauna
  - (ii) Impact on Aquatic Life
  
- b) Operation Phase
  - (i) Impact on Aquatic Life

**6.2.3 Impact on Chemical Environment**

- a) Construction Phase
  - i) Impact on Water Quality of the nearby rivers
  
- b) Operation Phase
  - i) Impact on Quality of Water Stored in Reservoir
  - ii) Impact on Water Bodies

**6.2.4 Impact on Socio-economic Environment**

- a) Design Phase
  - i) Structural Instability
  - ii) Health & Safety of Community & Workers
  - iii) Damage to the existing facilities
  
- b) Construction Phase
  - i) Community Health & Safety Hazards
  - ii) Workers' Health & Safety Hazards
  - iii) Traffic Congestion
  - iv) Public Protests
  - v) Disruption to Local Vendor's Business
  - vi) Mobilization of Child Labor
  - vii) Impacts on Sustainability of Works
  - viii) Damage to the existing facilities
  
- c) Operation Phase
  - i) Occupational Health & Safety Hazards
  - ii) Delivery of Unsafe Water
  - iii) Impact on Consumer's Health
  - iv) Non-sustainability of Services or Completed Works

  
Engineer



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Singhadurbar, Kathmandu

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**7 MATTERS CONCERNING THE PREVENTION & AUGMENTATION OF THE IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT**

To sustain the project, it is necessary to deal with the anticipated impacts properly. Hence, there is requirement of proposal of effective measures to cope with these impacts. Here, the proposed measures shall include a) Mitigation Measures to reduce or eliminate or avoid the adverse impacts and b) Augmentation Measures to maximize the beneficial impacts.

These Mitigation & Augmentation measures will be proposed for each anticipated impact. These measures shall primarily involve a) Mitigation Measures like Slope Protection Measures, Air Quality Monitoring, Noise Quality Monitoring, Waste Management, Prompt Backfilling, Awareness regarding Workers & Community Health & Safety Hazards etc. and b) Augmentation Measures like Prioritizing Local Labors, Provision of regular hands on training to the workers during the project construction period, Prioritizing Local Products, Prioritizing underprivileged group of people especially women and poor people in various capacity building programs and project related community meetings. These all will be discussed in detail in IEE Report.

These Mitigation & Augmentation measures will have to be incorporated from the planning stage onwards. In general, the following area shall be covered while preparing mitigation measures:

- a. Project design/pre-construction phase
- b. Project construction phase
- c. Project operation and maintenance phase

The concerned agencies like UWSSP, DWSSM, WUSC and local agencies, local administration, police officers shall be consulted during the implementation of mitigation measures. The proponent will be required to prepare the Environmental Management Plan (EMP), and these measures shall be outlined in EMP to implement the proposed measures during project implementation.



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## 8 ALTERNATIVE ANALYSIS

An alternative analysis of the project shall be considered as an integral part of the IEE study, which involves alternative ways of achieving the objectives of a proposed project in terms of environmental point of view. Alternative analysis will aim to attain suitable & feasible option of the proposed project, which shall be conducted during the study to minimize the possible negative environmental impacts. Alternative measures to the proposed project to meet the same project objectives will be described under the following aspects:

- a) **Without-Project or Do-Nothing Alternative:** This will help to analyze the condition of the existing environment of the project town in the absence of the proposed project.
- b) **With Project Alternative:** This will help to envisage the likely benefits of the proposed project in terms of environmental point of view. This will also assess the limitation of "Without Project" Alternatives. This will further analyze the alternatives to assess the most cost-effective, reliable and efficient system. This alternative will involve the following aspects:

Alternatives Relative to Planning & Design

- Alternative Sources
- Alternative Design
- Selected Proposed Alternative

Alternatives regarding potential environmental impacts, capital & operating costs, institutional training and monitoring requirements should be described. The costs and benefits of each alternative should be quantified (wherever possible), and incorporating the estimated costs of any associated mitigation measures. The "Without project" option is always open.

### 8.1 Alternative System Analysis

The system alternatives need to be developed to assess the most cost effective, reliable and efficient system that can serve the design population. Optimization of a proposed water supply system can be done in terms of system layout, alternative technology, alternative materials, alternative source and environmental impacts. In case of the Deurali Hupsekot Town Project, the system design has been done under two scenarios.

### 8.2 Alternative Assessment

As per Feasibility Study Report by PPTA team, the system design for the town has been done under two scenarios. The optimization of a proposed water supply system can be done regarding system layout, alternative technology, alternative materials and alternative source. In case of Deurali Hupsekot WSSP, the development of system alternatives has been done using alternative source and additional service areas.

#### 8.2.1 System Alternative I

Supply Water from Three Gravity Sources and One Pumping Source

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Engineer

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Ministry of Water Supply  
Saghadurbar, Kathmandu

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The three gravity sources Giruari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping will have 12lps discharge to be extracted for the new watersupply system. The designed discharge will be brought to proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system will be based on quality of water of the source.

The total estimated transmission pipe line length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative will cover for 3,652 HHs of the service area.

**8.2.2 System Alternative II**

*Supply Water from Three Gravity Sources, One Pumping Source and Other Two Gravity Source in New Service Area*

The three gravity sources Giruari khola, Betai khola and Pathar khola has combined discharge 39lps and Girubari khola pumping will have 12lps discharge to be extracted for the new water supply system. The designed discharge will be brought to proposed WTP and RVT location and distribute the water to the distribution system by gravity. The necessary treatment plant, service reservoir and other structures are designed as needed. The water treatment system will be based on quality of water of the source.

The total estimated transmission pipeline length from Girubarikhola, Betai khola, Patharkhola and Girubari pumping to Girubari WTP/ RVT site is about 14,077.00m. In addition, other two sources are added for Chapaha 1lps (Gaida Pakha Khola) and Sankhadev 5lps (Kuhi Khola) service area. The area is scattered and not match the criteria of UWSSP. The transmission main for Sankhadev settlement is about 17,610.00m. Separate transmission line is provisioned for each source. The transmission line alignment is stable. This alternative will cover for 4,024 HHs of the service area.

**8.2.3 Selected/Proposed Sub Project**

Environmentally, they are not much different and both of the alternatives have no such environmental issues too.

Depending upon the location, alternative I needs treatment plant at two location for total discharge i.e. 51lps. There is existing treatment plant for 10lps flow. New additional treatment plant is required for remaining flow. In addition, in alternative I, one set treatment plant will be constructed for Chapaha and other set will be constructed for Sankhadev. Both settlements are rural nature. Hence, based on the location, settlement pattern, sources to be used, alternative I is better than alternative II.

Major structures are provisioned at only two locations in alternative I, where in alternative II separate reservoirs and infrastructure are proposed at additional 9 locations. Hence, security threat is more in alternative II than in alternative I. Similarly, the transmission length in alternative II is more than alternative I and it



*ToR for IEE of Deurali Hupsekot WSSP*

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requires additional precautions for its safety. Similarly, the additional service area of the alternative II is scattered and not match the criteria of UWSSP.

The financial indicator also indicates that the affordability percentage of the source alternative I and II is almost same. The affordability is in between 3%-5% in alternative I and II. Financially, in risk factor, both alternatives are similar despite of feasibility of both alternatives. Alternative I is recommended for the detailed design because of the reliability of source, transmission line route and safety precaution issues.

This indicates that the Alternative II is unfeasible option for the project town as per technical assessment. Hence, Alternative I has been selected as the best feasible alternative as this alternative is technically, environmentally and financially feasible.

  
Engineer

  
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Sanitation and Sewerage  
Government of Nepal



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## 9 MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROPOSAL

### 9.1 Environmental Management Plan

The project proponent has to develop an Environmental Management Plan (EMP) to manage all the perceived environmental impacts of the project systematically. It shall be therefore based on the mitigation measures for the project induced impacts. An Environmental Management Plan (EMP) has a dual purpose. It is designed to monitor the contractor's work during project implementation. It helps to check contractual compliance with specified mitigation measures. It also helps in making periodic checks on the actual environmental impacts of the Project over the years following completion of the works and compares these with those impacts anticipated at the time of Project Appraisal. EMP, therefore, provides the necessary feedback required for correcting potentially serious Project deficiencies, and for the planning of other projects. EMP shall include the responsibilities of different stakeholders based on preliminary plans and schedules. This program shall include measures required during the project design, construction and operational phases and shall include recommendations on allocation of components of EMP to the various parties involved. Feasible and cost-effective measures to prevent/mitigate/reduce significant negative impacts should be recommended in an Environmental Management Plan. The impacts and costs associated with implementing the measures will have to be detailed. EMP will include proposed work programs, budget estimates, schedules, staffing and training requirements and other support services to implement the mitigating measures.

### 9.2 Environmental Monitoring Plan

The project will develop an Environmental Monitoring Plan for the activities during design, construction and operation phase of the project. The environmental monitoring of the project includes field supervision and reporting of project activities before and during the project construction and operation to ensure that the works are being carried out by the approved design and that the environmental mitigation measures are fully implemented by EMP. A monitoring system will be developed involving (i) front line monitoring (ii) monitoring by the government line agencies or independent monitors. To ensure the effective implementation of environmental monitoring plan (EMP), EMP matrix must be prepared in a tabulated form which must be followed by the concerned authorities during each phase of the project. The sample of EMP Matrix is given in Annex III. The details in EMP matrix must be given in detail in IEE report.

The table of EMP matrix must include the following matters;

- a) Types of Environmental Impacts
  - This may be Impacts on either Physical Environment or Biological Environment or Chemical Environment or Socio-economic Environment.
  - As for e.g. If Soil Erosion & Land Surface Disturbance is an anticipated impact, this will be categorized under 'Impact on Physical Environment'
- b) Project Phase
  - Design Phase/Construction Phase/Operation Phase-This will be confirmed as per the nature of the anticipated impacts.

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- c) Field of Anticipated Environmental Impacts
  - As for e.g.; If Soil Erosion & Land Surface Disturbance is an anticipated impact, the field should be "Topography/Geology".
- d) Proclamation of Anticipated Environmental Impacts
  - E.g. Soil Erosion & Land Surface Disturbance
- e) Mitigation measures for the Anticipated Environmental Impacts
  - As for e.g.; If Soil Erosion & Land Surface Disturbance is an anticipated impact, the proposed mitigation measures should be as follows;
  - Protecting the foundation from damage during backfilling
  - Using the right backfill materials
  - Compacting the backfill
  - Final finishing the subgrade to ensure that water drains away from the foundation
- f) Statement of Authorities responsible for the implementation of the proposed mitigation measures
  - As for e.g.; for the impact: Soil Erosion & Slope Instability, the responsible authority will be 'The Contractor' as this impact may be encountered during the construction phase.
- g) Monitoring Indicators
  - As for e.g.; the monitoring indicators for the above-mentioned impact will be Field Supervision by PMO & DSMC.
- h) Frequency of Indicators
  - As for e.g.; If Soil Erosion & Land Surface Disturbance is an anticipated impact, the frequency of the monitoring indicator will be Weekly Field Supervision.
  - As mentioned above, details of each & every impact should be given in this EMP matrix.

**9.3 Information Disclosure, Public Consultation, and Participation**

Public consultation is the process of exchanging information with those persons and organizations with a legitimate interest in a project and who are likely to be affected by the project (stakeholders). It is a two-way process that informs and involves the community in developing a project and informs the proponent about issues and concerns, which can then be addressed in project design. Information disclosure involves stakeholders in monitoring the development and implementation of a project and fosters openness in decision-making by presenting documents and other project materials for public scrutiny. The consultation and disclosure involve consultation with stakeholders at an early stage of project preparation, and throughout project implementation. As a minimum, stakeholders will be consulted regarding the scope of the environmental study before work has commenced in earnest, and should then be informed about the likely impacts of the project and proposed mitigation once the draft IEE report is under preparation. The report should record the views of stakeholders and indicate how these have been taken into account in project development. Information is disclosed through public consultation and more formally by making documents and other materials available and at a location in which stakeholders can easily access them. This normally involves making draft reports



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available (in the local language) at public locations in the community and providing a mechanism for the receipt of comments and making documents available more widely.

Public consultation and involvement should be given highest priority in the implementation of mitigation measures. Public consultation should take place and by decision of the consultation meeting, implementation of mitigation measures should be prioritized and should be carried out with the involvement of the local people.

Monitoring is one of the components of EMP. The results of monitoring should also be disclosed in the form of demonstration, charts, figures, graphs, and samples, etc., to the local people, school students, and other interested stakeholders. In the process of compliance monitoring of the project construction, local people and construction workers should be consulted.

**9.4 Grievance Redress Mechanism**

A project-specific grievance redress mechanism (GRM) will be established by MoWS as the project executive agency to receive, evaluate and facilitate the resolution of affected persons' concerns, complaints, and grievances related to social, environmental and other concerns on the project. GRM will aim to provide a time-bound and transparent mechanism to resolve such concerns. GRM will also have support system as Grievance Redress Committee (GRC).

GRC will be formed at the Project level, comprising: (i) Chief of WSSDO; (ii) members of WUSC; (iii) two representatives of affected persons, a male, and a female; (iv) a member of IP community, preferably female; (v) a representative of a non-government organization or community-based organization actively involved in IP development/other backward communities in the area, if any; (vi) local government representatives, i.e., Municipality and DCC; (vii) DSMC social safeguard expert; and (viii) DSMC environmental safeguard expert (ESE).

The environmental safeguard assistant (ESA) of the ICG will oversee the implementation/observance of the mechanism for environmental complaints at the project level. He/she will be technically advised, supported and trained by DRTAC's environmental specialist and the DSMC ESE. PMO's Environmental Officer will oversee the implementation/observance of GRM in all projects. Representatives of affected persons (APs), civil society and eminent citizens will be invited as observers during GRC meetings. Contractors and WUSCs (as Operators) will be required to designate their respective counterpart GRM staff. The Social Development Officer at RPMO will be the focal person for facilitating the grievance redress at the local level.



10 REPORT

The IEE report shall be prepared as per this ToR. The IEE report, whenever applicable, shall contain location maps, graphs, photographs, tables, and matrix. The IEE report will be prepared in two different formats which is shown in detail below:

I) ADB Format (For submission to ADB)

The outline of IEE report as per this format is as follows:

List of Abbreviations

Table of Contents

Executive Summary

- I. Introduction
- II. Policy, Legal & Administrative Framework
- III. Analysis of Alternatives
- IV. Description of the Project
  - A. Proposed Service Area
  - B. Project Components
  - C. Salient Features of the Proposed Project
- V. Description of the Environment
  - A. Physical Environment & Resources
    - i. Landforms & Topography
    - ii. Geology & Soils
    - iii. Climate
    - iv. Water Resources
    - v. Air Quality
    - vi. Acoustic Environment
  - B. Ecological Resources
    - i. Flora
    - ii. Fauna
    - iii. Aquatic Life
    - iv. Protected Areas
    - v. Community Forests
  - C. Socio-economic and Cultural Environment
    - i. Settlement Pattern
    - ii. Caste & Ethnicity
    - iii. Population & Demographic Characteristics
    - iv. Education & Health
    - v. Waterborne & Communicable Diseases
    - vi. Economic Activities



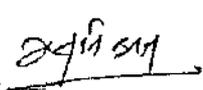
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- vii. Income Level & Poverty Conditions
- D. Existing Situation of the Utilities Associated with this project
  - i. Existing Water Supply Condition
  - ii. Existing Sanitation Situation
  - iii. Water Supply & Sanitation User's Association
- VI. Anticipated Environmental Impacts & Mitigation Measures
- VII. Information Disclosure, Consultation and Participation
- VIII. Grievance Redress Mechanism
- IX. Environmental Management Plan
- X. Monitoring & Reporting
- XI. Conclusion
- XII. Literature Reviewed

  
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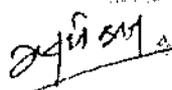


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- II) Format as per provided in EPR (1997 A.D. with latest amendments made in 2017 A.D.) -(For submission to the MoWS)
- List of Abbreviations
  - Table of Contents
  - Executive Summary (in English and Nepali)
  - 1. Introduction
  - Name of the Consultant preparing the report
  - 2. Description of the Project
  - General Introduction
  - Relevancy of the Project
  - 3. Methodology
  - 4. Policy, Legal & Administrative Framework
  - 5. Existing Environment
  - 6. Analysis of Alternatives
  - 7. Anticipated Environment Impacts
  - Impacts Physical Environment
  - Impacts on Chemical Environment
  - Impacts on Biological Environment
  - Impacts on Socio-economic Environment
  - 8. Mitigation & Augmentation Measures
  - 9. Information Disclosure, Consultation and Participation
  - 10. Grievance Redress Mechanism
  - 11. Environmental Management Plan
  - 12. Monitoring & Reporting
  - 13. Conclusion
  - 14. Literature Reviewed

This IEE format for MoWS is as per Schedule-5 (Pertaining to Rule 7) of EPR, 1997 with latest amendments 2017 which is included as follows:

  
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Schedule-5  
(Relating to Rule 7)

Matter to be mentioned while preparing reports relating to

**Initial environmental examinations:**

1. **Name and address of individual or institution preparing the report:**
2. **Summary of the proposal: (To briefly mention the following matters in regard to the possibly impact of the implementation of the proposal on the environment):**
  - (a) Objectives of the proposal
  - (b) Impact on land-use.
  - (c) Adverse impact on the environment impact on human life, and population pressure,
  - (d) Damage to be suffered by local goods or objects,
  - (e) Other necessary matters.
3. **The following matters must be explicitly mentioned in respect to the proposal:**
  - (a) Type of proposal; (i) Processing, (ii) Manufacturing, (iii) Installation, (iv) Service delivery, (v) Others
  - (b) If related to delivery, the nature and type of goods to be delivered.
  - (c) Proposal's; (i) Installed capacity, (ii) Number of hours to be operated per day or year,
  - (d) Materials to be used (quantity and year to be mentioned),
  - (e) Emission resulting from the implementation of the proposal (the time of operation and the consequent volume of emission to be specified) ;(i) Solid (ii) Liquid (iii) Air, (iv) Gas, (v) Noise (vi) Dust, (vii) Others
  - (f) Energy to be used: (i) Type, (ii) Sources (iii) Volume of consumption (per day and year)
  - (g) Human Resource requirements
  - (h) Resources required for the implementation of the proposal:
    - (i) Total (Gross) capital (ii) Working capital (iii) Land area, (iv) Building and their types, (v) Machinery and tools (vi) Others.
  - (i) Detailed particulars of the area where the project is to be implemented;
    - (i) Maps, (ii) Population and condition relating to settlements in the area as well as in the nearby areas, (iii) Particulars of any sensitive things or objects, if any, located close to the area where the proposal is to be implemented (iv) Current situation (v) Sources of water (vi) Arrangement made for disposing or processing the waste (vii) Paths for movement in the area where the proposal is to be implemented
  - (j) Manufacturing processes
  - (k) Details of the technology
  - (l) Other necessary matters.

*[Handwritten Signature]*

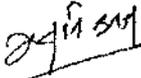
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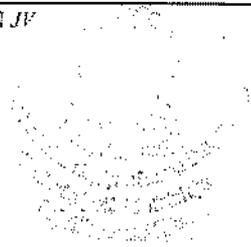


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4. **Impact of the implementation of the proposal on the environment:**
  - (a) Impact on the social, economic cultural spheres:
    - (i) Impact on human health, (ii) Degradation of cultivable land, (iii) Destruction of forests, (iv) Changes in social, cultural and religious norms and value, (v) Others.
  - (b) Biological Impact: (i) Population, (ii) Flora and fauna, (iii) 'Natural habitat and communities
  - (c) Physical Impact: (i) Land, (ii) Atmosphere, (iii) Water, (iv) Noise, (v) Man-made objects, (vi) Others
5. **Alternatives for the implementation of the proposal:**
  - (a) Design (b) Project site (c) Processes, time-schedule, (d) Raw materials to be used, (e) Others
6. **Alternatives to reduce or control the impact of the implementation of the proposal on the environment**
7. **Matters to be monitored while implementing the proposal.** 8. **Other necessary matters.**

*Note: - Data, maps, Photographs, tables, charts graphs etc. shall be enclosed, as required.*

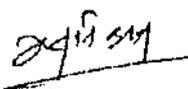
  
Engineer 



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**11 OTHER NECESSARY MATTERS**

Other necessary matters to be included in the IEE report will be Relevant Information, Literature Reviewed and Annexes that shall include Approved Terms of Reference, Checklists, Maps, Minutes of meetings, Tables & Charts, Questionnaires and Photographs to be used at the time of carrying out the baseline survey. The report will clearly recommend whether an Environmental Impact Assessment (EIA) is required or whether an Initial Environmental Examination (IEE) is sufficient for the proposed project.

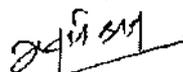
  
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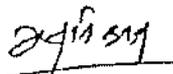
## 12 LITERATURE REVIEWED

- ADB, 2003. *Environmental Assessment Guidelines*.
- Constitution of Nepal (2015). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- District Development profile of Nepal 2010/11 with VDC Profile. A Socio-Economic Development District Health Office, Kavrepalanchowk, 2062/63
- Environmental Assessment and Review Framework, (2017). Regional Urban Development Project (RUDP), Ministry of Urban Development (MoUD), Government of Nepal for ADB
- Environmental Assessment and Review Framework, (2018). Urban Water Supply & Sanitation (Sector) Project, Ministry of Water Supply, Government of Nepal for ADB
- Environment Protection Act, (1997). Ministry of Science, Technology and Environment Kathmandu
- Environment Protection Rules, (1997 with latest amendments 2007 & 2017), Ministry of Science, Technology and Environment, Kathmandu
- Environment Statistics of Nepal, CBS, 2011
- Environmental Impact Assessment Guidelines, (1993). National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal
- Feasibility Study of Deurali Hupsekot Water Supply and Sanitation Project, 2019
- Detailed Engineering Design Report of Deurali Hupsekot Water Supply & Sanitation Project, 2019
- Draft Socio-Economic Profile of Deurali Hupsekot Water Supply & Sanitation Project, 2019
- National Urban Policy (2007). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- Proximity Report Generated by the Integrated Biodiversity Assessment Tool (Hupsekot Town), (2018), ADB
- Shrestha K 1998. Dictionary of Nepalese Plant names. Mandala Book Point, Kathmandu, Nepal.
- Solid Waste Management Act (2011). Ministry of Science and Technology and Environment, Kathmandu
- The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector, 2009
- Uprety, B.K (2003). Safeguard the Resources Environmental Impact Assessment Process and Practice, Kathmandu
- Water Resource Act (1992). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- [https://en.wikipedia.org/wiki/List\\_of\\_butterflies\\_of\\_Nepal](https://en.wikipedia.org/wiki/List_of_butterflies_of_Nepal)

  
Engineer



## ANNEXES

  
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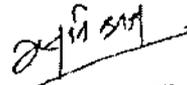


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**ANNEX I**

**ADB's REA Checklist & Preliminary Climate Risk Screening  
Checklist**

  
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Ministry of Water Supply  
Singhadurbar, Kathmandu

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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.

Country/Project: NEP: Urban Water Supply and Sanitation (Sector) Project  
 Title: Subproject: Deurali Hupsekot Water Supply and Sanitation Project

Screening Questions	Yes	No	Remarks
A. Project Siting: Is the project area			
Densely populated?		✓	Hupsekot Rural Municipality has a moderate population density.
Heavy with development activities?		✓	
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...			
pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and		✓	

*[Signature]*  
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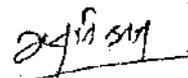
Screening Questions	Yes	No	Remarks
Soil erosion runoff?			
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
Hazard of land subsidence caused by excessive ground water pumping?		√	The proposed project shall be using surface water source only.
Social conflicts arising 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)?	√		Water Treatment proposed in the detailed design and water quality monitoring in EMP will ensure the water supply as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√		Water Treatment proposed in the detailed design, water quality monitoring and continuous trainings to WUSC as stated in EMP will ensure the water supply as prescribed in the NDWQS & its Directives.
Inadequate protection of intake works or wells, leading to pollution of water supply?	√		Provision of retaining wall and gabion protection wall for the proposed sump well at the source.
Over pumping of ground water, leading to salinization and ground subsidence?		√	There is no use of groundwater source.
Excessive algal growth in storage reservoir?	√		EMP provides mitigation measures.
Increase in production of sewage beyond the capabilities of community facilities?			EMP provides mitigation measures.
Inadequate disposal of sludge from water treatment plants?	√		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?			Transmission lines and access roads will not be affected. As stated in EMP, Impaired access roads will be repaired, as appropriate.

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Screening Questions	Yes	No	Remarks
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		EMP provides measures to mitigate health and safety impacts from improper handling, potential accidents or human error in dosing.
Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?	√		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.
Increased road traffic due to interference of construction activities?	√		EMP provides mitigation measures.
Continuing soil erosion/silt runoff from construction operations?		√	
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.
Delivery of water to distribution system, which is corrosive due to inadequate attention to the feeding of corrective chemicals?	√		EMP provides mitigation measures.
Accidental leakage of chlorine gas?		√	
Excessive abstraction of water affecting downstream water users?		√	Water irrigation in the vicinity comes from existing wells near
Competing uses of water?		√	
Increased sewage flow due to increased water supply	√		EMP provides mitigation measures.
Increased volume of sillage (wastewater from cooking and washing) and sludge from wastewater treatment plant		√	It is beyond the scope of the project.
Large population influx during project construction and operation that causes an 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.

24/11/19  
  
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ToR for IEE of Deurali Hupsekot WSSP

Screening Questions	Yes	No	Remarks
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and	√		EMP provides mitigation measures.

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Preliminary Climate Risk Screening Checklist for Sample Sub Project Towns

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

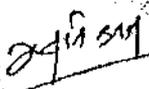


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**Annex II**  
**Checklists for Baseline Information Collection & Sample**  
**Questionnaire for Socio-economic Survey**

  
  
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**Government of Nepal**  
**Ministry of Water Supply**  
**Singhadurbar Kathmandu**



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Simple Checklists for Baseline Information Collection

A. Physical Environment

Parameters	Description
Topography	
Geology (Rock and Soil Types)	
Erosion and Sedimentation	
Climate	
Quarry Sites (if any)	
Land Use	
Air Quality	
Noise Level	
Drainage Network	

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Engineer



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B. Floras & Faunas  
 Floras (Plant Life Forms)

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

Mammals in the project area

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

Birds Sighted in the project area

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

Herpeto-fauna in the Project Area

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT

Fish in the Project Area

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

*[Handwritten Signature]*  
 Engineer



Government of Nepal  
 Ministry of Water Supply  
 Singhadurbar, Kathmandu

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**CHECKLISTS FOR FOCUS GROUP DISCUSSION**

Date:

Project:

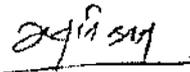
Venue:

Number of Participants:

Purpose Statement:

**Discussion, Responses & Outcomes:**

No.	Questions/Issues by the Consultant	Responses or Findings
1		
2		
3		
4		
5		
6		

  
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१.१ कोटा  २ कोटा  ३ कोटा  बाढा वा भी मन्थे बाढी

१.१.१ घरको अवस्थान गरी घरको विवरण लेख्ने। पक्की  बाँधी  काँचो

(पक्की : भत्त तल्लाम, बाँधी पक्की : हुरा/दाहको भन्डो, टोपको भन्डा/कुपा/सोडा/मिचोरी, टाकने आदि, काँचो : बाँधी भन्डा/सोडा/मिचोरी आदीको)

१.१.२ घर परिवारको जम्मा जमीन छ। छ  छैन  छिनभन्ने मुकदमाको नाम कसको नाममा पर्ने।

१.१.३ घरको लागि माई/पैसा कसको नाममा  छ  छैन  छ भने बाबतको गुरा  भन्डा वा बडी

१.१.४ माइको परिवारको नाम उल्लेख कसको नाममा छैन। (माइको नामको सफा लेख्ने)

क्र.सं.	सुचना	संख्या	विवरण	क.सं.	संख्या	विवरण	संख्या	विवरण
१	माइको परिवारको नाम			१		सुना/सोडा/मिचोरी		
२	बाँधीको नाम			२		मिचोरी		
३	काँचोको नाम			३		बाँधी/मिचोरी		
४	माइको नाम			४		बाँधी/मिचोरी		
५	बाँधीको नाम			५		सोडा/मिचोरी		
६	काँचोको नाम			६		सोडा/मिचोरी		
७	माइको नाम			७		सोडा/मिचोरी		
८	बाँधीको नाम			८		सोडा/मिचोरी		
९	काँचोको नाम			९		सोडा/मिचोरी		

१.१.५ घरको कुल मूल्य कति भएर उल्लेख गरिने। १ महिना  २ महिना  ३ महिना  ४ महिना

१.१.६ घरको मूल्य कसको नाममा  छ  छैन  छ भने बाबतको गुरा  भन्डा वा बडी

१.१.७ घरको मूल्य कसको नाममा  छ  छैन  छ भने बाबतको गुरा  भन्डा वा बडी

१.१.८ घरको मूल्य कसको नाममा  छ  छैन  छ भने बाबतको गुरा  भन्डा वा बडी

क्र.सं.	विवरण	माइको नाम	बाँधीको नाम	काँचोको नाम
१	माइको नाम			
२	बाँधीको नाम			
३	काँचोको नाम			
४	माइको नाम			
५	बाँधीको नाम			
६	काँचोको नाम			
७	माइको नाम			
८	बाँधीको नाम			
९	काँचोको नाम			
१०	माइको नाम			
११	बाँधीको नाम			
१२	काँचोको नाम			
१३	माइको नाम			
१४	बाँधीको नाम			
१५	काँचोको नाम			
१६	माइको नाम			
१७	बाँधीको नाम			
१८	काँचोको नाम			
१९	माइको नाम			
२०	बाँधीको नाम			
२१	काँचोको नाम			
२२	माइको नाम			
२३	बाँधीको नाम			
२४	काँचोको नाम			
२५	माइको नाम			
२६	बाँधीको नाम			
२७	काँचोको नाम			
२८	माइको नाम			
२९	बाँधीको नाम			
३०	काँचोको नाम			
३१	माइको नाम			
३२	बाँधीको नाम			
३३	काँचोको नाम			
३४	माइको नाम			
३५	बाँधीको नाम			
३६	काँचोको नाम			
३७	माइको नाम			
३८	बाँधीको नाम			
३९	काँचोको नाम			
४०	माइको नाम			
४१	बाँधीको नाम			
४२	काँचोको नाम			
४३	माइको नाम			
४४	बाँधीको नाम			
४५	काँचोको नाम			
४६	माइको नाम			
४७	बाँधीको नाम			
४८	काँचोको नाम			
४९	माइको नाम			
५०	बाँधीको नाम			
५१	काँचोको नाम			
५२	माइको नाम			
५३	बाँधीको नाम			
५४	काँचोको नाम			
५५	माइको नाम			
५६	बाँधीको नाम			
५७	काँचोको नाम			
५८	माइको नाम			
५९	बाँधीको नाम			
६०	काँचोको नाम			

१.१.९ माइको परिवारको नाम उल्लेख कसको नाममा  छ  छैन  छ भने बाबतको गुरा  भन्डा वा बडी

क्र.सं.	विवरण	माइको नाम	बाँधीको नाम	काँचोको नाम
१	माइको नाम			
२	बाँधीको नाम			
३	काँचोको नाम			

*Engineer*  
Engineer



ToR for IEE of Deurali Hupsekot WSSP

1.1	कृषि उपकरणको विक्रीबाट आउने भाडो, भाँडे, बाँधो, सफाईको फ्यान्सिभल				
1.2	पशुपक्षीको उपचारको लागि, दवा, खाना, उपकरण आदि।				
(क) को नाममा					
2	घर, तहलको रूपमा				
2.1	गाईको / गोशाला				
2.2	ज्यामना घरको				
2.3	पशुपक्षीको उपचारको लागि				
2.4	वैदेशिक राजदूतको (अतिथीको)				
2.5	पशुपक्षीको उपचारको लागि				
2.6	उपयोग				
2.7	पशुपक्षीको उपचारको लागि				
2.8	गाईको / गोशालाको उपचारको लागि				
(ख) को नाममा					
क+ख नाममा					

1.15. खाँडको परिवारले कुनै अर्थात् खाँडको छ ? छ  छैन  छ भने रकम रु.

२. खानेपानी तथा सरसफाई व्यवस्थापन

२.१. खाँडको परिवारले पिउने, खाना पकानेको लागि प्रयोग गर्ने पानीको स्रोत कुन छ ? दैनिक कति लिटर पानी खाने हुन्छ (काँडा सतको सिटामा) ? पिउन लगाइनुहोस्।

क्र.सं.	स्रोत	स्रोतको स्थिति	स्रोतको सुरक्षा	स्रोतको दूरी
१	खानेपानी	<input type="checkbox"/>	ईयात / स्वयं	<input type="checkbox"/>
२	खानेपानीको उपकरण / डिप ट्याङ्क	<input type="checkbox"/>	खानेपानी उपकरणको डिप ट्याङ्क	<input type="checkbox"/>
३	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>
४	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>
५	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>
६	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>
७	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>
८	खानेपानीको स्रोत	<input type="checkbox"/>	खानेपानीको स्रोत	<input type="checkbox"/>

२.२. दैनिक आवश्यक पानी आपूर्ति गर्नका लागि पानी सफाईको विभिन्न विस्तृत विवरण दिनुहोस्।

क्र.सं.	विवरण	परिष्कार	मर्मत	सफाई	जम्मा	परिष्कार	मर्मत	सफाई	जम्मा
१	जल स्रोत / ट्याङ्क								
२	फिल्टर / डिप								
३	खानेपानीको स्रोत								
४	पानी सफाई गर्ने उपकरण / डिप ट्याङ्क								
५	खानेपानीको स्रोत								
६	खानेपानीको स्रोत								
७	खानेपानीको स्रोत								
८	खानेपानीको स्रोत								

नोट: खानेपानीको स्रोतको स्थिति, सुरक्षा, दूरी, सफाई, मर्मत, आदिबारे विवरण दिनुहोस्।

३. निजी द्वारा जडान

३.१. के घरको घरमा पानीको जडान गर्नु भएको छ ? छ  छैन  यदि छ भने कसको घरको छ ?

क) सरकारी निजी घर  ख) कम्प्युटराइज्ड निजी घर  ग) कृषकको घर

३.२. खाँडको घरमा प्रयोग हुने पानीको गुणस्तर कस्तो छ ? १) राम्रो २) ठिकै ३) खराब

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Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

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- ३.३ किं तपाईं आपली घरमा धारा जोड्न चाहनु हुन्छ ? चाहन्छु  चाहैन्या
- ३.४ यदि तपाईंको घरमा निजी धारा जडान भएको छैन भने, किन जडान गभरेको ?
- क) यहाँ धर्म हाक्ला गभएकोले  ख) जडान शुल्क धेरै पर्ने भएकोले
- ग) मासिक पानी दिने धेरै आडने भएकोले  घ) पानीको लागी प्रयाप्त चपएकोले
- ङ) पानीको आपूर्ति नियमित नभएकोले  च) यस क्षेत्रमा पाइपमाइन डडान गर्ने आवस्था उपलब्ध नभएकोले
- छ) पानीको गुणस्तर राम्रो नभएकोले  ज) अन्य कारण उल्लेख गर्नु  झ) बाँदा छैन
- ३.५ हाल तपाईंको पानीधारा जापत महिन्यामा पानीको माग्नु किदै हुनुहुन्छ ? छ  दिन

**सह-सगानि जवधारणा सम्बन्धी प्राथमिकता**

३.६ यदि तपाईंको समरपानिका/गा वि.स. मा विभिन्न योजना उपलब्धता गर्न रकम उपलब्ध छ भने तिनविधिम भन्ने कत कत योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ?

क) सडक बती	<input type="checkbox"/>	ख) विद्युत	<input type="checkbox"/>
ग) कालोपत्रे सडक	<input type="checkbox"/>	घ) बजार	<input type="checkbox"/>
ङ) विद्यालय	<input type="checkbox"/>	च) सरसफाई सुविधा	<input type="checkbox"/>
झ) अस्पताल	<input type="checkbox"/>	छ) सिंचाई	<input type="checkbox"/>
ज) व्यवस्थित आनिपानी प्रणाली	<input type="checkbox"/>	ड) पाटीपौसा प्रणाली	<input type="checkbox"/>
झ) पेटलबाँधी सडक	<input type="checkbox"/>	ढ) अन्य	<input type="checkbox"/>

३.७ यदि तपाईंको घरमा धारा छैन र निजी धारा राख्न इच्छुक हुनुहुन्छ भने, केन रकम सह-सगानि गर्न नसक्नुहुन्छ ? कृपया तब दिइएको तालिकामा निजि धारा राख्ने कति रकम नम्म लगानी गर्नुहुन्छ तपाणीको रकमको सीमाना  दिन लगाउनुहोस ।

क्र.सं.	सह-सगानि रकम	सं.	सह-सगानि रकम	सं.
१	५२००० भन्दा बढी	<input type="checkbox"/>	५	१००० देखि १००० सम्म
२	१००० देखि ५२००० सम्म	<input type="checkbox"/>	४	५२०० देखि १००० सम्म
३	५००० देखि १००० सम्म	<input type="checkbox"/>	३	१२०० भन्दा कम

- ३.८ निजी धारा जडान जापत लाग्ने शुल्क थ्याग गर्न  नगर्नु  नगर्नु छैन
- ३.९ तपां ध्यानकर्ता योजना शुने भएमा आपत्ती घरमा धारा जडान गरी गर्वा नियमानुसार मासिक पानी महशुस नियमित मुकाननु तयार हुनुहुन्छ ?
- ३.१०  छैन  यदि इच्छुक हुनु हुन्छ भने तस दिइएको तालिकामा पानी महशुसको सीमाना  दिन लगाएर आफुलाई इच्छा व्यक्त गर्नुहोस ।

क्र.सं.	सह-सगानि रकम	सं.
१	२००० भन्दा बढी	<input type="checkbox"/>
२	१२०० देखि २०००	<input type="checkbox"/>
३	५०० देखि १२००	<input type="checkbox"/>
४	२०० देखि ५००	<input type="checkbox"/>
५	१०० देखि २००	<input type="checkbox"/>
६	५० देखि १००	<input type="checkbox"/>
७	२० देखि ५०	<input type="checkbox"/>

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Engineer



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- ४.५ क्या खानेपानी किलरण यन्त्राणांको व्यवस्था हुँदा तपाईंको परिवारबाट प्रतिवद्धता स्वरूप अग्रिम कायमको ५९.९९% रकम दिन तयार हुनु हुन्छ? छ  छैन
- ४.६ क्या इन्जिन्याई सुविधा (कामुदायिक शौचालय तथा सनही टोल) निर्माणको लागि सह तयारी स्वरूप ५९.९९% स्वामीय निकाय र उपभोक्ताको सहसहयोगी पत्र इच्छुक हुनुहुन्छ? छ  छैन

**५. लैङ्गिक दृष्टिकोणबाट महिला सहभागिता**

आयोजनाको विभिन्न चरणमा महिला सहभागिता अध्ययन, वैकल्पिक विपन्न वर्गको आधिकारी जनजाति, दलित तथा पिछेपछे वर्ग वर्गको समावेशी सहभागिता सम्बन्धि जानकारी संकलन गर्न प्रत्येक अर्थ-सोच समितिको अध्यक्षको प्रस्ताव गरिएको छ।

**क) महिलाहरूको उपस्थिति र सहभागिता**

- ५.१ आयोजनाकोचालना छलफल गर्न कुनै बैठक बोलाईएको थियो? थियो  थिएन
- ५.२ के आयोजनाको छरीट गर्न बैठकमा महिला उपभोक्ताहरूको उपस्थिति थियो? थियो  थिएन
- यदि थियो भने महिला उपभोक्ताहरूको अभिप्रेत कस्तो थियो? यस्तो मान  अनुकूल/सहयोगी  विपरीत
- ५.३ आयोजनाको फिचरकोचालनको रकमको गर्न के खानेपानी उपभोक्ता तथा सरसफाई समिति/संस्था गठन भएको छ? छ  छैन/योसँग छैन

**ख) लैङ्गिकताका आधारमा कार्य विभाजन**

५.४ तपाईंको समितिकोमा विद्यमान कामहरूकोसुर कस्तो गर्ने गर्दछ: (✓) चित्त लगाउनुपर्ने दैनिक रूपमा।

क्र.सं.	व्यवस्थापित क्रियाकलापहरू	पुरुष	महिला	कुल समय
१	खानेपानी भर्ने, बोक्ने, भण्डारण			
२	शान्ति तयार गर्ने, माहल माहल			
३	जालकोसंस्था र बुझ्नुको स्थापना			
४	मुला सुत्ने घर सफा गर्ने			
५	खाद्यान्न भण्डारण तथा तयारी			
६	अन्य			

**ग) पारिवारिक व्यवस्थापन, जाक श्रोत र अन्य विषयमा महिलाहरूको नियन्त्रण र पहुँच**

५.५ तलको तालिकामा उल्लेखित पारिवारिक विषय वा क्षेत्रहरूमा नियन्त्रण गर्दा गर्दाको घर परिवारमा महिलाको भनाई सुन्नुपर्ने हुन्छ? उपयुक्त कोठामा (✓) चिन्ह लगाउनुहोस्

क्र.सं.	विषय वा कार्यक्षेत्रहरू	हुन्छ (✓)	हुँदैन (✓)
१	अधिक सतकारको सुराह		
२	केटाकेटीको शिक्षा दिना		
३	केटाकेटी र बुझ्नुको स्वास्थ्य र स्थापना		
४	अग्रज-सम्पत्ति-कितनेच (घर जग्गा)		
५	दैनिक क्रियाकलापहरू		
६	धार्मिक क्रिया व्यवहार, विवाह, मृत्यु, आहुति तथा सामाजिक/पारिवारिक सुसम्बन्ध आदि		
७	अन्य		

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५.६ वहाँको परिवारमा पारिवारिक सम्पत्तिको निम्न विवरणमा भन्सारको पहुँच र स्वामित्व रहेको छैन तब सञ्जो परिवारमा उपयुक्त कोठामा (पवित्र लागु हुने)

क्र.सं.	विवरण	पहुँच	स्वामित्व
१	जग्गा जमिन		
२	घर तथा अन्य संरचनाहरू		
३	पशु सम्पत्ति/संचित पैसा		
४	दैनिक किस्ताहरू/पहरे		
५	अन्य		

घ) खा.पा.उ.स.स. तथा समुदायमा भन्सारको स्तर (होसियार) (निम्न बूटाहरू फोक्सो गुण छलफलको आधारमा जानकारी लिएर टिपोट गर्नुपर्नेछ)

क्र.सं.	विवरण	उत्पन्न	मध्यम	निम्न
१	आयसम्पत्तिको विवरण			
२	आयसम्पत्तिको विवरण			
३	दायित्वबोध र क्षमता			
४	त्याका, तर्क संगत, धर्म र मेहनत			
५	अन्य			

६. सम विकासमा पहुँचको आधारमा सामाजिक समावेशी सहभागिता

क) आयोजना क्रियाकलापमा वैयक्तिक विपन्न वर्गहरू, पिछडिएका वर्ग, जातजाति, रसित, अपाङ्गता आदिको ध्यानको उपस्थिति

१.१ आयोजनाकोवारेमा छलफल गर्ने कुनै भेला/ बैठकमा समावेशी तवरले बोलाइएको थियो ?  
 थियो  थिएन

१.२ के आयोजनाको छनौट गर्नु बैठकमा समावेशीताको आधारमा संलग्न/पिछडिएको वर्गको थियो ?  
 थियो  थिएन

१.३ के खा.पा.उ.स.स. को गठनमा समावेशीता बढाउन भएको थियो ? थियो  थिएन

ख) निम्न प्रक्रियामा समावेशी प्रकृया अपन्याइएको थियो ?

१.१ आयोजना छनौट गर्ने क्रियाकलापको कस्तो प्रतिक्रिया कस्तो थियो ?  
 उत्पन्न  मध्यम  निम्न

१.२ साना सहर/ खानेपानी आयोजना कार्यान्वयन गर्ने सामाजिक समावेशी आधारमा उपभोक्ताहरूको परिचालन गर्न भएको प्रयास कस्तो थियो ? राम्रो  मध्यम  निम्न

७. स्वास्थ्य र सरसफाइ

क) खानेपानी

१. तपाईंको विचारमा खानेपानीको गुणस्तर तराई/सराय/भागमा के सम्बन्धहरू देखिन सक्छ ?  
 (एक भन्दा बढी उत्तर आउन सक्छ)

१.१ दुर्गन्ध आउने/ पिपिटी स्वाद  १.२ दल विद्यमान/रातो

१.३ विरामी आनाउने  १.४ अन्य (उल्लेख गर्ने)

२. के सफाईमा पानी भर्ने र रोक्ने आँडो पानी खप्नु र भण्डार गर्नु पूर्व सफा गर्नुपर्ने भन्ने थाहा छ ? छ  छैन

धरि छ भने, पानी राख्ने बाँडो कस्तो ढक्का गर्ने हुन्छ ?

२.१ साँझी पानी गाभने  २.२ खराती पानीले  २.३ मुस/पिटी र बाँसले

२.४ साँझी पानीले  २.५ अन्य (उल्लेख गर्नुस)

३. तपाईं घरमा पानी कसरी राख्नु हुन्छ ?

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(एक भन्दा बढी उत्तर आउनु सक्ने)

- १.१) पानी भर्नु पछि बाँझ लाग्ने  १.२) बाथी पानी कडाई   
 १.३) पानी राख्ने भँडो राम्रोसँग ढाकेर उल्टो राख्ने  १.४) अन्य उल्लेख

- क्यान्डिडको नाम वा अर्जिस्टेड पानी कम्पनी भित्रको नाम ?  
 १.१) बाथी पानी अर्जि अखोला, लोडा, कल्लो, नयाँ घोडा  
 १.२) विमान, राम, जगन्नाथीमा बुढाएर  
 १.३) भागीरथी नदी, अम्बोरा, कल्लो, विमानको पानी खाने  
 १.४) अन्य (उल्लेख गर्ने)

ख. वर्षी

१. के तपाईंको घरमा वर्षी छ  हो  (केवलमे १.१ मात्र)  
 १.१) यदि हो भने, कस्तो प्रकारको वर्षी छ ?   
 १.२) बाँझ वर्षी  १.३) सिस्टम फर्निचर   
 १.४) क्लिष्ट/ड्रेडर खाले वर्षी  १.५) अन्य   
 १.६) बाइलर/सिस्टम फर्निचर

- १.७) यदि छ भने, तपाईंको घरमा वर्षी कसकसले प्रयोग गर्नुहुन्छ ?   
 १.८) वर्षीमा १) घुम्दा काटेको रूपले २) कतारमा न जोडने यात्रा ३) तिरामी सविला  
 १.९) वर्षी छैन भने, तपाईं गर्न कोसो जान्नुहुन्छ ?   
 १.१०) खोला/कल्लो/किशोर का. खुला/भेदन/उदर/घरे/नबक/उदर/घरे/कडा सजिलो हुन्छ।  
 १.११) के तपाईंको समुदाय खुला/भेदन/उदर/घरे/नबक/उदर/घरे/कडा सजिलो हुन्छ ?  हो

ग. खानेपानीको सरसफाई

- १.१) खानेपानीको सफाई गर्नका लागि कुनै योजना/उपाय ?  हो  (एक भन्दा बढी उत्तर आउनु सक्ने)  
 १.२) पानीको खाना छोपेर/उल्टो राख्ने  १.३) अथवा हातमा पानी पस्कने गर्दा   
 १.४) कति खाने/खानेकुरा राम्रोसँग पछाँचेर छोपेर  १.५) हाथी गोडा सफा गरेर मात्र भ्रमणमा प्रयोग   
 १.६) धुने पानी वा सफे गर्नेका खाना, कुनैपलुम थिसाउने गर्नु   
 १.७) उदर/पस्यु/घात/भीडा/कडा/सफा गरेर मात्र खाना पस्कने/खाने   
 १.८) कुनै खाँदा पछाँचेर बाइलर/उदर/नबक/उदर/घरे/कडा सजिलो हुन्छ।   
 १.९) के तपाईं खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ ?  राख्नु  राख्नु

घ. सौभाग्यपूर्ण सरसफाई (घरपरिवारको संख्या अनुसार ज्याकासापमा टाँक विन्द लगाएर बस्नु पर्ने)। जस्तो खासतयाको परिवार भए इरेक ज्याकासापमा टाँक बहिरु पारको संख्या आउनुपर्ने।

१. तपाईं र परिवारका अन्य सदस्यले कतिपय र के गरेपछि हात धुनुहुन्छ ? धुने भाए पस्ने  विन्द लगाउनुपर्ने र नभन्ने भए पस्ने  विन्द लगाउनुपर्ने  एक भन्दा बढी उत्तर आउनु सक्ने।

क्र.सं.	व्यक्ति	विन्द लगाउनुपर्ने	नभन्ने भए पस्ने
१	खाना खाना भए		
२	खाना खाएपछि		
३	विना सापुणले		
४	फोहोर भेला छोपेपछि		

*(Signature)*  
 Engineer

Ministry of Water Supply  
 Government, Kathmandu

ToR for IEE of Deurali Hupsekot WSSP

7	अवसाट फके पछि				
8	केन्द्रिय टोलाई दिना				
9	विस्थापन वसाट फके पछि				
10	अन्य (उल्लेख गर्नु)				

7. तपाईं 7 परिवारका अन्य सदस्यले के रो हाल अनुकुल ? हुनेमा यस्तो (✓) चिन्ह लगाउनुहोस् र नहुनेमा यस्तो (X) चिन्ह लगाउनुहोस्।

क्र.सं.	विवरण	समाधान	अवस्था	समाधान	अवस्था
1	पानी मात्र				
2	खानी पानी				
3	मुस/पछि पानी				
4	सफुन पानी				
5	अन्य (उल्लेख गर्नु)				

तपाईं 7 परिवारका अन्य सदस्यले कहिले कहिले मुसाउनुहुन्छ ?

मुसाउने भए यस्तो (✓) चिन्ह लगाउनुहोस् र नमुसाउने भए यस्तो (X) चिन्ह लगाउनुहोस्।

क्र.सं.	विवरण	समाधान	अवस्था	समाधान	अवस्था
1	प्रत्येक दिन				
2	एक दिन विचार्				
3	हप्तामा 2 पटक				
4	हप्तामा 1 पटक				
5	2 हप्तामा 1 पटक				
6	यसैगना एक पटक				

क. फोहर मैला व्यवस्थापन

1. तपाईंको घरबाट निस्कने मूल फोहर मैला कहाँ विस्थापन गर्नुहुन्छ ?

1.1 घर नजिक खान्दा  1.2 निजी फोहर संकलनकर्तालाई दिने

1.3 गाँस/गोरपालिकाको व्यवस्था गरेको खान्दा वा खान्दा  1.4 अन्य (उल्लेख गर्नु)

2. तपाईंको घरको फोहर बस्तुलाई अन्यथास्थित तरिकाले विस्थापन गर्नुमा हुने तपाईंको असरहरू के हुन् ? (एक पन्ना चढी उत्तर दिनु)

2.1 फोहर वासाबाटको बृद्धि  2.2 माथ्युट्टे, सिंगो, किराहरूको बृद्धि

2.3 रोग सन्तान बृद्धि  2.4 अन्य (उल्लेख गर्नु)

3. तपाईंको घरबाट निस्कने फोहर पानी कहाँ विस्थापन गर्नुहुन्छ ?

3.1 खोखोमा (Soak pit)  3.2 तरकारी बारीमा/कोसा बारीमा

3.3 सार्वजनिक बरामा  3.4 अन्य (उल्लेख गर्नु)

ख. बस्तुमाउने फोहर व्यवस्थापन

1. के तपाईंले बस्तुमाउ पाल्नु गर्नुमा छ ? छ  छैन  छैन भने पानी जम्न सक्ने रोगमा जान्छे

यदि छ भने कुन कुन प्रकारका बस्तुमाउ विधिहरूमाई कस्ता तरिका हुन्छ ?

क्र.सं.	विवरण	समाधान	अवस्था	समाधान	अवस्था
1	गाँस/पानी				
2	बोरे/सामर				
3	बाख्रा				

*(Signature)*  
Engineer



ToR for IEE of Deurali Hupsekot WSSP

Y	उत्तर/विवरण	
Z	विवरण	

२. क्या आउटलेट विद्युतको कक्षा र कक्षी नियन्त्रित गर्नुहुन्छ ?

- २.१ भन्जानमा  २.२ आगो जाने गर्दिछ या ना
- २.३ भोक्ने पदार्थ प्लान्टमा प्रयोग गर्ने  २.४ अन्य उपलब्ध गर्ने

३. क्या आउटलेटको कोठो देखाको नयाभन्नि अन्वयस्थित शहरको नियन्त्रित भएर हुने अथवा अन्वयस्थितको के हुन् ? (एक भन्दा बढी उत्तर आउनु सक्ने)

- ३.१ कोठावर्गीय कोठोको बन्ने हुने  ३.२ सामुदायिक, शिक्षा, स्वास्थ्यको बन्ने हुने
- ३.३ कोठावर्गीय बन्ने हुने  ३.४ गेट, छरछिमेक तथा शहरको सीमा भित्र
- ३.५ अन्य उपलब्ध गर्ने

४. सेफ्टी (फोहरसेवी) व्यवस्थापन (सिफ्ट सेफ्टी/सिफ्ट) नामा भएको फोहरसेवी रूप प्रदान गर्न सकिने ?

१) सिफ्ट विद्युतको मासुमा व्यवस्थापन (अन्वय) कहाँ गर्ने गर्नुपर्छ ?

- १.१  १.२  १.३  १.४  १.५

२) को फोहरसेवी देखा/अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- २.१  २.२  २.३  २.४  २.५

३) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ३.१  ३.२  ३.३  ३.४  ३.५

४) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ४.१  ४.२  ४.३  ४.४  ४.५

५) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ५.१  ५.२  ५.३  ५.४  ५.५

६) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ६.१  ६.२  ६.३  ६.४  ६.५

७) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ७.१  ७.२  ७.३  ७.४  ७.५

८) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ८.१  ८.२  ८.३  ८.४  ८.५

९) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ९.१  ९.२  ९.३  ९.४  ९.५

१०) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १०.१  १०.२  १०.३  १०.४  १०.५

११) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- ११.१  ११.२  ११.३  ११.४  ११.५

१२) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १२.१  १२.२  १२.३  १२.४  १२.५

१३) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १३.१  १३.२  १३.३  १३.४  १३.५

१४) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १४.१  १४.२  १४.३  १४.४  १४.५

१५) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १५.१  १५.२  १५.३  १५.४  १५.५

१६) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १६.१  १६.२  १६.३  १६.४  १६.५

१७) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १७.१  १७.२  १७.३  १७.४  १७.५

१८) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १८.१  १८.२  १८.३  १८.४  १८.५

१९) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- १९.१  १९.२  १९.३  १९.४  १९.५

२०) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- २०.१  २०.२  २०.३  २०.४  २०.५

२१) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- २१.१  २१.२  २१.३  २१.४  २१.५

२२) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- २२.१  २२.२  २२.३  २२.४  २२.५

२३) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

- २३.१  २३.२  २३.३  २३.४  २३.५

२४) सिफ्टको अन्वयको अन्वयको कक्षा (देखा/सिफ्ट) बाहेक ?

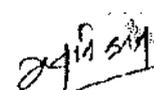
- २४.१  २४.२  २४.३  २४.४  २४.५

Engineer





**ANNEX III**  
**Sample of EMP Matrix**

  
Engineer



ToR for IEE of Deurali Hupsekot WSSP

EMP Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
A. Types of Impacts					
a) Project Phase (Design/Construction/Operation)					



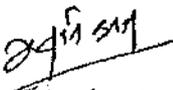
*[Handwritten Signature]*  
Engineer



ToR for IEE of Deurali Hupsekot WSSP

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**ANNEX IV  
PHOTOGRAPHS**

  
Engineer





1. Proposed/ Existing Intake, Betai Khola



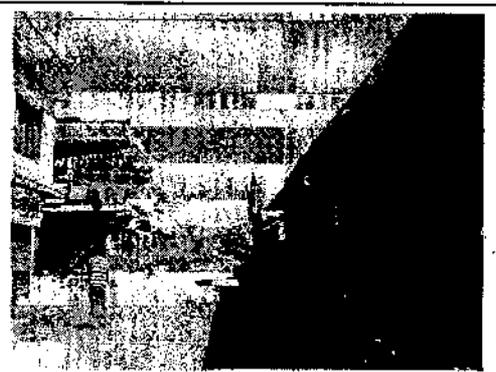
2. Proposed/ Existing Intake, Pathar Khola



3. Proposed/ Existing Intake, Girubari Khola  
(Satakon)



4. Public Participation during Detailed Design  
Presentation



5. A view of Settlement Area



6. Detailed Design Presentation



*Signature*  
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Engineer



## **ANNEX 2: SAMPLE FORMS, FORMATS AND REPORT TEMPLATE**



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**ANNEX 2A: RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR DEURALI HUPSEKOT PROJECT AND PRELIMINARY CLIMATE RISK SCREENING CHECKLIST FOR SAMPLE PROJECT TOWNS**

**Instructions:**

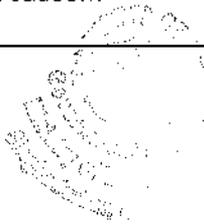
This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender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

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

**Country/Project Title:** **NEP: Urban Water Supply and Sanitation (Sector) Project**

**Project:** **Deurali Hupsekot Water Supply and Sanitation project**

Screening Questions	Yes	No	Remarks
A. Project Siting : Is the project area			
Densely populated?		√	Hupsekot Rural Municipality has moderate population density.
Heavy with development activities?		√	
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...			



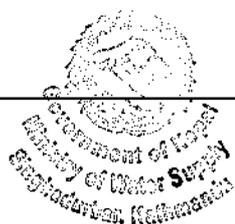
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Screening Questions	Yes	No	Remarks
Pollution of raw water supply from upstream wastewater discharge from communities, industries, Soil erosion runoff?		√	
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	
Hazard of land subsidence caused by excessive ground water pumping?		√	
Social conflicts arising from displacement of communities		√	
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	√		Basic water treatment is proposed under the proposed project. EMP recommends water quality monitoring as prescribed in the NDWQS & its Directives.
Delivery of unsafe water to distribution system?	√		Design proposes office building that also comprises water quality laboratory to deliver safe water. EMP recommends continuing training of WUSC in water quality monitoring, as prescribed in the NDWQS Directives.
Inadequate protection of intake works or wells, leading to pollution of water supply?	√		Design has considered the safest site for intake regarding environmental pollution and proposes enough measures to mitigate contamination. There is also provision of protection works for intakes/sump wells.
Over pumping of ground water, leading to salinization and ground subsidence?		√	
Excessive algal growth in storage reservoir?		√	EMP provides mitigation measures.
Increase in production of sewage beyond the capabilities of community facilities?		√	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.		√	

10/01/2023  
 Test 1/1/23

Government of Nepal  
 Ministry of Water Supply  
 Sanjivpur, Kathmandu

Screening Questions	Yes	No	Remarks
Impairments associated with transmission lines and access roads.	√		EMP provides mitigation measures.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	√		EMP provides mitigation measures.
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?		√	EMP provides mitigation measures
Dislocation or involuntary resettlement of people?		√	
Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	
Noise and dust from construction activities?	√		EMP provides mitigation measures.
Increased road traffic due to interference of construction activities?	√		EMP provides mitigation measures.
Continuing soil erosion/silt runoff from construction operations?	√		EMP provides mitigation measures.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	√		EMP incorporates monitoring of distributed water according to the Directives for the NDWQS.
Accidental leakage of chlorine gas?		√	EMP provides mitigation measures.



Screening Questions	Yes	No	Remarks
Excessive abstraction of water affecting downstream water users?		√	EMP provides mitigation measures
Competing uses of water?		√	
Increased sewage flow due to increased water supply		√	
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		√	This is not under the scope of the project.
Large population influx during project construction and operation that causes an increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	
Social conflicts if workers from other regions or countries are hired?	√		Expected as low concern. Priority will be given to local workers.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	√		EMP provides mitigation measures.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community	√		EMP provides mitigation measures.

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 18/02/2018



**Preliminary Climate Risk Screening Checklist for Sample Project Towns**

Screening Questions		Score	Remarks
<b>Location and Design of project</b>	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	Investments in the proposed project will not likely be affected by climate change and extreme weather events due to the siting of project.
	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	
<b>Materials and Maintenance</b>	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-meteorological parameters) affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
<b>Performance of project outputs</b>	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Regular operation and maintenance will not allow this effect to occur

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



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**ANNEX 2B: RELEVANT ENVIRONMENTAL QUALITY STANDARDS**

**B.1 Ambient Air Quality Standards**

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard ( $\mu\text{g}/\text{m}^3$ ) *	WHO Air Quality Guidelines ( $\mu\text{g}/\text{m}^3$ ) **	
			Global Update 2005	Second Edition ^ 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM <sub>10</sub>	Annual	-	20	-
	24-hour	120	50	-
PM <sub>2.5</sub>	1-year	-	10	-
	24-hour	-	25	-
SO <sub>2</sub>	Annual	50	-	-
	24-hour	70	20	-
	10-minute	-	500	-
NO <sub>2</sub>	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

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

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

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

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

**B.2 Noise Level Standards**

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L <sub>eq</sub> 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		
Urban residential area	55	50	55	45
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.



*[Handwritten Signature]*  
Engineer



**B.3 National Drinking Water Quality Standards, 2006**

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-water Quality, 4th Edition, 2011*
	Parameter	Unit	Max. Concentration Limits	
Physical	Turbidity	NTU	5 (10) **	-
	pH		6.5 - 8.5	none
	Color	TCU	5 (15)	none
	Taste & Odor		Would not be objectionable	-
	TDS	mg/l	1000	-
	Electrical Conductivity	µS/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	0.005
	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 national standard value.

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



*[Handwritten signature and date]*

**ANNEX 2C: SAMPLE GRIEVANCE REDRESS FORM**

(To be available in Nepalese and English)

The \_\_\_\_\_ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information 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:	

*[Faint signature or stamp]*

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Signature



**ANNEX 2D: SAMPLE TRAFFIC MANAGEMENT PLAN**

**SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)**

**A. Principles**

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

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

**B. Operating Policies for TMP**

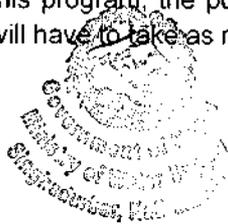
The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

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

**C. Analyze the impact due to street closure**

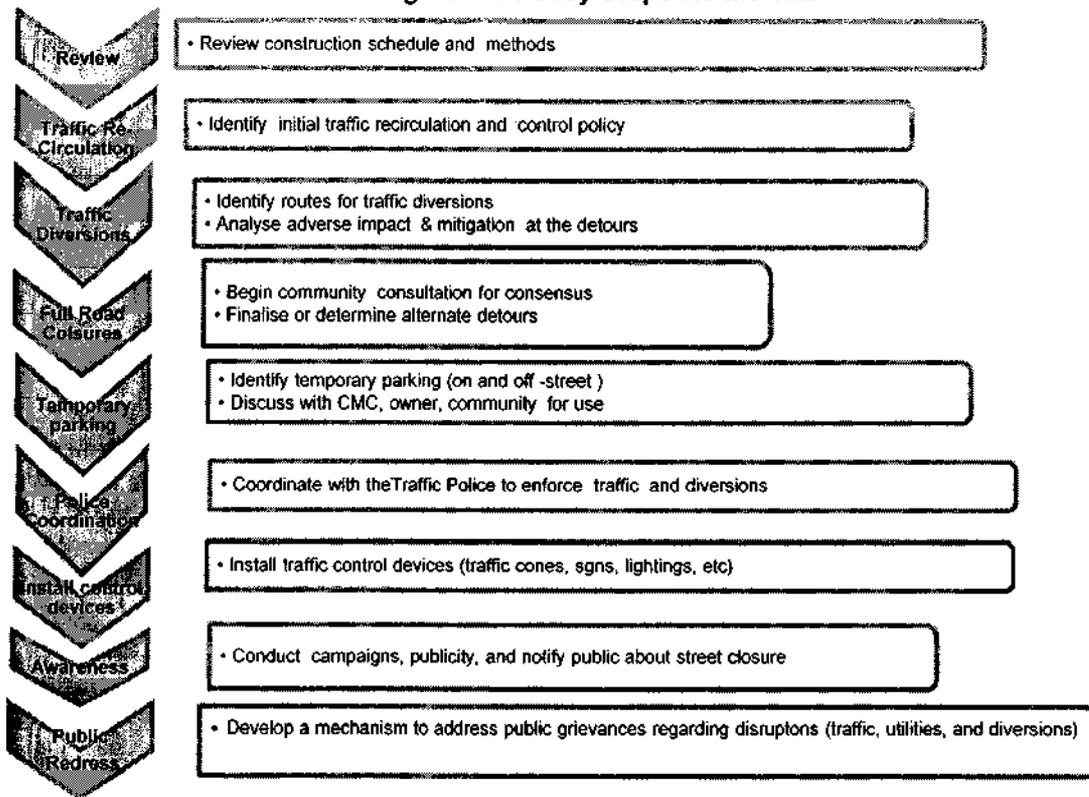
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

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



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

Figure A1: Policy Steps for the TMP



**D. Public awareness and notifications**

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

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

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

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

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

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the 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:

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

#### **E. Vehicle Maintenance and Safety**

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

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

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

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

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

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

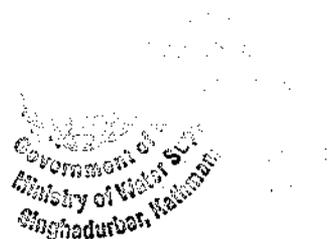
The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should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

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective

jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

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

The 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 2E: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
- Manage 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

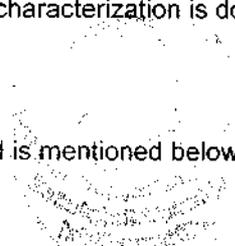
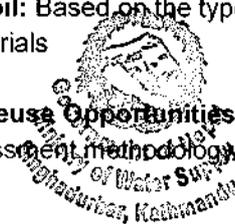
**Spoil volumes, Characteristics and Minimization**

**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 client 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



*[Handwritten Signature]*  
Engineer



**ANNEX 2F: 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 projects
- Environmental category of the projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and project progress and status

No.	Project Name	Status of Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

**COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS**

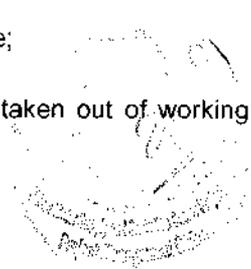
No.	Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

**COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS**

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

**COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be Reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual Report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
  - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
  - If MWSS water was escaping site boundaries or MWSS tracks were seen on adjacent roads;
  - adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
  - Are their designated areas for concrete works, and refueling;
  - Are their spill kits on site and if there are site procedure for handling emergencies;
  - Is there any chemical stored on site and what is the storage condition?
  - Is there any dewatering activities if yes, where is the water being discharged;
  - How are the stockpiles being managed;
  - How is solid and liquid waste being handled on site;
  - Review of the complaint management system;
  - Checking if there are any activities being under taken out of working hours and how that is being managed.



**Summary Monitoring Table**

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

**Overall Compliance with CEMP/EMP**

No.	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 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	Site Location	Parameters (Monitoring Results)

Engineer

Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

Testing	PM10 ( $\mu\text{g}/\text{m}^3$ )	SO2 ( $\mu\text{g}/\text{m}^3$ )	NO2 ( $\mu\text{g}/\text{m}^3$ )

**Water Quality Results**

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity ( $\mu\text{S}/\text{cm}$ )	BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity ( $\mu\text{S}/\text{cm}$ )	BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)

**Noise Quality Results**

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Government Standard)	
			Day Time	Night Time

**ANNEX 2G: SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT**

Project Name \_\_\_\_\_  
 Contract Number \_\_\_\_\_

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
 TITLE: \_\_\_\_\_ DMA: \_\_\_\_\_  
 LOCATION: \_\_\_\_\_ GROUP: \_\_\_\_\_

WEATHER CONDITION: \_\_\_\_\_

INITIAL SITE CONDITION: \_\_\_\_\_

CONCLUDING SITE CONDITION: \_\_\_\_\_

Satisfactory \_\_\_\_\_ Unsatisfactory \_\_\_\_\_ Incident \_\_\_\_\_ Resolved \_\_\_\_\_ Unresolved \_\_\_\_\_



**INCIDENT:**

Nature of incident:

Intervention Steps:

**Incident Issues**

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

**Inspection**

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation
Site Restored to Original Condition	Yes <input type="checkbox"/> No <input type="checkbox"/>

Signature

**Sign off**

\_\_\_\_\_  
Name  
Position

\_\_\_\_\_  
Name  
Position

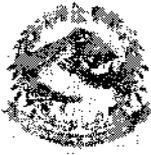
Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu



**ANNEX 3:  
PUBLIC NOTICE, DEED OF INQUIRY (MUCHULKA), RECOMMENDATION  
LETTERS & MINUTES OF MEETINGS**







# हुप्सेकोट गाउँपालिका

२ नं. वडा कार्यालय

भैरहवा, नवलपरासी (ब.सु.प.)

गण्डकी प्रदेश, नेपाल

२०७३

पत्र ०६६/१६६

च.नं. २४६

मिति २०७६।०।३

विषयः- मुचुल्का सम्बन्धमा ।

श्री ओ प्रसन्न सम्बन्ध ।

राजिवाली विकास बैंकको आर्थिक सहयोगमा नवलपरासी जिल्ला हुप्सेकोट गाउँपालिका अन्तर्गत निर्माण हुन उद्देश्यको बाहेरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक गतावलीय परीक्षणको सार्वजनिक सूचना हामी तपसिलका व्यक्तिहरुको सूच्य मा राख भएकाले यो मुचुल्का आयको मिति २०७६।०।३ गतेका दिन तयार गरी रही छाप जारी दिने ।

तपसिल

- |                      |           |       |
|----------------------|-----------|-------|
| १. पवित्रा शर्मा     | हु.गा.पा. | जम्मा |
| २. लुन कपुराना       | वडा नं.२  | ०६    |
| ३. लोक बहादुर नेपाली | वडा नं.२  | ०६    |
| ४. राम बहादुर शम्क   | वडा २     | ०६    |

२०७६।०।३  
पत्र ०६६/१६६  
वडा आ.स.का



WARD NO. 3



# हुप्सेकोट गाउँपालिका

उ.म. नं. १७७३  
वनसुखे भानु, नवलपरासी (ब.स.प.)  
गण्डकी प्रदेश, नेपाल  
२०७३

व.सं. २०७६/०६/०६

नं. ४९७

मिति २०७६/०६/०२

श्री जो जस सग सम्बन्ध छ ।

विषय: मुचुल्का सम्बन्धमा ।

एशियाली विकास बैकको आर्थिक सहयोगमा नवलपरासी जिल्लाको हुप्सेकोट गाउँपालिका अन्तर्गत निर्माण हुन गइरहेको सहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षणको सार्वजनिक सूचना हामी तपशिलको व्यक्तीहरुको रोहवरमा टाँस भएकोले यो मुचुल्का आजको मिति २०७६/०६/०२ गतेमा तयार गरि सही छाप गरि दियो

तपशिल:

१. धनमाया वि.क. धन माया वि.क.

२. रेशमलाल परियार

३. कृष्ण श्रेष्ठ

४. चौ. कुमाल

५. कृष्ण देवी पाण्डे

घटिलाल सिधुन  
चडा अध्यक्ष



Engineer

Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

RECOMMENDATION LETTER



हुप्सेकोट गाउँपालिका  
गाउँ कार्यपालिकाको कार्यालय

इयालबास, नवलपरासी (व.सु.पूर्व)

बागेश्वरी प्रदेश, नेपाल

संस्थापना: २०७२

पत्र संख्या: ०७६/०७७

व.नं. ८६०

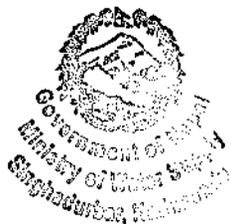
मिति: २०७६/१/०६

श्री. शहरी खनिपानी तथा सरसफाई आयोजना,  
पानी पोखरी, काठमाडौं।

विषय: सिफारिस गरिएको।

उपर्युक्त सम्बन्धमा यस गाउँपालिका अन्तर्गत संचालन हुने शहरी खनिपानी आयोजना सम्बन्धी राष्ट्रिय सञ्चालन गर्न अभियान राष्ट्रिय ऐनिकमा मिति २०७६/०८/०२ मा सार्वजनिक सूचना प्रकाशित भएको छ। सो प्रकाशन मितिदेखि पन्ध्र (१५) दिन भित्र स्थानीय स्तरका जनकौरहरुबाट आयोजनाद्वारा बतावरणमा कुनै प्रकारको नकारात्मक असर नपर्ने भनी राष्ट्रिय सञ्चालन प्राप्त भएकोले र सरकारवालाहरुको माझमा प्रारम्भिक अध्ययनमा आधारित रहर परामर्शदाताद्वारा गरिएको प्रस्तुतिकरण अनुसार पनि प्रस्तावित आयोजनाले अन्तर्को भौतिक, जैविक, सामाजिक आर्थिक एवं सांस्कृतिक बतावरणमा कुनै नकारात्मक असर नपर्ने देखिएकोले आयोजना सञ्चालनको लागि सिफारिस गरि पठाईएको इत्यहात अनुरोध छ।

लक्ष्मी देवी श्रेष्ठ



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# हुप्सेकोट गाउँपालिका

३ ल. वडा कार्यालय  
बन्दुके धान, नवलपरासी (द.प.प.)  
गण्डकी प्रदेश, नेपाल  
२०७३

सं. २०७९/०६/७

नं. ४९७

मिति २०७९/०८/०१

श्री जो जस संग सम्बन्ध छ ।

विषय: मुचुल्का सम्बन्धमा ।

एशियाली विकास बैंकको आर्थिक सहयोगमा नवलपरासी जिल्लाको हुप्सेकोट गाउँपालिका अन्तर्गत निर्माण हुन गईरहेको सहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षणको सार्वजनिक सूचना हामी तपशिलको व्यक्तीहरुको रोहवरमा टाँस भएकोले यो मुचुल्का आजको मिति २०७६/०८/०१ गतेमा तयार गरि सही छाप गरि दियो

तपशिल:

१. धनमाया वि.क. धन माया वि.क.

२. रेशमलाल परियार

३. कृष्ण श्रेष्ठ *K. Shrestha*

४. चौ कुमाल

५. कृष्ण देवी पाण्डे *K. Devi Pandey*

एविलाल मिश्र  
सहा अधीक्षक



*Engineer*



RECOMMENDATION LETTER



हुप्सेकोट गाउँपालिका  
गाउँ कार्यपालिकाको कार्यालय

झ्यालबास, नवलपरासी (व.सु.पूर्व)

गण्डकी प्रदेश, नेपाल

स्थापना २०७३

पत्र संख्या ०७६/०७९

च.न. ८६०

मिति: २०७६/९/०६

श्री शहरी खानेपानी तथा सरसफाई आयोजना,  
पानी पोखरी, काठमाडौं ।

विषय: सिफारिस गरिएको ।

उपरोक्त सम्बन्धमा यस गाउँपालिका अन्तर्गत सञ्चालन हुने शहरी खानेपानी आयोजना सम्बन्धी राय सुझाव  
सकलत गर्न अभिमान राष्ट्रिय दैनिकमा मिति २०७६/०८/०२ मा सार्वजनिक सूचना प्रकाशित भएको छ । सो प्रकाशन  
मितिमा पत्र (१२) दिन अघि स्थानीय स्तरका जानकारीहरूबाट आयोजनाद्वारा वातावरणमा कुनै प्रकारको नकारात्मक  
असर नपर्ने भनी राय सुझाव प्राप्त भएकोले र संशोधनवालाहरूको माझमा प्राथमिक अध्ययनमा आधारित रहने  
परामर्शदाताद्वारा गरिएको प्रस्तुतिकरण अनुसार पनि प्रस्तावित आयोजनाले क्षेत्रको भौतिक, जैविक, सामाजिक, आर्थिक एवं  
सांस्कृतिक वातावरणमा कुनै नकारात्मक असर नपर्ने देखिएकोले आयोजना सञ्चालनको लागि सिफारिस गरि पठाईएको  
ध्येहारा अनुरोध छ ।

  
सहमी देवी पाण्डे





# हुप्सेकोट गाउँपालिका

३ नं. वडा कार्यालय  
बन्दिने धान, नवलपरासी (ब.स.प.)  
गण्डकी प्रदेश, नेपाल

सं. २०७६/०६/०६

च.नं. ४९७

दि. २०७६/०६/०२

श्री जो जस सग सम्बन्ध छ ।

विषय: मुचुल्का सम्बन्धमा ।

एशियाली विकास बैकको आर्थिक सहयोगमा नवलपरासी जिल्लाको हुप्सेकोट गाउँपालिका अन्तर्गत निर्माण हुन गइरहेको सहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक व्रतावरणीय परिक्षणको सार्वजनिक सुचना हामी तपशिलको व्यक्तीहरुको रोहवरमा टाँस भएकोले यो मुचुल्का आजको मिति २०७६/०६/०२सम्म तयार गरि सही छाप गरि दियो

तपशिल:

१. धनमाया विक. धन गाउँपालिका

२. रेशमलाल परियार

३. कृष्ण श्रेष्ठ

४. चौरे कुमाल

५. कृष्ण देवी पाण्डे

छविलाल मिश्र  
वडा अध्यक्ष



Engineer

RECOMMENDATION LETTER



हुप्सेकोट गाउँपालिका  
गाउँ कार्यपालिकाको कार्यालय

झ्यालबास, नवलपरासी (व.सु.पूर्व)

राष्ट्रकी प्रदेश, नेपाल

संस्थापना २०७३

पत्र संख्या : ०७६/०७७

च.सं. ६६०

मिति: २०७६/११/०२

श्री भार्गवी खानेपानी तथा सरसफाई आयोजना,  
पानी पाखरी, काठमाडौं ।

विषय: सिफारिस गरिएको ।

उपरोक्त सम्बन्धमा यस गाउँपालिका अन्तर्गत सञ्चालन हुने शहरी खानेपानी आयोजना सम्बन्धी राय सुझाव संकलन गर्ने अभियान राष्ट्रिय तहमा मिति २०७६/०८/०२ मा सार्वजनिक सूचना प्रकाशित भएको छ । सो प्रकाशन मितिका पछि (१५) दिन भित्र स्थानीय स्तरका जानकारीदाता आयोजनादाता ब्यक्तिहरूमा कुनै प्रकारको नकारात्मक प्रतिक्रिया नपने भनी राय सुझाव प्राप्त भएकोले र सरकार/बालाहरूको माझमा प्रारम्भिक अध्ययनमा आधारित र हेर परामर्शदाताद्वारा गरिएको प्रस्तुतिकरण अनुसार पनि प्रस्तावित आयोजनाले क्षेत्रको भौतिक, वैदिक, सामाजिक, आर्थिक एवं सांस्कृतिक बालावरणमा कुनै नकारात्मक असर नपने देखिएकोले आयोजना सञ्चालनको लागि सिफारिस गरि पठाईएको ब्यहोरा अनुरोध छ ।

सुशीला देवी चौण्ड



MINUTES OF MEETING-1

Deurali Hupsekot

आज मिति २०७२/०६/१३। गतेका दिन जिल्ला रत्नपुर  
 हुसेकोट गाउँपालिका कार्य क्षेत्र विषय स्वरूप  
 उपस्थित तथा शरसुन्दर कार्यालय बाहरी उपस्थित  
 आयोजनाका लागि यस मी हेरफेरको योजना  
 उपस्थित तथा शरसुन्दर उपस्थित स्वरूपका  
 आयोजना मी मूक बहादुर पुलामी जसको कार्य  
 तामा, गाउँपालिकाका मूक बहादुर पुलामी हेरफेर  
 आयोजना मी शरसुन्दर कार्यालय मूक बहादुर  
 को कार्यकारी आयोजना मी हेरफेरको योजना  
 एक इन्जिनियर आयोजना मी मूक बहादुर  
 मी विरक्त हेरफेरका मी आयोजना मी शरसुन्दर  
 मी शरसुन्दर आयोजना मी मूक बहादुर  
 उपस्थित स्वरूपका मूक बहादुर आयोजना  
 उपस्थित मी मूक बहादुर आयोजना मी मूक बहादुर  
 गरी निर्णय पारित गरियो।

- १- आयोजना मी- मूक बहादुर पुलामी
- २- विरक्त उपस्थित मी- मूक बहादुर
- ३- उपस्थित मी- मूक बहादुर (स.स.)
- ४- शरसुन्दर मी- मूक बहादुर
- ५- शरसुन्दर मी- मूक बहादुर
- ६- उपस्थित मी- मूक बहादुर
- ७- उपस्थित मी- मूक बहादुर
- ८- उपस्थित मी- मूक बहादुर
- ९- उपस्थित मी- मूक बहादुर
- १०- उपस्थित मी- मूक बहादुर



*(Signature)*  
 Director



आयोजना प्रस्ताव तथा निर्देश

आयोजना प्रस्ताव

प्रस्ताव नं १ शहरी स्वच्छता आयोजनाको लागि  
सम्बन्धमा

प्रस्ताव नं २ प्रस्तावित आयोजनाको व्यवहार  
विधि सम्बन्धमा

प्रस्ताव नं ३ सेवा क्षेत्र निर्धारण सम्बन्धमा

प्रस्ताव नं ४-आवृत्त पत्र जमा व्यवस्थापन  
तथा उपवास गराउने तथा शौचालय सुबत्त  
सम्बन्धमा

प्रस्ताव नं ५ आयोजनाको लागि इलेक्ट्रो लाभासी  
तथा प्राविधिक समर्थन सम्बन्धमा

प्रस्ताव नं ६ आयोजनाको कार्य गर्नका लागि  
कालावरुण सम्बन्धमा

प्रस्ताव नं ७ हाल भइरहेको पुस्तो क्षेत्र  
को पाईप लाईन शुरुवातमा

निर्देश

प्रस्ताव नं १ माथी वलफल गर्न परामर्श कालाको  
दौलीले शहरी स्वच्छता आयोजनाको लागि  
कारी गाउँले त्रिलशिलाका सयतगाँउ  
काठिम लडन डे.व.प. ड.फ. (Town  
Development Fund) को माध्यमबाट  
०६ अगुडन लडनेमा आ आयोजनाको लागि  
हेतुमा जमिनी गराउने।



Handwritten signature and date.



उपरोक्त प्रस्ताव तथा निर्देश

आपका धन्यवाद,

प्रस्ताव नं १ शहरी स्वच्छता कार्योजनाको लागि  
सम्बन्धमा ।

प्रस्ताव नं २, प्रस्तावित कार्योजनाको स्थलगत  
निरीक्षण सम्बन्धमा

उत्ताव नं ३ सेवा क्षेत्र निर्धारण सम्बन्धमा  
प्रस्ताव नं ४-आवश्यक पर्ने जग्गा व्यवस्थापन  
तथा उपकरण खरिद तथा सामग्री सुव्यवस्था  
सम्बन्धमा ।

प्रस्ताव नं ५ कार्योजना नजदर क्षेत्रको सामग्री  
तथा प्राविधिक समर्थन सम्बन्धमा ।

प्रस्ताव नं ६ कार्योजनाको कार्य गर्दा आइएन  
का लागू सम्बन्धमा ।

प्रस्ताव नं ७ हाल भइरहेको पुरानो स्वरूपता  
को पाइप लाईन सम्बन्धमा ।

निर्देश

प्रस्ताव नं १ माथी कलफल गर्दा परामर्शदाताको  
टोलीले शहरी स्वच्छता कार्योजना को लागि  
कार्यी जागृदने त्रिल शिलालाग नेशनल गेट  
डिभिम लन्डन डेव. ए. डी. डी. (Town  
Development Fund) १००% नेपाल खास  
कर आउदा सम्बन्धमा मा कार्योजना को लागि  
दिइएको निर्देशन जारी गर्दछ ।



U/W

संशोधन आयोगको प्रति विज्ञापनका लागि  
 पत्राचारको माध्यमबाट विज्ञापनदेखि निम्नमा  
 १- विज्ञापनको लागि कसको लागि आसानी  
 किन २- विज्ञापनको लागि कसको लागि  
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 कसको लागि विज्ञापनको लागि

निर्णयः

संशोधन आयोगको प्रति विज्ञापनका लागि  
 एक आयोगको समेत हुन

कसको लागि विज्ञापनको लागि  
 कसको लागि विज्ञापनको लागि  
 (कसको लागि विज्ञापनको लागि)

कसको लागि विज्ञापनको लागि  
 कसको लागि विज्ञापनको लागि  
 कसको लागि विज्ञापनको लागि

संशोधन आयोगको प्रति विज्ञापनका लागि  
 कसको लागि विज्ञापनको लागि



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सर्वजनिक स्थानांमध्ये निर्माण झालेल्या आवाजपट्टी  
जवळच सामाजिक सुरक्षिततेची वसतीघर व  
बाहेर बाहेर निसर्ग जरी उपलब्ध असताना  
निर्माण करावे।

निर्णय नं. ५

प्रस्ताव नं. ६ बाबी खालील जरी आवाजपट्टी  
डिस्ट्रिक्ट शासकीय व वसाविका सम  
जमिनी बाबी स्थानीय जमीन मालकी  
इतर मालकी वसाविका व वसाविका जमीन व  
येथे वार वसाविका जमीन वसाविका जमीन  
याच प्राविधिक यंत्रणे जरी असल्याने  
सो. शासकीय प्राविधिक वसाविका वसाविका  
वसाविका जमीनी वसाविका वसाविका जमीनी

निर्णय नं. ६

प्रस्ताव नं. ६ बाबी खालील जरी आवाजपट्टी  
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निर्णय नं. ६

प्रस्ताव नं. ६ बाबी खालील जरी वसाविका  
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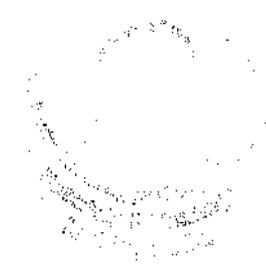


*[Signature]*  
Engineer



अनुसार परिकल्पना गर्ने गर्नु (सुदूरपश्चिम प्रदेश)  
सारको / बाक मिठवारी खोला SUM पिप  
PUMपीप / पम्पर खोला र गेटको खोला  
केटा सुभावेरा गरे प्रयोग गर्ने क्षेत्र  
निर्देश गरिबद्ध

*(Handwritten signatures and scribbles)*



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24/8/21  
Rishuwar

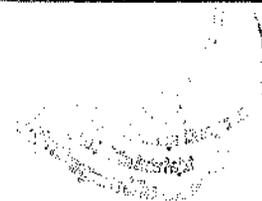
MINUTES OF MEETINGS-2

DATE

आज दिनांक २०७६ साल ३१० ००६ जतेका दिन  
 मस डेउराली (सालेखेका) हुम्पेको नगरपालीका  
 उपमाया सन्धिक सचिवालयमा गरी मस वडाका  
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 ले मस वडाका हुम्पेको नगरपालीका हुम्पेको नगरपालीका  
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- (१) श्री. मस वडाका हुम्पेको नगरपालीका
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- (११) श्री. मस वडाका हुम्पेको नगरपालीका

- (१२) श्री. मस वडाका हुम्पेको नगरपालीका
- (१३) श्री. मस वडाका हुम्पेको नगरपालीका
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- (२०) श्री. मस वडाका हुम्पेको नगरपालीका



Government of Nepal  
 Ministry of Water Supply and Sewerage Engineering  
 Singhadurbar, Kathmandu

DATE

Handwritten notes on lined paper, likely a list of items or a schedule. The text is heavily obscured by a dark, grainy overlay, making it difficult to read. Some legible fragments include:

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MINUTES OF MEETINGS-2

(DATE)

कार्य विधि २०६४ संख्या ३१७/६०६४ अन्तर्गत १९७७  
सन् १९७७ (सोती खोला) हुपसेकोट नदीको  
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उपस्थिति :

- (१) श्री. लाल बहादुर पुजारी - अध्यक्ष
- (२) श्री. राम नारायण धराले - उपाध्यक्ष
- (३) श्री. गुण सुब्बा - उपाध्यक्ष
- (४) श्री. रामे सिंह नारायण शर्मा - सचिव
- (५) श्री. मनी पायल - उपाध्यक्ष
- (६) श्री. लाल बहादुर शेरपुजा - सचिव
- (७) श्री. अमरपती पायल - सचिव
- (८) श्री. लाल देवी शर्मा - सचिव
- (९) श्री. नारायण शर्मा - सचिव
- (१०) श्री. राम बहादुर शर्मा - सचिव
- (११) श्री. राम बहादुर शर्मा - सचिव

विशेष उपस्थिति

- (१२) श्री. राम बहादुर - लाल देवी पायल - सचिव
- (१३) श्री. राम बहादुर - लाल देवी पायल - सचिव
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- (१९) श्री. राम बहादुर - लाल देवी पायल - सचिव
- (२०) श्री. राम बहादुर - लाल देवी पायल - सचिव



Government of Nepal  
Ministry of Water Supply and Sewerage Engineering  
Kathmandu  
Engineer

		DATE
२१	कुल्लुवा राई मंडल, हरेकली का पा कुल्लुवा	
२२	सिद्धार्थ U105	
२३	भद्राचण्ड ५ शिवारा	
२४	सुपुला काण्ड - दे का का पा - कापला ५३	
२५	सुपुला काण्ड -	
२६	मिना लाल प्रजापति	
२७	सुना बहादुर खत्री	
२८	सुना क खत्री	
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Engineer





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आज मिति २०७६।०।२४ जतेका दिन यस र्थै कैउरानी लोम  
खोला खानेपानी तथा घरसफाई उपभोक्ता संस्था द्वारा प्रस्ता  
वित कैउरानी टुप्से डोच शहरी खानेपानी आयोजना सम्बन्धी  
सचिवालय कैठक संस्थाका अध्यक्ष र्थै प्रेस वहाडुर पुवासी  
उपभोक्तासभामा मन्त्रिनिम प्रस्ताव माफी छलफल गरी  
निर्णय पारित गरियो ।

उपस्थिति

- १. उपभोक्ता र्थै प्रेस वहाडुर पुवासी
- २. व. व. उपभोक्ता र्थै छजना व पाडे
- ३. उपभोक्ता र्थै गुरु प्रयाक सुवेदी
- ४. समवेत र्थै प्रिय मरामक रेग्मी
- ५. व. व. उपभोक्ता र्थै मनि पाडे
- ६. व. व. सचिव र्थै लाल वहाडुर वीरपुजा
- ७. उपभोक्ता र्थै वृज्ज पाडे

आजका प्रस्तावनिर्णय

प्रस्ताव नै १ आयोजनाको वातावरणीय प्रभाव मूल्यांकन  
सम्बन्धमा ।

निर्णय

प्रस्ताव नै १ माथि छलफलको मिति २०७६।०।२४ मा यस  
कैउरानी टुप्से डोच शहरी खानेपानी आयोजनाको प्रारम्भिक  
वातावरणीय प्रभाव मूल्यांकन आर्किड आयोजना साईटद्वय  
दक्षिणमा सुचना प्रकाशित गरी आम उपभोक्ता र जनभावस  
लाई आयोजना निर्माण र त्यसमा हुने वातावरणीय असर  
को शय-सुभाव मात्रा गरिएकोमा सम्बन्धित श्रोतकारण  
द्वारा नै प्रतिक्रिया नै आएको र छलफलमा मेटिएको  
निर्णय नै समुदायको जीवनमा सकारात्मक सुधार ल्याउने  
र वातावरणीय सुधार समेत आउने सम्बन्धी विषयमा -  
अमृतमण्ड वल्लभ भन्ने बाहारा निर्णय गरिद ।

१. २. ३. ४. ५. ६. ७.



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Engineer



MINUTES OF PUBLIC CONSULTATION

भाषामिती २०६६।०।२१ जतेका दिन यस र्थे देउराली लोको  
व्कोला खानेपानी तथा करसफाई उपमोला र्थेस्वा द्वारा प्रस्ता  
वित देउराली हटवेडोच साहरी खानेपानी आयोजना एकीकी  
अधिवान्य के ठक र्थेस्वाडा प्रथमअ र्थे मेक वहाडुर पुलागी  
अरु र्थेस्वाधस्तामा वशी निम्न प्रस्ताव माफी दलफल गरी  
निर्णय पारित गारयो ।

उपस्थिती

- १. नौ - आध्यक्ष र्थे मेक वहाडुर पुलागी
- २. दो - उपाध्यक्ष र्थे लजना व पाछे
- ३. तुनी - उपाध्यक्ष र्थे युक्त प्रयाद युंकी
- ४. समेव र्थे - विजय शराम्म र्थे
- ५. रुत - उपाध्यक्ष र्थे मनि पाछे
- ६. अरु - र्थे र्थे र्थे र्थे - लाल वहाडुर र्थे
- ७. अरु - र्थे र्थे र्थे र्थे - लजना पाछे

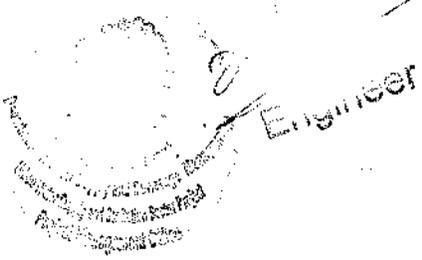
आजका प्रस्तावनिर्णय

प्रस्तावनेपु आयोजनाकी वातावरणीय प्रभाव मूल्यांकन  
सम्बन्धमा ।

निर्णय

प्रस्तावनेपु माफि दलफलमा की मिति २०६६।०८।१४ मा यस  
देउराली हटवेडोच साहरी खानेपानी आयोजनाकी प्रारम्भिक  
वातावरणीय प्रथमअ दलवन्धी आर्किड आयोजना वाहडुर  
यसिमा सुचना प्रकाशित गरी आगम उपमोला र जनभाव  
लाई ध्यानमा राखि र ताल्ल्याव हुने वातावरणीय प्रभाव  
को र्थे  
- र्थे  
निर्णयने र्थे  
र वातावरणीय सुधार समेत आउने सम्बन्धी विषयमा -  
अमकपड दलफल भन्ने कुराको निर्णय गरिदह ।

अध्यक्ष उपाध्यक्ष उपाध्यक्ष उपाध्यक्ष उपाध्यक्ष



**ANNEX 4:  
SAMPLE SURVEY QUESTIONNAIRE AND CHECKLISTS**

   
Engineer

  
Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

तेश्रो साना शहरी खासपानी तथा सरसफाइ आयोजना  
घरघुरी अवस्था वस्तु प्रश्नावली

(आयोजना प्रयोजनको लागि मात्र तथ्यांकको प्रयोग गरिनेछ)

नगर आयोजना: देउराली हूपसेकोट घर नं. १४  
 जिल्ला: सुनसरी नगरपालिका/गा.वि. हूपसेकोट उपमहानगर वडा नं. १  
 अन्तरवाता सिनेको नाम: अन्तरवाता मिति २०७२/०८/०५  
 सुपरिवेक्षकको नाम: मोड नं. ५३५९-९९९४

१. सामाजिक-आर्थिक तथा अन्य विवरण

(उपरोक्त क्वेष्टन (V) को पिन लगाउनुका आवश्यक विवरणहरू भर्नुहोस्)

- १.१ अन्तरवाता सिनेको नाम: अन्तरवाता मिति
- १.२ घरमूलको नाम: सिने मिठो  मिठो  तेश्रो मिठो  पेशा   
 परिवार सदस्य: पुरुष ३ महिला ५ तेश्रो मिठो  जम्मा: ८ एकल: ० महिला घरमूल पर
- १.३ यस परिवारका आर्थिक रूपमा अशक्तता भएका परिवार सदस्य सङ्ख्या: ०
- १.४ बालि/बनजातिमध्ये कुन हो? क) बाबु/मा  ब) अनजाति  ग) दलित  ङ) अन्य   
 परिवारको स्तर: एकल  समुदाय
- १.५ घर परिवारका सदस्यहरूको विवरण दिनुहोस्

क्र.सं.	नाम	वयस	शिक्षा	व्यवसाय	अन्य
१					
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१०					

नोट: पेशा: १. कृषि २. व्यापार ३. मोकरी ४. उद्योगियन्दा ५. रेटिडेन्स (वेदमिक सेवागार)  
 ६. न्याया ७. अन्य ८. कुनै पेशा नभएका व्यक्तिहरूको विवरण, गृहिणी, बराका  
 बुझाउने, ९. यदि मुनिका बालबालिकाको लागि नोट गर्ने

१.६ शिक्षा: १. निरक्षर २. साक्षर ३. प्राथमिकसम्म ४. माध्यमिकसम्म ५. एस.एस.सी. उत्तिर्ण  
 ६. आई.ए. ७. बि.ए. ८. एम.ए. ९. अन्य

१.७ यस परिवारमा बसोबास गर्ने समय सदस्यहरूको विवरण सहायोगी:  देखावाल  कुल सङ्ख्या

१.८ यस नगर/शहरमा कठिने देखि बस्ने जाउनु भएको छ?  बस  
 स्ववासी  बसाइ सरेको  बसाइ सरी आएको भए कुन जिल्लाबाट

१.९ बसाइ सार्नुको कारण: प्राकृतिक प्रकोप  व्यापार/व्यवसाय  शिक्षा  रूढ  जिविकोपार्जन

१.१० यो घर आफ्नै हो? हो  भाडामा बसेको  अन्य  भाडामा बसेको भए आर्थिक कति  
 तिर्नुहुन्छ

१.११ यस घरमा भान्सा कोठा बाहेक अन्य कति वटा कोठाहरू छन्?



१ कोठ  २ कोठ  ३ कोठ  कोठ वा सो भन्दा बढी   
 १.१२ घरको अवलोकन गरी घरको किसिम लेख्ने। पक्की  पत्ली  कच्ची   
 (पक्की : छत इजान, अर्ध पक्की : बुझा/इटाको गाढो, टाँसको छाना/बुझा/स्लेट,फिगटी/टापल आदि, कच्चा : माटो गाढो र  
 घर/टापल/खपडाको छानाको)  
 १.१३ यस परिवारसंग जग्गा जमीन छ? छ  छैन  (किन भने सुक्यायोको रूपमा गणना गर्ने)  
 जग्गा कीत छ: ०-१८००  
 १.१४ यहाँले गाई/भैती पाल्नु भएकोछ? छ  छैन  छ भने कतिवटा? एउटा  दुईटा वा बढी   
 १.१५ तपाईंको परिवारमा तल उल्लेखित कन कुन सामान छन्? (भएको सामानको संख्या लेख्ने)

क्र.सं.	वस्तु	संख्या	क्र.सं.	वस्तु	संख्या	वैशेष्य
१	साइकल/रिक्सा	१	९	सोम/गुस चुलो	१	
२	मोटरसाइकल		१०	रेफ्रिजरेटर		
३	बैलगाडा		११	वाहिजा/मोशन		
४	कार/बिप		१२	वाटर फिल्टर		
५	मितीजघ/बस		१३	कम्प्युटर		
६	ट्याब्लेट/टुक		१४	इमेल/इन्टरनेटको पहुँच	३	मोबाइल
७	रोटियो/म्यालेट	१	१५	बन्य घर उल्लेख गर्ने।		
८	टेलेभिजन/मिडियासेट	१	१६			

१.१६ यदि मूल पैसा कति घर कति महिना खान पुग्छ? ३ महिना  ६ महिना  ९ महिना  १२ महिना   
 यदि नपुग मरमा कसरी खानु हुन्छ? १  पार २  करी ३  गजन्दा ४  रोमिटेन्स (विदेशिक  
 रोजगार) ५  अन्य ६  अन्य

१.१७ तपाईंको परिवारको औसत वार्षिक खर्च कति छ उल्लेख गर्नुहोस्।

क्र.सं.	वस्तु	संख्या	वैशेष्य
१	(क) कृषि तर्फ		
१.१	रसायनिक मल/बिउ/किटनाशक आदी खरिद गर्ने		
१.२	माटोको तैयारी, रोप्ने, गोड्ने, बासी काट्ने, मिठाउने, बुझाउने र बिक्री गर्दा हुने खर्च		
१.३	बन्य घर (उल्लेख गर्ने)		
२	(ख) गैर कृषि तर्फ		
२.१	आवासीय (बनाउ र दैनिक उपभोग्य वस्तु)		
२.२	कपडा		
२.३	माझा		
२.४	घर बाह्य/घर भित्र		
२.५	पातियात/सत्रार		
२.६	बिचुल		
२.७	घानो पोत/भर्मत सम्भार		
२.८	बीबि/उपचार (पातियात हुने रोग)		वार्षिक खर्च
२.९	बीबि/उपचार (बन्य रोग)		वार्षिक खर्च
२.१०	बन्य आइपर्व कर्मकाण्ड सम्भार आदि उल्लेख गर्ने		वार्षिक खर्च

(ख) को जम्मा  
 कःस को रूपमा १३,०००/-

१.१८ तपाईंको परिवारको औसत मासिक आय कति छ उल्लेख गर्नुहोस्।

क्र.सं.	आयस्रोत	सम्पन्न स्रोत पुरुष	सम्पन्न स्रोत महिला	प्रकृत हुने व्यक्त (र मासिक)	वैशेष्य
१	(क) कृषि तर्फ				



१.१	कृषि उत्पादनको विधीबाट आय (मकै, गहुँ, धान, तरकारी, फलफूल)		
१.२	पर्यावरण उत्पादन (धुप, बढी, झु, माछा, कच्चा आदि)	(क) को नाम	
२	(ख) पैसा कति रूपैयाँ		
२.१	नोकरी / जातिर		
२.२	व्याज/मजदुरी		
२.३	पेन्सन/सप्लाई खासी		
२.४	वैदेशिक रोजगार (सिमिटेन्स)		
२.५	पसल/व्यापार		
२.६	सञ्चालन		
२.७	पसल/घर भाडा		
२.८	खासी/दुबानी व्यवसाय		
२.९	अन्य धेरै उल्लेख गर्ने		
		(ख) को नाम	
		कम्प्युटर प्रम्मा	२५,०००/-

१.११ यहाँको परिवारले कुनै रूपमा निर्धरको छ ? छ  छैन  (छ भने रकम रु )

### २. खानेपानी तथा सरसफाइ व्यवस्थापन

२.१ तपाईंको परिवारले पिउनु, खाँदा पकाउनुको लागि प्रयोग गर्ने पानीको स्रोत कुन हो ? दैनिक कति लिटर पानी खर्चनु हुन्छ ? कृपया सूत्रको कोठामा (✓) चिन्ह लगाउनुहोस् ।

स्रोत	स्रोत	स्रोत	स्रोत	
१	खेत/बना	A	नगर/बना	A
२	ट्यूबवेल/इकाभपम्प/विप ट्यूबवेल	A	ट्यूबवेल/इकाभपम्प/विप ट्यूबवेल	A
३	सार्वजनिक धारा	A	सार्वजनिक धारा	A
४	निजी धारा	A	निजी धारा	A
५	मुला खोला नदी, खोखरी	A	मुला खोला नदी, खोखरी	A
६	पिकेतासँग पानी किनेर	A	पिकेतासँग पानी किनेर	A
१०	बर्षाको पानी संकलन गरेर	A	बर्षाको पानी संकलन गरेर	A
११	अन्य	A	अन्य	A

२.२ दैनिक आवश्यक पानी आपूर्ति गर्नका लागि पानी संकलनबाट निम्न विस्तृत विवरण दिनुहोस् ।

स्रोत	स्रोत	स्रोत	स्रोत	स्रोत	स्रोत	स्रोत	स्रोत	स्रोत	स्रोत
१	कति बोझ/पटक								
२	जिटर/बोझ								
३	कुन परिवार								
४	पानी ल्याउन/भार्ने समय (मिनेट/बोझ)								
	• पानीको महान नाम/पुत								
	• महानमा पसेरु पर्ने समय								
	• फर्कदा लाग्ने समय								
५	प्रति बोझ लाग्ने समय								

नोट: कसैकोसँगै बिने व्यक्ति पानीको स्रोत हेर्ने बाँकी घरमा गतिएर परिभाषित गर्ने ।

### ३. निजी धारा जडान

३.१ के तपाईंले घरमा प्राइम धारा जडान गर्नु भएको छ ? छ  छैन  यदि छ भने कस्तो प्रकारको छ ?

क) घरभित्र निजी धारा  ख) कम्पाउण्डभित्र निजी धारा  ग) सामुदायिक धारा

३.२ तपाईंले घरमा प्रयोग हुने पानीको शुद्धीकरण कस्तो छ ? १) राम्रो २) ठिकै ३) खराब



१ कोठा  २ कोठा  ३ कोठा  कोठा वा सो भन्दा बढी

१.१२ घरको अवलोकन गरी घरको किसिम लेख्ने। पक्की  पक्की  कच्ची

(पक्की : छत बलान, अर्ध पक्की : दुश/इटाको गाढो, टीनको छाना/हुस/स्लेट/फिगटी/टाइल आदि कच्ची माटो गाढो र हर/टाइल/खपडाने छार्को)

१.१३ ग्रस परिवारसंग जग्गा जमीन छ ? छ  छैन  (छैन भने सुकुम्बासीको रूपमा गणना गर्ने)

जग्गा कति छ ? ०-१८-०

१.१४ यहाँले गाई/बैसी पाल्नु भएको छ ? छ  छैन  छ भने कतिवटा ? एउटा  दुईवटा वा बढी

१.१५ तपाईंको परिवारमा तल उल्लेखित कुन कुन सामान छन् ? (भएको सामानको संख्या लेख्ने)

क्र.सं.	सामग्री	संख्या	नोट/कल	क्र.सं.	सामग्री	संख्या	नोट/कल
१	साइकल/रिक्सा	१		९	स्टोम/प्यास कुल्चे	१	
२	मोटरसाइकल			१०	रिफ्रिजरेटर		
३	बैलगाडा			११	वाणिज्य रेडियो		
४	कार/जिप			१२	वाटर फिल्टर		
५	मिनीबस/बस			१३	कम्प्युटर		
६	ट्याक्टर/ट्रक			१४	इमेल/इन्टरनेटको पहुँच	२	मोबाइल
७	रेडियो/क्यासेट	१		१५	अन्य भए उल्लेख गर्ने।		
८	टेलिभिजन/मिडियासेट	१					

१.१६ यदि मुन पेशा कृषि भए कति महिना खान पुग्छ ? ३ महिना  ६ महिना  ९ महिना  १२ महिना

यदि नपुग भएमा कसरी खान्नु हुन्छ ? १. व  भार २.  कुरी ३. ज  पशुधन ४. रिमिटेन्स (बैदेशिक रोजगार) ५.  व्यासा ६. अन्य

१.१७ तपाईंको परिवारको औसत वार्षिक खर्च कति छ उल्लेख गर्नुहोस्।

क्र.सं.	वर्षको वार्षिक र किसिम	वार्षिक खर्च रु	नोट/कल
१	(क) कृषि लागत		
१.१	रसायनिक अल, विउ, किटनाशक आदी खरिद गर्दा		
१.२	माटोको देयाति, रोप्ने, गोडने, बाढी काटने, मिश्राउने, दुधानी र बिक्री गर्दा हुने खर्च		
१.३	अन्य भए उल्लेख गर्नुहोस्		
	(क) को जम्मा		
२	(ख) गृह कृषि लागत		
२.१	खाद्यान्न (अन्न र दैनिक उपभोग्य बस्तु)		
२.२	कपडा		
२.३	शिक्षा		
२.४	घर भाडा/घर समेत		
२.५	यातायात/सञ्चार		
२.६	विद्युत		
२.७	पानी पोल/समस्त सम्भार		
२.८	औषधि/उपचार (फर्नीचर हुने लाग)		वार्षिक खर्च
२.९	औषधि/उपचार (अन्य लाग)		वार्षिक खर्च
२.१०	अन्य आहपर्व कर्मकाण्ड सम्झार आदि उल्लेख गर्ने		वार्षिक खर्च
	(ख) को जम्मा		
	कम्प्युटर को कुल जम्मा	१५,०००/-	

१.१८ तपाईंको परिवारको औसत वार्षिक आय कति छ ? उल्लेख गर्नुहोस्।

क्र.सं.	सामग्री	सम्पन्न परिवार पुनः आहवा	सादा हुने आय (सामान्य)	नोट/कल
१	(क) कृषि लागत			



Engineer



१.१	कृषि उत्पादनको विकोबाट शाय (मकै, गहुँ, घान, तरकारी, फलफूल)				
१.२	प्रजाजन्त उत्पादन (दुग्ध, दही, घ्यू, माछा, कुखुरा आदि)				
		(क) को जम्मा			
२	(ख) गैर कृषि तर्फ				
२.१	गोकरी / जागिर				
२.२	ज्वाल पकडरी				
२.३	पेल्स/चुपदान बाई				
२.४	बैदेशिक रोजगार (रिमिटन्स)				
२.५	पसल/व्यापार				
२.६	उद्योग				
२.७	पसल/घर भाडा				
२.८	गाडी/इबानी व्यवसाय				
२.९	अन्य भए उल्लेख गर्ने				
		(ख) को जम्मा			
		कुल कुल जम्मा		२९,०००	

१.१९ यहाँको परिवारले कुनै खाद्य विपणको छ ? छ  छैन  (ह भने रकम रु )

### ३. खानेपानी तथा सरसफाइ व्यवस्थापन

२.१ तपाईंको परिवारले पिउन, खाना पकाउनको लागि प्रयोग गर्ने पानीको स्रोत कुन हो ? दैनिक कति लिटर पानी बर्चनु हुन्छ ? कृपया स्रोतको कोशमा (✓) चिन्ह लगाउनुहोस् ।

क्र.सं.	स्रोत/प्रकार	चिन्ह	दैनिक लिटर	स्रोत/प्रकार	चिन्ह	दैनिक लिटर
१	बुहार/कुवा	A		बुहार/कुवा	A	
३	ट्युबवेल/ह्याण्डपम्प/डिप ट्युबवेल	A		ट्युबवेल/ह्याण्डपम्प/डिप ट्युबवेल	A	
२	सार्वजनिक धारा	A		सार्वजनिक धारा	A	
७	निजी धारा	A	X.0	निजी धारा	A	
८	सुन, खोला, नदी, पोखरी	A		सुन, खोला, नदी, पोखरी	A	
६	निर्भोलाहरूवा पानी क्लिनर	A		निर्भोलाहरूवा पानी क्लिनर	A	
१०	बजारको पानी सक्कल गरर	A		बजारको पानी सक्कल गरर	A	
११	अन्य	A		अन्य	A	

२.२ दैनिक आवश्यक पानी आपूर्ति गर्नका लागि पानी सक्कलवार निम्न विस्तृत विवरण दिनुहोस् ।

क्र.सं.	विवरण	वर्षा याममा			सुखा याममा			
		रुदन	सकल	माथिके	जम्मा	पुरुष	सकल	माथिके
१	कति बेप/घटक				१/१			
२	लिटर/बेर							
३	कुल परिमाण							
X	पानी ल्याउन लाग्ने समय (मिनेट)/बेप							
	• भागेको मुहान्न सम्म पुग्न							
	• मुहान्नमा पस्नु पर्ने समय							
	• एककटा लाग्ने समय							
Y	प्रति बेप लाग्ने समय				२५ मिनेट			

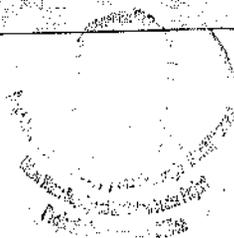
नोट : बजारबाटो बिचै व्यक्तिले पानीको भाँडे ठेगो सोको समयमा बसिनु पर्ने परिमाण उल्लेख गर्ने ।

### ३. निजी धारा जडान

३.१ के तपाईंले घरमा पाइप धारा जडान गर्नु भएको छ ? छ  छैन  यदि छ भने कस्तो प्रकारको छ ?

क) घराभित्र निजी धारा  ख) कम्युनिसिटी निजी धारा  ग) सामुदायिक धारा

३.२ तपाईंको घरमा प्रयोग हुने पानीको गुणस्तर कस्तो छ ? १) राम्रो २) ठिकै ३) खराब



Signature

३.३ के तपाई आफ्नो घरमा धारा जोड्न चाहनु हुन्छ ? चाहन्छु  चाहन्न

३.४ यदि तपाईको घरमा निजी धारा जोड्न भएको छैन भने, किन जोड्न नभएको ?

- क) खर्च गर्ने क्षमता नभएकोले  ख) जडान शुल्क धेरै पर्ने भएकोले
- ग) भौतिक पानी बिल धेरै बाउने भएकोले  घ) पानीको मात्रा पर्याप्त नभएकोले
- ङ) पानीको आपूर्ति नियमित नभएकोले  च) यस क्षेत्रमा प्राइपलइन्ट जोड्न गरी व्यवस्था उपलब्ध नभएकोले
- छ) पानीको गुणस्तर राम्रो नभएकोले  ज) अन्य कारण देखाइने गर्छ  झ) बाह्य छैन

३.५ हाल तपाईले पानीधारा बापत महिनामा पानीको महशुल तिर्दै हुनुहुन्छ ? छ  छैन

**सह-सम्पत्ति अवधारणा सम्बन्धी प्राथमिकता**

४.१ यदि तपाईको नगरपालिका/गा.वि.स. मा विभिन्न श्रेणीका सम्पत्तिहरू गर्न रकम उपलब्ध छ भने निम्नलिखित मध्ये कुन कुन योजनालाई पहिलो प्राथमिकता दिनुहुन्छ ?

- |                               |                      |                        |                      |
|-------------------------------|----------------------|------------------------|----------------------|
| क) सडक मर्मत                  | <input type="text"/> | ख) विद्युत             | <input type="text"/> |
| ग) खालोपत्रे सडक              | <input type="text"/> | घ) संचार               | <input type="text"/> |
| ग) विद्यालय                   | <input type="text"/> | च) सरसफाइ/सुविधा       | <input type="text"/> |
| घ) बासुताघ                    | <input type="text"/> | ज) सिंचाइ              | <input type="text"/> |
| ङ) व्यवस्थित खानेपानी प्रणाली | <input type="text"/> | ट) पाटीपौवा प्रमर्माणा | <input type="text"/> |
| ज) प्रबन्धकारी सडक            | <input type="text"/> | ड) अन्य                | <input type="text"/> |

४.२ यदि तपाईको घरमा धारा छैन र निजी धारा राख्न इच्छुक हुनुहुन्छ भने, कति रकम सह-सम्पत्ति गर्न सक्नुहुन्छ ? कृपया तल दिइएको तालिकामा निजि धारा राख्न कति रकम सक्षम भएतामा पहिलो रकमको सीमामा  चिन्ह लगाउनुहोस्।

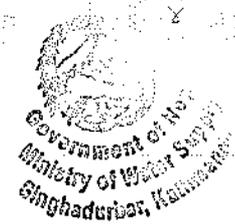
सह-सम्पत्ति	रकम	नगारपुर
१	११००० पन्चा माथि	
२	१००१ देखि ११००० सम्म	१००१ देखि १००० सम्म
३	१००१ देखि १००० सम्म	११०१ देखि १००० सम्म
		११०० पन्चा सम्म

४.३ निजी धारा जोड्न बापत लाग्ने शुल्क व्यहोर्ने गर्नेछ/ मन्जुर छ/ मन्जुर छैन

४.४ नयाँ खानेपानी योजना शुरू भएमा आफ्नो घरमा धारा जोड्न गरी नयाँ नियमानुसार मासिक महशुल नियमित बुझाउनु तयार हुनुहुन्छ ?

ख  छैन  यदि इच्छुक हुनु हुन्छ भने तल दिइएको तालिकामा पत्की/काठको सीमामा  चिन्ह लगाएर आफ्नो इच्छा व्यक्त गर्नुहोस्।

सह-सम्पत्ति	रकम	चिन्ह
१	रु १०० पन्चा माथि	<input type="checkbox"/>
२	रु १११ देखि १००	<input type="checkbox"/>
३	रु १०१ देखि ११०	<input type="checkbox"/>
४	रु १११ देखि १००	<input type="checkbox"/>
५	रु १०१ देखि ११०	<input type="checkbox"/>
६	रु १११ देखि १००	<input type="checkbox"/>
७	रु १०१ देखि ११०	<input checked="" type="checkbox"/>



- ४.३ तपाईं खानेपानी (बनान) स्थानीयको व्यवस्था हुँदा तपाईंको परिवारबाट प्रतिबद्धता स्वरूप ब्रिचम  
 लागतको ४% रकम दिन तयार हुनु हुन्छ ? छ  छैन
- ४.४ तपाईं सरसफाई योजना (सामुदायिक शौचालय तथा सरुवा भवन) निर्माणको लागि सहयोगी स्वरूप  
 ४% रकमको निकाय र उपभोक्ताको सहयोगी गर्न इच्छुक हुनुहुन्छ ? छ  छैन

**५. लैङ्गिक दृष्टिकोणबाट महिला सहभागिता**

(आयोजनाको विभिन्न चरणमा महिला सहभागिता सम्बन्धि नैसर्गिक/सामाजिक विभिन्न वर्गको आदिवासी जनजाति, प्रशिक्षित तथा प्रशिक्षित एक वर्गको समन्वयी सहभागिता सम्बन्धि जानकारी संकलन गर्ने प्रत्येक चरणकोमा योधिने परामर्शहरू प्राप्त गरिएको छ।)

- क) महिलाहरूको उपस्थिति र सहभागिता
- ५.१ आयोजनाको बारेमा छलफल गर्न कुनै बैठक बोलाइएको थियो ?  
 थियो  थिएन  थाहा छैन
- ५.२ के आयोजनाको छनोट गर्न बैठकमा महिला उपभोक्ताहरूको उपस्थिति थियो ?  
 थियो  थिएन  थाहा छैन
- यदि थियो भने महिला उपभोक्ताहरूको सक्रिय कस्तो थियो ?  
 मुल्य मात्र  अन्तर्निहित  निर्णायक
- ५.३ आयोजनाको क्रियाकलापहरूको रेकर्ड गर्न के बानेश्वरी उपभोक्ता तथा सरसफाई  
 समिति/संस्था गठन भएको छ ? छ  छैन/थाहा छैन

ख) लैङ्गिकताका आधारमा कार्य विभाजन

५.४ तपाईंको तालिममा विद्यमान कामहरूको बरत गर्ने गर्नुहुन्छ ? (यदि हो भने तालिमको दैनिक घण्टामा)

क्र.सं.	कार्यविधि/कार्यकलापहरू	पुरुष	महिला	कुल समान
१	खानेपानी गर्ने, सौकी, मसुदाकरण	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
२	सान्छो सफाई गर्ने, भाँडा साफुन	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
३	बासबान्सा र नुढबुडाको स्वास्थ्य	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
४	सुगा बुने घर लुका गर्ने	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
५	खाद्यान्न मसुदाकरण तथा तयारी	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
६	अन्य	<input type="checkbox"/>	<input type="checkbox"/>	

ग) पारिवारिक व्यवस्थापन, मात्र खात र अन्य विषयमा महिलाहरूको नियन्त्रण र पहुँच

५.५ तपाईंको तालिममा उल्लेखित पारिवारिक विषयमा क्षेत्रहरूमा निर्भर गर्दा तपाईंको घर परिवारमा महिलाको भन्दा सुनुवाई हुन्छ ? उपयुक्त कोठामा ( ) चिन्ह लगाउनुहोस्

क्र.सं.	विषय/कार्यक्रमहरू	हुन्छ (✓)	हुँदैन (X)
१	आर्थिक सरोकारका कुराहरू	<input checked="" type="checkbox"/>	<input type="checkbox"/>
२	केटाकेटीको शिक्षा दिना	<input checked="" type="checkbox"/>	<input type="checkbox"/>
३	केटाकेटी र नुढबुडाको स्वास्थ्य र स्वाहार	<input checked="" type="checkbox"/>	<input type="checkbox"/>
४	अच्छल सम्पत्ति किनवेज (घर जग्गा)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
५	दैनिक क्रियाकलापहरू	<input checked="" type="checkbox"/>	<input type="checkbox"/>
६	सामाजिक विधि व्यवहार, विवाह, बर्तव्य, साहसक तथा सामाजिक/पारिवारिक सुझावहरूको लागि	<input checked="" type="checkbox"/>	<input type="checkbox"/>
७	अन्य	<input type="checkbox"/>	<input type="checkbox"/>



५. यहाँको परिवारमा पारिवारिक सम्पत्तिको निम्न विषयमा महिलाको पहुँच र स्वामित्व रहेको छैन तलको तालिकामा उपयुक्त कोठामा ( ) चिन्ह लगाउनुहोस्

क्र.सं	विवरण	पहुँच	स्वामित्व
१	जग्गा जमिन	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
२	घर तथा अन्य संरचनाहरू	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
३	चल सम्पत्ति/संचित पैसा	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
४	ईतिक क्रियाकलापहरू	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
५	अन्य	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

घ) खा.पा.उ.स.स. तथा समुदायमा महिलाको स्तर (हेचिबल) (निम्न बुँदाहरू फोकस ग्रुप छलफलको आधारमा जानकारी लिएर टिपोट गर्नुपर्नेछ)

क्र.सं	विषय	उच्च	मध्यम	निम्न
१	आत्मसम्मानबोध	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
२	आत्मविश्वास बढाउने शीप	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
३	दायित्वबोध र क्षमता	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
४	ल्याकत, सकेँ संपत, धैर्य र मेहनत	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
५	अन्य	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

६. सम विकासमा पहुँचका आधारमा सामाजिक समावेशी सहभागिता

क) आयोजना क्रियाकलापमा गैरसामान्यत विपन्न वर्गहरू, पिछडाएका वर्ग, जातजाति, धर्म, बहुराष्ट्र भएको व्यक्तिको उपस्थिति

६.१ आयोजनाकोबारेमा छलफल गर्ने कुनै मेला/ बैठकमा समावेशी तवरले बोलाईएको थियो ?  
 थियो  थिएन  टाढा  अरु

६.२ के आयोजनाको छनौट गर्ने बैठकमा समावेशीताको आधारमा सहभागीहरूको उपस्थिति थियो ?  
 थियो  थिएन

६.३ के खा.पा.उ.स.स.को गठनमा समावेशीता बर्गीकार भएको थियो ? थियो  थिएन

ख) निर्णय प्रक्रियामा समावेशी प्रक्रिया अपनाईएको थियो ?

६.४ आयोजना छनौट गर्ने जातजातिहरूको कस्तो भूमिका कस्तो थियो ?  
 उच्च  मध्यम  निम्न

६.५ साना सवारी चालेपानी आयोजना कार्यान्वयन गर्ने सामाजिक समावेशी आधारमा उपमोताहरूको परिचालन गर्ने भएको प्रयास कस्तो थियो ? सधैं  उच्च  निम्न

### ७. स्वास्थ्य र सरसफाइ

क) खानेपानी

१ तपाईंको विहारमा पानीको गुणस्तर नतापी (खतरा) मारमा के समस्याहरू देखिन पुग्छ (एक भन्दा बढी उत्तर आउन सक्ने)

१.१) दुर्गन्ध बाउने / नमिठो स्वाद  १.२) रसि कटिने/रुखे

१.३) बिरामी बनावुने  १.४) अन्य (बुझ्नेछु)

२. के तपाईंलाई पानी भर्ने र राख्ने भाँडो पानी भर्नु र चण्डार गर्नु पुग्ने सक्छ भन्नुपर्ने बाधा छ ? छ  छैन

यदि छ भने, पानी राख्ने भाँडो कसरी सफा गर्ने हुन्छ ?

२.१) छापी पानी भाउने  २.२) सरसो पानीले  २.३) मूक/फिटो र पानीले

२.४) साबुन पानीले  २.५) अन्य (बुझ्नेछु)

३. तपाईं घरमा पानी कसरी राख्नु हुन्छ ?

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 English



(एक सन्दा नदी उत्तर बाउज सक्ने)

- ३.१) पानी भन्ने पहिले भाँडा सफा गर्ने  ३.२) बाकी पानी फर्पान्ने   
 ३.३) पानी राख्ने भाँडो राम्रोसँग ढाकेर/छोपेर राख्ने  ३.४) अन्य (उल्लेख गर्ने)

४. तपाईं घरको वा शैटोबाट पानी कसरी निकाल्नुहुन्छ ?

- ४.१) पानी सानु/बाथि बम्बोरा, जोटा, करुवा, सग छोपेर   
 ४.२) गिलास, सग, कप पापीमा खुबाएर   
 ४.३) गापोबाट, सोटा, बम्बोरा, करुवा, गिलासमा पानी सारेर   
 ४.४) अन्य (उल्लेख गर्ने)

ब. खपी

१. के तपाईंको घरमा खपी छ ?  हो  होइन (दिनभन्ने १-३ जाने)

१.१ यदि छ भने, कस्तो प्रकारको खपी छ ?

- १) खान्ने खपी  २) विस्तृत खान्ने   
 ३) भेटिनेभेटिने खान्ने खपी  ४) अन्य   
 ५) बाँट्टा/विन/पोर फालेर

१.२ यदि छ भने, तपाईंको घरमा खपी कसरीसक्ने प्रयोग गर्नुहुन्छ ?

१) छिन्ने, २) बग्दा भाँडोक सक्ने ३) बपस्क र पीढने माथि ४) बिरामी सक्ने

१.३ यदि छैन भने, दिखा गर्ने कहाँ जानुहुन्छ ?

(क) खोला/जङ्गल/किनार बा खुला मैदान/छर्उ ग. घर/सडक छेउ घ. जहाँ खपिको हुन्छ)

१.४ के तपाईंको समुदाय खुल्लरिसामुक्त क्षेत्र घोषणा भएको छ ?  हो  होइन  थाहा छैन

ग. खानेकुराको सरसफाई

१. बाथपछाईं दूषित हुनाबाट कसरी बचाउनुहुन्छ ? (एक सन्दा नदी उत्तर बाउज सक्ने)

- १.१) पकाएको खाना छोपेर/ढाकेर राख्ने  १.२) सफा हातले खाना पस्कने गर्नाले   
 १.३) काँचे खाने खानेकुरा राम्रोसँग पकाएर छोपेर  १.४) हात/गोडा सफा गरेर मात्र खान्नामा पसेर   
 १.५) धेरै बासी वा सड्ने गसका खाना फालफुस बिसर्जन गर्ने   
 १.६) डाढु पन्तु, घाँस/भाँडाबुँडा सफा गरेर मात्र खाना पस्कने/खाने   
 १.७) चुनो पीकी पकाउने मात्रा, डकनठकसफा राख्ने

२. के तपाईं खानेकुरा छोपेर/ढाकेर राख्नुहुन्छ ? राख्नु  राखिन

घ. व्यक्तिगत सरसफाई (घरपरवारको संख्या अनुसार कयाक्यापमा टोक चिन्ह लगाएर राख्ना राख्ने । जस्तो सारजनाको परिवार भए तरेक कयाक्यापमा टोक चिन्ह राख्ने संख्या बाउनुपर्ने)

१. तपाईं र परिवारका अन्य सदस्यले कहिले र के गरेपछि हात धुनुहुन्छ ? धुने भए यस्तो (✓) चिन्ह लगाउनुहोस् र नधुने भए यस्तो (✗) चिन्ह लगाउनुहोस् । (एक सन्दा नदी उत्तर बाउज सक्ने)

क्र.सं.	व्यक्ति	सुनो (✓)		नधुने (✗)	
		घर (✓)	सुनो (✓)	घर (✗)	सुनो (✓)
१	खाना खाने अघि			✓	✓
२	खाना खाएपछि			✓	✓
३	दिखा गएपछि			✓	✓
४	फोहर मैला छोएपछि			✓	✓



(एक भन्दा बढी उत्तर बाउन सक्ने)

- ३.१) पानी भन्ने पहिले भाँडा सफा गर्ने  ३.३) बापी माथी फर्काउने   
 ३.२) पानी सक्ने भाँडा राम्रोसँग ढाकेर/छोपेर राख्ने  ३.४) अन्य (उल्लेख गर्नु).....

४. तपाईं गाछो वा पेटोबाट पानी कसरी निकाल्नुहुन्छ ?

- ४.१) पानी सार्नु जसि अम्बोरा, मोटा, करबा, मग घोएर   
 ४.२) गिलास, मग, कप गाछोमा इजाएर   
 ४.३) गाछोबाट मोटा, अम्बोरा, करबा, गिलासमा पानी सारेर   
 ४.४) अन्य (उल्लेख गर्नु).....

५. चर्पी

१. के तपाईंको घरमा चर्पी छ ?  छैन  (केतपने १.३ जाने)
- १.१ यदि छ भने, कस्तो प्रकारको चर्पी छ ?
- १) खान्दे चर्पी  २) सिस्टम फलस   
 ३) पॉन्ट्रिटेड खान्दे चर्पी  ४) अन्य   
 ५) बिटर फिल/चोर फलस
- १.२ यदि छ भने, तपाईंको घरमा चर्पी कसकसले प्रयोग गर्नुहुन्छ ?
- १) सबैले २) बच्चा बाहेक सबैले ३) बयस्क र पौढले मात्र ४) बिरामी मात्रैले
- १.३ यदि छैन भने, दिवा गर्ने कहाँ जानुहुन्छ ?
- क) बोला/जुन/किनार छ खुल्ला मैदान/दाउँ गा घर/सडक छेउ छ जहाँ सजिलो हुन्छ
- १.४ के तपाईंको समुदाय खुल्लरिसामुक्ता क्षेत्र घोषणा भएको छ ?  छैन  थाप्ट भएन

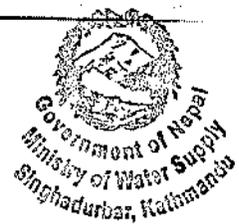
६. खानेकुटाको सरसफाइ

१. खाएपछि दूधित हुनबाट कसरी बचाउनुहुन्छ ? (एक भन्दा बढी उत्तर बाउन सक्ने)
- १.१) पकाएको खाता छोपेर/ढाकेर राख्ने  १.२) सफा हातले खाना पस्कने गर्नाले   
 १.३) काँचै खाइने खानेकुटा राम्रोसँग पखालेर घोएर  १.४) हात गोडा सफा गरेर मात्र खानेकुटा पारेर   
 १.५) धेरै बासी वा सडे गलेका खाता, फलफूल बिसर्जन गर्ने   
 १.६) हाडु पानु, थाल/पाँडाकुँडा सफा गरेर मात्र खाना पस्कने/खाने   
 १.७) चुनो जौकी पकाउने भाडा, उकनहरूसफा राख्ने
२. के तपाईं खानेकुटा छोपेर/ढाकेर राख्नुहुन्छ ?  राख्नु  राख्दैन

७. व्यक्तिगत सरसफाइ (घरपरिवारको संख्या अनुसार क्याकवापमा टिक चिन्ह लगाएर संख्या राख्ने । जस्तो चारजनाको परिवार भए हरेक क्याकवापमा टिक बाहेत चारको संख्या आउनुपर्ने)

१. तपाईं र परिवारका अन्य सदस्यले कहिले र के गरेपछि हात धुनुहुन्छ ? धुने भए यस्तो (✓) चिन्ह लगाउनुहोस् र नधुने भए यस्तो (✗) चिन्ह लगाउनुहोस् । (एक भन्दा बढी उत्तर बाउन सक्ने)

क्र.सं.	किसिम	४ वर्षे मुलिका बालबालिका		माइला		पुरुष	
		धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)	धुने (✓)	नधुने (✗)
१	खाना खानु जसि			✓		✓	
२	खाना खाएपछि			✓		✓	
३	दिवा गएपछि			✓		✓	
४	फोहर मैला छोएपछि			✓		✓	



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४. तपाईं र परिवारका अन्य सदस्यले के ले हात धुनुहुन्छ ? कुनैमा यस्तो  चिन्ह लगाउनुहोस् र सधुनेमा यस्तो  चिन्ह लगाउनुहोस्।

\* चिन्ह लगाउनुहोस्।

१	खामबाट फर्केपछि	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
२	कडाकटीलाई रिला	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
३	पिसाब गराइ सकेपछि	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
४	अन्य (उल्लेख गर्ने)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

५. तपाईं र परिवारका अन्य सदस्यले कोहिने कोहिने गृहाउपयोग ?

गृहाउपयोग माय यस्तो  चिन्ह लगाउनुहोस् र अन्यमा यस्तो  चिन्ह लगाउनुहोस्।

\* चिन्ह लगाउनुहोस्।

विवरण		यसको उपयोग	यसको उपयोग
१	पानी माने	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
२	बिचानी पानी	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
३	मूत्र/पिठो पानी	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
४	साबुन पानी	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
५	अन्य (उल्लेख गर्ने)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
जम्मा			

६. तपाईं र परिवारका अन्य सदस्यले कोहिने कोहिने गृहाउपयोग ?

गृहाउपयोग माय यस्तो  चिन्ह लगाउनुहोस् र अन्यमा यस्तो  चिन्ह लगाउनुहोस्।

\* चिन्ह लगाउनुहोस्।

विवरण		यसको उपयोग	यसको उपयोग
१	भरतको दिन	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
२	एक दिन बिछार	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
३	हप्तामा १ पटक	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
४	दुइतामा १ पटक	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
५	२ हप्तामा १ पटक	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
६	महिनामा एक पटक	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
जम्मा			

७. फोहोर क्रीमा व्यवस्थापन

१. तपाईंको घरबाट निस्कने ठोस फोहोर मैना कहाँ विचर्जन गर्नुहुन्छ ?

१.१ घर नजिक खाल्डोमा  १.२ निजी फोहोर संकलनकर्तालाई दिने

१.३ गा.वि.स/नगरपालिकाले व्यवस्था गरेको खाल्डो वा स्थानमा  १.४ अन्य (उल्लेख गर्ने)

२. ठोस तपाईं तारस फोहोर बस्तुमाथि अव्यवस्थित तरिकाले विचर्जन गर्नुमा हुने तपाईंको बचत/खर्च के हुन्छ ? (एक/बन्दा/बढी/सतत/वाञ्छित/सक्ने)

२.१ फोहोर बाक्लावरणमा बुझि  २.२ सामथ्र्ये फिर्सा किराडुन

२.३ टोपा सनेमा बुझि  २.४ अन्य (उल्लेख गर्ने)

३. तपाईंको घरबाट निस्कने फोहोर पानी कहाँ विचर्जन गर्नुहुन्छ ?

३.१ खाल्डोमा (Soak pit)  ३.२ सरकारी जागीर/करेस/बस्ती

३.३ सार्वजनिक बस्तीमा  ३.४ अन्य (उल्लेख गर्ने)

८. बस्तुमाथको फोहोर व्यवस्थापन

१. के तपाईंले बस्तुमाथ मान्नु भएको छ/छ  छैन  छैन भने पानी/अन्य खरब रोपमा जाने) यदि छ भने कुन कुन प्रकारका खरब र तिनीहरूलाई कहाँ राख्नु हुन्छ ?

वस्तुमाथको प्रकार	वस्तुमाथ	वस्तुमाथ कहाँ राख्नु हुन्छ
१	पाई/मैली	<input checked="" type="checkbox"/>
२	बगार/संगुर	<input checked="" type="checkbox"/>
३	बाख्रा	<input type="checkbox"/>



*[Handwritten Signature]*  
Engineer



1. **सूत्र/होस**  
**धन्य**

2. **बस्तुमाउबाट निस्कने फोहर कहाँ र कसरी बिसर्जित गर्नुहुन्छ ?**

2.1 **मलखाइमा**  2.2 **आमो बाल्ने/गुईठा बत्ताउने**   
 2.3 **गोबर त्यास/साट्टामा प्रयोग गर्ने**  2.4 **अन्य (उल्लेख गर्ने)**

3. **बस्तुमाउको फोहर मैलाको बर्झामाथि अव्यवस्थित तरिको बिसर्जित गर्दा हुने खराब बसिरहरूको के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)**

3.1 **वातावरणीय फोहरमा बृद्धि हुने**  3.2 **खामखट्ट, फिफा, किराहरूको बृद्धि हुने**   
 3.3 **रोगब्याधि बढ्ने तथा सन्**  3.4 **गाँउ, छरछिमेक तथा नगर बस्तुमाथि देखिने**   
 3.5 **अन्य (उल्लेख गर्ने)**

4. **सेफ्टेज (फोहरसेढो) व्यवस्थापन (चर्चिबाट सेफ्टीटयाकमा चल्ना भएको फोहरसेढो अप्ठ्यारो सहित)**

4.1 **चर्चिबाट बिसर्जित मलमूत्र व्यवस्थापन (जम्मा) कहाँ गर्ने गरेको छ ?**  
**बान्दो**  **रिड बान्दो**  **सेफ्टी टयाक**  **अन्य**

4.2 **यो सेफ्टी टयाक/बान्दोको क्षमता कति (ठूलो सानो साइज) छ ?**  **ठिक**  **खराब**

4.3 **हालसम्म कतिवटा सफा गर्ने भएको छ ?**  **छ**  **बहुत कति वर्षमा भयो ?**   
**सफागर्न कति रकम तिर्नु पर्छ ?**

4.4 **सेफ्टी टयाकबाट निस्कने फोहर प्रयोग गर्न सक्ने किसिम प्रयोग गर्ने सक्नु भएको ?**  **छ**  **सैन**

4.5 **सेफ्टी टयाकबाट निस्कने फोहर सफा गर्नको लागि रकम तिर्ने तयार हुनुहुन्छ ?**  **छ**  **सैन**   
 4.6 **१ दिन तयार भए कति रकम तिर्नुहुन्छ ?** **रु २००० भन्दा**  **र २००० माथि**

4.7 **तपाईंको घरबाट सेफ्टीटयाकमा चल्ना भएको फोहर सेढो (सेफ्टेज) कहाँ जाने गर्नुहुन्छ ?**

4.8 **सफा गर्ने**  4.9 **सफा गर्ने मान्छे हुने गर्छ**  4.10 **व्यवस्थित कम्पनीको सेवागर्ने**  4.11 **अन्य**

4.9 **सेफ्टेज(फोहर सेढो) कहाँ व्यवस्थान गर्ने गरेको छ ?**

4.12 **बेतबारिमा**  4.13 **बोलासाथमा/खोन्डाखोन्डासाथमा**  4.14 **बगमण्डल/सामुहिक स्थानमा**  4.15 **सडक बाटो**   
 4.16 **खेतखेत**  4.17 **अनुकुल अनुसार**  4.18 **अन्य**

4.19 **सेफ्टेज(फोहर सेढो) व्यवस्थापन सुचारु गर्ने चाहनुहुन्छ ?** **चाहन्छु**  **चाहन्न**

4.20 **सेफ्टेज(फोहरसेढो) व्यवस्थापन सुचारु गर्दा के गर्ने चाहानु हुन्छ ?**

4.21 **सेफ्टीटयाक बत्ताउने**  4.22 **भएको सेफ्टीटयाक/चर्चिको बान्दो सुचारु गर्ने**   
 4.23 **तपाईंको चर्चिबाट हुने जोडी सामुहिक रूपमा सेफ्टेज प्रयोग गर्न सक्ने व्यवस्थापन गरे सेवागर्न तयार हुनुहुन्छ ?**  
 4.24 **अन्य (उल्लेख गर्ने)**

10. **सुचारु गर्ने कति रकम सम्वलनी गर्ने इच्छा छ ? सोध्न नोट गर्ने** रु.

11. **पानीजन्य सल्ला रोगहरू**

11.1 **पानीजन्य सल्ला रोगको कारणहरूको के हुन् ? (एक भन्दा बढी उत्तर आउन सक्ने)**

11.2 **दूषित पानी प्रयोग गर्दा**  11.3 **दूषित खाता खाँदा**   
 11.4 **घर तथा सामुहिक स्थानमा फोहर जडान**  11.5 **मानिसको मलमूत्र जसामाथी बिसर्जित गर्नाले**   
 11.6 **फोहर मैला जसामाथी कुनो गर्ने**  11.7 **स्वास्थ्य शिक्षा तथा स्वस्थ बानीको अभाव**   
 11.8 **सरसफाई र स्वास्थ्य सम्बन्धी ज्ञान र जेतमाथी अभाव**  11.9 **अन्य**

12. **तपाईंको परिवारमा कुनै बिरामी परेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार तस्वर लेख्ने)**



- २१ घरायसी उपचार गर्ने  २२ घासी, फाँफो, पुजारी कहाँ जाने   
 २३ औषधि पसलमा जाने  २४ स्वास्थ्य चौकि वा अस्पतालमा जाने   
 २५ अन्य (उल्लेख गर्ने)

३. यदि परिवारमा कसैलाई फाँडापखाला लागेमा के गर्नुहुन्छ ? (प्राथमिकता अनुसार उम्हार लेख्ने)

- ३१ जीवजल खुवाउने  ३२ घरायसी उपचार गर्ने   
 ३३ घासी, फाँफो वा पुजारी कहाँ जाने  ३४ औषधि पसलमा जाने   
 ३५ स्वास्थ्य चौकि वा अस्पतालमा जाने  ३६ अन्य (उल्लेख गर्ने)

४. मत एक यासभित्रमा तपाईंको परिवारका सदस्यलाई फाँडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरूबाट प्रभावित पिए ? प्रभावित भएका भए कति जना दिए तसको जासिकमा सुचना जोड्ने गर्ने ।

क्र.सं.	नाम	जन्म	प्राथमिकता
१	फाँडापखाला		
२	जाड		
३	चुक		
४	टाइफाइड		
५	दिवा		
६	छासा सम्बन्धी रोग		
७	जोकोरोग (मलेरिया)		
८	कमलजित (जम्झीस)		
९	अन्य		

५. मत एक बर्षभित्र तपाईंको परिवारमा फाँडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरूबाट कसको मृत्यु भएको छ ? (मृत्यु बबस्था)

क्र.सं.	नाम	जन्म	मृत्यु
१	फाँडा पखाला		
२	जाड		
३	पानीजन्य अन्य सरुवा रोगहरू		

७. मत एक बर्षभित्र तपाईंको परिवारका सदस्यलाई फाँडापखाला र पानीजन्य अन्य सरुवा रोगहरूको उपचारमा कति रकम खर्च गर्नु पर्यो ?

क्र.सं.	नाम	जन्म	रकम
१	फाँडापखाला		
२	पानीजन्य अन्य सरुवा रोगहरू		

अन्यथाः



*[Signature]*  
 Engineer

A. Checklist for Physico-Chemical Environment

Parameters	Description
Topography	27°74'N Latitude and 83°98'E Longitude Inner Terai Region
Geology (Rock and Soil Types)	Boulder, cobble, pebble, gravel and sand with intercalation of clays as well as detritus of quaternary age
Erosion and Sedimentation	No such events recorded and observed
Climate	Mild; Generally warm & temperate Less rainfall in winter than in summer Average Rainfall: 1811mm
Quarry Sites (If any)	No
Land Use	Agricultural land is the dominant followed by forests and residential areas.
Air Quality	Medium
Noise Level	Medium
Drainage Network	Storm Water Drain Along Main Market Area, However, in other areas, drainage not required due to its topography.



*[Handwritten signature]*  
*[Faint circular stamp]*

- २.१ घरायसी उपचार गर्ने  १ २.२ क्षामी, फाँकी, पुजारी कहाँ जाने   
 २.३ औषधि पसलमा जाने  २ २.४ स्वास्थ्य चौकी वा अस्पतालमा जाने   
 २.५ अन्य (उल्लेख गर्ने)

३. यदि परिवारमा कुसैलाई फाडापखाला लागेमा के गर्नुहुन्छ ? (प्रतिक्रिया अनुसार नम्बर लेख्ने)

- ३.१ जीवजल खुवाउने  १ ३.२ घरायसी उपचार गर्ने   
 ३.३ क्षामी, फाँकी वा पुजारी कहाँ जाने  ३.४ औषधि पसलमा जाने   
 ३.५ स्वास्थ्य चौकी वा अस्पतालमा जाने  ३.६ अन्य (उल्लेख गर्ने).....

४. गत एक सालभित्रमा तपाईंका परिवारका सदस्यहरू फाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरूबाट प्रभावित थिए ? प्रभावित भएका भए कति जना थिए तलको तालिकामा सख्या नोट गर्ने ।

क्र.सं.	रोग	५ वर्ष मुनिका बालबालिका	महिला	पुरुष	कुल
१	फाडापखाला				
२	जाड				
३	जुक				
४	टाईफाइड				
५	दोखा				
६	छाला खुम्न्ती रोग				
७	बौला रोग (मलेरिया)				
८	कमलपित्त (जङ्गीस)				
९	अन्य				
जम्मा					

५. गत एक वर्षभित्र तपाईंका परिवारमा फाडा पखाला तथा पानीजन्य अन्य सरुवा रोगहरूबाट कसको मृत्यु भएको छ ? (मृत्यु अवस्था)

नाम	५ वर्ष मुनिका बालबालिका	महिला	पुरुष
फाडा पखाला			
जाड			
पानीजन्य अन्य सरुवा रोगहरू			
जम्मा			

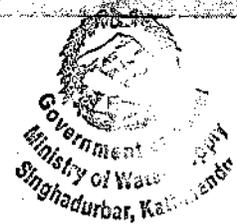
६. गत एक वर्षभित्र तपाईंको परिवारका सदस्यलाई फाडापखाला र पानीजन्य अन्य सरुवा रोगहरूको उपचारमा कति रकम खर्च गर्नु पर्यो ?

रोग	खर्च रकम (रु.मा)
फाडापखाला	
पानीजन्य अन्य सरुवा रोगहरू	
जम्मा	

घन्यबाध

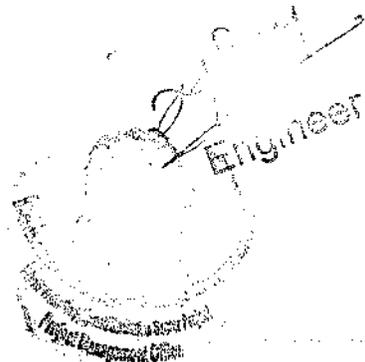


*[Signature]*  
 Engineer



A. Checklist for Physico-Chemical Environment

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Noise Level	Medium
Drainage Network	Storm Water Drain Along Main Market Area, However, in other areas, drainage not required due to its topography.



IEE for Deurali Hupsekot WSSP

B. Floras & Fauna

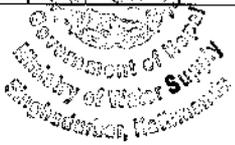
Floras (Plant Life Forms)

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status		
							IUCN	CITES	GoN IBAT
1	Aank	<i>Caloptrix gigantea</i>	Pasture land	Shrub	Commonly Found	Medicinal Uses, and Agroforestry	LC	LC	LC
2	Amala	<i>Phyllanthus emblica</i>	Dry Open Forest Areas	Tree	Commonly Found	Medicinal Uses, Agroforestry, Edible Fruit, Fuel wood and Source of charcoal.	LC	LC	LC
3	Bakeino	<i>Melia azedarach</i>	Along road and forest edges	Medium Sized Shrub or Tree		Edible Fruits, Agroforestry	LC	LC	LC
4	Barro	<i>Terminalia bellirica</i>	Scattered Forest Areas	Tree		Medicinal Uses, Edible Fruits, Agroforestry and Fuel wood and Source of charcoal.	LC	LC	LC
5	Bayer	<i>Zizyphus mauritiana</i>	Sandy Soils along hills, slopes	Tree		Medicinal Uses, Edible Fruits, Agroforestry and Fuel wood and Source of charcoal.	LC	LC	LC
6	Bot Dhaiyanro	<i>Lagerstroemia parviflora</i> Roxb.	Open grasslands	Tree		Edible Gum, Carpentry, Black Dye	LC	LC	LC
7	Bhalayo	<i>Busbanania latifolia</i>	Open Areas of Forests	Tree		Edible Fruit, Edible Oil from seeds, Medicinal Uses, Agroforestry, Firewood and Charcoal	LC	LC	LC
8	Bhimsenpati Jhar	<i>Isodon ternifolia</i>	Open Forests	Shrub		Medicinal Uses, Edible Leaves	LC	LC	LC



IEE for Deurali Hupsekot WSSP

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status		
							IUCN	CITES	GoN IBAT
9	Chhatiwari	<i>Alstonia scobolaris</i>	Nearby Forests	Tree		Medicinal Uses	LC	LC	LC
10	Dabdabe	<i>Garuga pinnata</i>	Mixed Type Forests	Tree		Edible Fruits & Agroforestry	LC	LC	LC
11	Damaikath	<i>Myrsine sp.</i>	Open areas favoring moist soils	Tree		Agroforestry and Fuel wood	LC	LC	LC
12	Dhatrung	<i>Ebretia laevis</i>	Forest Patches, Bushlands	Tree		Medicinal Uses	LC	LC	LC
13	Dhurseli	<i>Colebrookea oppositifolia</i>	Lowhills	Shrub		Medicinal Uses	LC	LC	LC
14	Dudhkhirro	<i>Holarrbena pubescus</i>	Forests near watercourses	Tree		Medicinal Uses and Agroforestry	LC	LC	LC
15	Harro	<i>Terminalia chebula</i>	Mixed Type Forests	Tree		Medicinal Uses, Edible Fruits and Edible Oil from Medicinal uses,	LC	LC	LC
16	Jamun	<i>Syzygium cumini</i>	Evergreen to Deciduous Forests	Tree		Cultural & Religious Values	LC	LC	LC
17	Kadam	<i>Anthocephalus chinensis</i>	Deep Moist Soils often in secondary forests along riverbanks	Tree		Medicinal Uses & Wood for Light Construction Works	LC	LC	LC
18	Khayer	<i>Acacia catechu</i>	Tropical Moist Deciduous Forests	Tree		Medicinal Uses, Firewood, Charcoal	LC	LC	LC
19	Kumbhi	<i>Careya arborea</i>	Along forest edges	Tree		Medicinal Uses, Wood for general construction works	LC	LC	LC
20	Kuro	<i>Barleria crsitata</i>	Waste Places and Along the roadsides	Shrub		Medicinal Uses & Agroforestry	LC	LC	LC



IEE for Deurali Hupsekot WSSP

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	IUCN	Protection Status		
								CITES	GoN	IBAT
21	Kutmiro	<i>Litsea monopetala</i>	Lowlands	Tree		Medicinal Uses & Wood for furniture	LC	LC	LC	
22	Kyamun	<i>Cleistanthus operculatus</i> ( <i>Syzygium nervosum</i> )	Grasslands	Tree		Agroforestry and Wood for furniture	LC	LC	LC	
23	Lahare gayo	<i>Bridelia retusa</i>	Open Land	Tree	LC	Medicinal Uses, Fuel wood and Construction Works	LC	LC	LC	
24	Latikath	<i>Swida oblonga</i>	Nearby Forests	Tree	LC	Medicinal Uses	LC	LC	LC	
25	Nim	<i>Azadirachta indica</i>	Lowland Forest Areas	Tree	LC	Edible Fruits, Edible Leaves, Medicinal Uses, Agroforestry, Firewood	LC	LC	LC	
26	Palans	<i>Butea monosperma</i>	Open Grasslands and Wastelands	Tree	LC	Medicinal Uses, Agroforestry, Firewood of	LC	LC	LC	
27	Rajbrikshya	<i>Cassia fistula</i>	Open Forests & Grasslands	Tree	LC	Medicinal Uses, Agroforestry, Making good quality charcoal	LC	LC	LC	
28	Sal	<i>Shorea robusta</i>	Nearby Forests	Trees	LC	Medicinal, Making plates, cups (Tapari), Fuelwood, Edible Seeds	LC	LC	LC	
29	Sandan	<i>Desmodium oojinense</i>	Nearby Forests	Tree	LC	Medicinal uses and Fuel wood	LC	LC	LC	

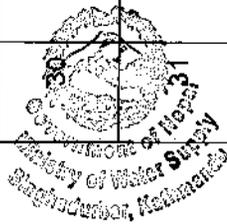


IEE for Deurail Hupsekot WSSP

SN	Local Name	Botanical Name	Location	Vegetation Type/Life Forms	Local Status	Local Uses	Protection Status		
							IUCN	CITES	GoN IBAT
	Satsal	<i>Dalbergia latifolia</i>	Nearby Forests	Tree	LC	Medicinal Uses & Agroforestry	LC	LC	LC
	Saj	<i>Terminalia alata</i>	Sal Forests	Tree	LC	Medicinal Uses, Fuel wood and Making of Excellent Charcoal	LC	LC	LC
32	Sindure	<i>Mallotus philippensis</i>	Scrubby Vegetation and Open Rocky Grounds	Tree	LC	Edible Fruits, Edible Oil from seeds, Medicinal Uses, Agroforestry uses, Fuel Wood and various other uses.	LC	LC	LC
33	Sisau	<i>Dalbergia sissoo</i>	Open Areas of Nearby Forests	Tree	LC	Medicinal Uses, Agroforestry Uses, Firewood and Charcoal Production	LC	LC	LC
34	Tantani	<i>Dillenia pentagyna</i>	Open places in foothills	Tree	LC	Edible Fruits, Medicinal Uses, Wood For Furniture, Charcoal Production	LC	LC	LC

Mammals in the project area

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Protection Status		
						IUCN	CITES	GoN IBAT
1	Bengal Fox	<i>Vulpes Bengalensis</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC
2	Common Leopard	<i>Panthera pardus</i>	Forests	Occasionally Spotted in Forest Areas	Livestock Raider	VU	VU	VU
3	Five Stripped palm Squirrel	<i>Funambulus Pennantii</i>	Forests	Commonly Found	Crop Raider	LC	LC	LC



IEE for Deurali Hupsekot WSSP

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Protection Status			
						IUCN	CITES	GoN	IBAT
4	Gray Wolf	<i>Canis lupus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
5	Golden Jackal	<i>Canis aureus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
6	Greater Short Nosed Fruit Bat	<i>Cynopterus sphinx</i>	Forests	Commonly found in forest areas	Crop Raider	LC	LC	LC	LC
7	House Rat	<i>Rattus Rattus</i>	Human Habitations	Commonly Found	Crop Raider	LC	LC	LC	LC
8	Jungle Cat	<i>Felis Chaus</i>	Forests	Commonly found in forest areas	Livestock Raider	LC	LC	LC	LC
9	Jungle Rat	<i>Bandicota indica</i>	Forests & Agricultural Field	Commonly found in forest areas	Crop Raider	LC	LC	LC	LC
10	Rhesus Monkey	<i>Macaca mulatta</i>	Forests	Commonly found in forest areas and in human habitations also	Crop Raider	LC	LC	LC	LC
11	Small Indian Mongoose	<i>Herpetes auropunctatus</i>	Forests and Agricultural Field	Commonly Found	No	LC	LC	LC	LC

Birds Sighted in the project area

Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
Barn Swallow	<i>Hirundo Rustica</i>	Swallow	Farmland & Settlement Areas	Commonly Found/LC	LC	LC	LC	LC
Black Francolin	<i>Francolinus Francolinus</i>	Game Bird	Thick vegetation near water	Commonly Found/LC	LC	LC	LC	LC
Black Kite	<i>Milvus Migrans</i>	Diurnal Raptors	Settlement Areas with high human population	Occasionally Spotted	LC	LC	LC	LC

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IEE for Deurali Hupsekot WSSP

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status		
						IUCN	CITES	GoN IBAT
4	Chestnut Headed Bee Eater	<i>Merops Leschenaulti</i>	Near Passerine Bird	Highland Areas	Commonly Found	LC	LC	LC
5	Common Cuckoo	<i>Cuculus Canorus</i>	Cuckoo	Deciduous & Coniferous Forests, Woodland Areas, Meadows, Lowlands	Commonly Found	LC	LC	LC
6	Common Hoopoe	<i>Upupa epops</i>	Coraciiform (Colorful Birds)	Fairlands	Commonly Found	LC	LC	LC
7	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Plump Bird	Open Areas, Urban Parks & gardens with fruiting trees	Commonly Found	LC	LC	LC
8	Crimson Sun Bird	<i>Aethopyga Siparaja</i>	Sunbird	Forest & Cultivated Areas	Commonly Found	LC	LC	LC
9	Eurasian Tree Sparrow	<i>Passer Montanus</i>	Passerine Bird	Human Habitations	Commonly Found	LC	LC	LC
10	Eurasian Wigeon	<i>Anas penelope</i>	Wigeon (Dabbling Duck)	Open Wetlands	Commonly Found	LC	LC	LC
11	Fulvous breasted Woodpecker	<i>Dendrocopus Maceti</i>	Woodpeckers	Subtropical or Tropical Dry Forests and Lowland Forest	Occasionally Spotted	LC	LC	LC
12	Gadwall	<i>Anas strepera</i>	Dabbling Duck	Open Wetlands	Commonly Found	LC	LC	LC
13	House Crow	<i>Corvus Splendens</i>	Crow	Urban & Rural Habitats including towns, cities, farmlands	Commonly Found	LC	LC	LC
14	House Sparrow	<i>Passer Domesticus</i>	Sparrow	Urban & Rural Habitats including towns, cities, farmlands	Commonly Found	LC	LC	LC
15	Indian Cuckoo	<i>Cuculus micropterus</i>	Cuckoo	Deciduous & Evergreen Forests	Commonly Found	LC	LC	LC
16	Kalij Pheasant	<i>Lophura leucomelanos</i>	Pheasant	Forests	Occasionally Spotted	LC	LC	LC
17	Large Billed Crow	<i>Corvus macrorhynchos</i>	Crow	Human Habitations	Commonly Found	LC	LC	LC
18	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Whistling Duck	Freshwater Wetlands, Wet paddy Fields	Commonly Found	LC	LC	LC
19	Lineated	<i>Megalaima</i>	Asian Barbet	Holes at Tree trunks	Occasionally	LC	LC	LC

IEE for Deurali Hupsekot WSSP

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status			
						IUCN	CITES	GoN	IBAT
	Barbet	<i>lineate</i>			Seen				
20	Little Egret	<i>Egretta Garzetta</i>	Heron	Open Wetlands, Rice Fields	Commonly Found	LC	LC	LC	LC
21	Mallard	<i>Anas platyrhynchos</i>	Common Duck	Wetlands, Rivers & Streams	Commonly Found	LC	LC	LC	LC
22	Oriental Pied Hornbill	<i>Anthracceros albirostris</i>	Hornbill	Lowland Forests	Occasionally Seen	LC	LC	LC	LC
23	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Dove	Open habitats with good tree cover nearby human habitations	Commonly Found	LC	LC	LC	LC
24	Plum headed Parakeet	<i>Psittacula cyanocephala</i>	Parrot	Forest Areas, Open Woodlands, City Gardens also	Commonly Found	LC	LC	LC	LC
25	Rock Dove	<i>Columba Livia</i>	Dove/Common Pigeon	Open habitats with good tree cover nearby human habitations	Commonly Found and Abundant	LC	LC	LC	LC
26	Spotted Owlet	<i>Athene Brama</i>	Owl	Open habitats including farmlands and human habitations, City Areas	Commonly Found	LC	LC	LC	LC
27	Western (Asian) Koel	<i>Eudynamys Scolopaceus</i>	Cuckoo	Cultivated Lands, Forests	Commonly Found in forest areas	LC	LC	LC	LC
28	White Breasted Water Hen	<i>Amaurornis Phoenicurus</i>	Water Bird	Near Freshwater and Brackish Water	Commonly Found	LC	LC	LC	LC

Herpeto-fauna in the Project Area

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
1	Common Indian Monitor	<i>Varanus Bengalensis</i>	Moist Forest Areas	Occasionally Spotted	LC	LC	LC	LC
2	Common toad/Himalayan Toad	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Shrubland near streams, Vicinity of seepage & fields	Commonly Found	LC	LC	LC	LC
3	Garden lizard	<i>Calotes versicular</i>	Gardens, Agricultural	Commonly Found	LC	LC	LC	LC

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IEE for Deurali Hupsekot WSSP

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status		
					IUCN	CITES	GoN IBAT
			Fields				
4	Green Pit Viper	<i>T. albolabris</i>	Small Bush Vegetations, Trees, Urban Areas also	Occasionally Spotted	LC	LC	LC
5	House Lizard	<i>Hemidactylus Flaviviridis</i>	Human Habitations	Commonly Found	LC	LC	LC
6	Olive Keelback Water Snake	<i>Atretium Schistosum</i>	Water or Surrounding Vegetation	Occasionally Spotted	LC	LC	LC
7	Rat snake	<i>Ptyas mucosus</i>	Forest Areas and Vegetations near Human Habitations	Occasionally Spotted	LC	LC	LC
8	Stream Frog	<i>Rana cyanophylectis</i>	Agricultural Fields, Roadsides, Freshwater, Vegetations near Human Habitations	Commonly Found	LC	LC	LC

Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1	Andha Bam	<i>Amphipnous cuchia</i>	Common	June to November	
2	Bokshi Machho	<i>Amblyceps mangois</i>	Common	June to September and February to March	
3	Chuche Buduna	<i>Garra Annandalei</i>	Common	Resident	
4	Hile	<i>Channa Gachua</i>	Common	Available throughout year	
5	Jalkapoor	<i>Clupisoma garua</i>	Common	June to October	
6	Jarua	<i>Chagunius chagunio</i>	Common	Local Migrant-April to June	
7	Mangur	<i>Clarias batrachus</i>	Common	Available	

IEE for Deurali Hupsekot WSSP

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
			Fields					
4	Green Pit Viper	<i>T. albolabris</i>	Small Bush Vegetations, Trees, Urban Areas also	Occasionally Spotted	LC	LC	LC	LC
	House Lizard	<i>Hemidactylus Flaviviridis</i>	Human Habitations	Commonly Found	LC	LC	LC	LC
6	Olive Keelback Water Snake	<i>Atretium Schistosomum</i>	Water or Surrounding Vegetation	Occasionally Spotted	LC	LC	LC	LC
7	Rat snake	<i>Ptyas mucosus</i>	Forest Areas and Vegetations near Human Habitations	Occasionally Spotted	LC	LC	LC	LC
8	Stream Frog	<i>Rana cyanophylectis</i>	Agricultural Fields, Roadside, Freshwater, Vegetations near Human Habitations	Commonly Found	LC	LC	LC	LC



Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1	Ahdha Bam	<i>Amphiprionus cuchia</i>	Common	June to November	
2	Bokshi Machho	<i>Amblyceps mangois</i>	Common	June to September and February to March	
3	Chuche Buduna	<i>Gerra Annandalei</i>	Common	Resident	
4	Hile	<i>Channa Gachua</i>	Common	Available throughout year	
5	Jalkapoor	<i>Clupisoma garua</i>	Common	June to October	
6	Jarua	<i>Chagunius chagunio</i>	Common	Local Migrant-April to June	
7	Mangur	<i>Clarias batrachus</i>	Common	Available	



IEE for Deurali Hupsekot WSSP

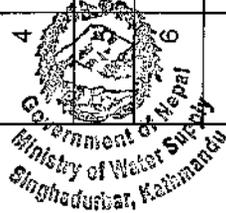
SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status		
						IUCN	CITES	GoN IBAT
	Barbet	<i>lineate</i>			Seen			
20	Little Egret	<i>Egretta Garzetta</i>	Heron	Open Wetlands, Rice Fields	Commonly Found	LC	LC	LC
21	Mallard	<i>Anas platyrhynchos</i>	Common Duck	Wetlands, Rivers & Streams	Commonly Found	LC	LC	LC
22	Oriental Pied Hornbill	<i>Antracoceros albirostris</i>	Hornbill	Lowland Forests	Occasionally Seen	LC	LC	LC
23	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Dove	Open habitats with good tree cover nearby human habitations	Commonly Found	LC	LC	LC
24	Plum headed Parakeet	<i>Psittacula cyanocephala</i>	Parrot	Forest Areas, Open Woodlands, City Gardens also	Commonly Found	LC	LC	LC
25	Rock Dove	<i>Columba Livia</i>	Dove/Common Pigeon	Open habitats with good tree cover nearby human habitations	Commonly Found and Abundant	LC	LC	LC
26	Spotted Owllet	<i>Athene Brama</i>	Owl	Open habitats including farmlands and human habitations, City Areas	Commonly Found	LC	LC	LC
27	Western (Asian) Koel	<i>Eudynamis Scolopaceus</i>	Cuckoo	Cultivated Lands, Forests	Commonly Found in forest areas	LC	LC	LC
28	White Breasted Water Hen	<i>Amauromis Phoenicurus</i>	Water Bird	Near Freshwater and Brackish Water	Commonly Found	LC	LC	LC

Herpeto-fauna in the Project Area

SN	Local Name	Scientific Name	Habitat	Local Status	Protection Status		
					IUCN	CITES	GoN IBAT
1	Common Indian Monitor	<i>Varanus Bengalensis</i>	Moist Forest Areas	Occasionally Spotted	LC	LC	LC
2	Common toad/Himalayan Toad	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Shrubland near streams, Vicinity of seepage & fields	Commonly Found	LC	LC	LC
3	Garden lizard	<i>Calotes versicular</i>	Gardens, Agricultural	Commonly Found	LC	LC	LC

IEE for Deurali Hupsekot WSSP

S.N.	Local Name	Scientific Name	Habitat	Local Status	Protection Status			
					IUCN	CITES	GoN	IBAT
			Fields					
4	Green Pit Viper	<i>T. albolabris</i>	Small Bush Vegetations, Trees, Urban Areas also	Occasionally Spotted	LC	LC	LC	LC
5	House Lizard	<i>Hemidactylus Flaviviridis</i>	Human Habitations	Commonly Found	LC	LC	LC	LC
6	Olive Keelback Water Snake	<i>Atretium Schistosom</i>	Water or Surrounding Vegetation	Occasionally Spotted	LC	LC	LC	LC
7	Rat snake	<i>Ptyas mucosus</i>	Forest Areas and Vegetations near Human Habitations	Occasionally Spotted	LC	LC	LC	LC
8	Stream Frog	<i>Rana cyanophylectis</i>	Agricultural Fields, Roadsides, Freshwater, Vegetations near Human Habitations	Commonly Found	LC	LC	LC	LC



Fish in the Project Area

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
1	Ahdha Bam	<i>Amphipnous cuchia</i>	Common	June to November	
2	Bekshi Machho	<i>Amblyceps mangols</i>	Common	June to September and February to March	
3	Chuche Buduna	<i>Garra Annandalei</i>	Common	Resident	
4	Hile	<i>Channa Gachua</i>	Common	Available throughout year	
5	Jalkapoor	<i>Cluptionsa garua</i>	Common	June to October	
6	Janua	<i>Chagunius chagunio</i>	Common	Local Migrant-April to June	
7	Mangur	<i>Clarias batrachus</i>	Common	Available	



IEE for Deurali Hupsekot WSSP

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status		
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	Barbet	<i>lineate</i>			Seen			
20	Little Egret	<i>Egretta Garzetta</i>	Heron	Open Wetlands, Rice Fields	Commonly Found	LC	LC	LC
21	Mallard	<i>Anas platyrhynchos</i>	Common Duck	Wetlands, Rivers & Streams	Commonly Found	LC	LC	LC
22	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	Hornbill	Lowland Forests	Occasionally Seen	LC	LC	LC
23	Oriental Turtle Dove	<i>Sreptopelta orientalis</i>	Dove	Open habitats with good tree cover nearby human habitations	Commonly Found	LC	LC	LC
24	Plum headed Parakeet	<i>Psittacula cyanocephala</i>	Parrot	Forest Areas, Open Woodlands, City Gardens also	Commonly Found	LC	LC	LC
25	Rock Dove	<i>Columba Livia</i>	Dove/Common Pigeon	Open habitats with good tree cover nearby human habitations	Commonly Found and Abundant	LC	LC	LC
26	Spotted Owllet	<i>Athene Brama</i>	Owl	Open habitats including farmlands and human habitations, City Areas	Commonly Found	LC	LC	LC
27	Western (Asian)Koei	<i>Eudynamys Scolopaceus</i>	Cuckoo	Cultivated Lands, Forests	Commonly Found in forest areas	LC	LC	LC
28	White Breasted Water Hen	<i>Amauornis Phoenicurus</i>	Water Bird	Near Freshwater and Brackish Water	Commonly Found	LC	LC	LC

Herpeto-fauna in the Project Area

SN	Local Name	Scientific Name	Habitat	Local Status	Protection Status		
					IUCN	CITES	GoN IBAT
1	Common Indian Monitor	<i>Varanus Bengalensis</i>	Moist Forest Areas	Occasionally Spotted	LC	LC	LC
2	Common toad/Himalayan Toad	<i>Bufo melanostictus/Duttaphrynus Himalayanus</i>	Shrubland near streams, Vicinity of seepage & fields	Commonly Found	LC	LC	LC
3	Garden lizard	<i>Calotes versicular</i>	Gardens, Agricultural	Commonly Found	LC	LC	LC

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IEE for Deurail Hupsekot WSSP

S.N.	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location
8	Singhi	<i>Heteropneustes fossilis</i>	Common	throughout year Available throughout year	

Note: All the above-mentioned floral & faunal species are found in various locations of the project town. Due to increasing urbanization, some of the species found within the settlement areas have now been increasingly shifted to the roadside bushes as well as nearby forests areas.

  
Engineer



**CHECKLISTS FOR FOCUS GROUP DISCUSSION**

**A. FOCUS GROUP DISCUSSION -1**

Date: 18 October, 2018

Project: Deurali Hupsekot Water Supply & Sanitation Project

Venue: Ward No. 11- Office

Number of Participants: 8

Purpose Statement: Information Dissemination to the participants regarding UWSSSP, Discussions regarding the proposed project and Roles & Responsibilities of various Stakeholders

Question 1: What do you know about Urban Water Supply & Sanitation (Sector) Project? Can you please share the information you know about this project?

Findings: All the participants are found aware about the proposed project.

Question 2: How do you feel about the project proposed in your town? Do you think that this proposed project is important for your town?

Findings: According to the participants, they are in need of the improved water supply system as they are facing hardship of water for years. Thus, they expect this proposed project to improve the existing water system.

Question 3: How familiar are you with the term "Environment"?

Findings: The participants are quite familiar with the environment and are concerned about it too.

Question 4: Are there any community forests and protected areas within this project area?

Findings: No such protected areas and community forests are known to be existing within the project area.

Question 5: Do you have any idea about the environmental concerns regarding the proposed project?

Findings: Their main concerns regarding the environmental aspects are Dust Emissions, Water Quality, Noise Pollution, Community Forest Conservation, Traffic Congestion, Obstruction to the vendors & passersby, Damage to the existing facilities and Construction Waste & Solid Waste Management during construction period. They are also concerned about effective operation & management and anticipated leakage problems during operation phase.

Question 6: Do you have any objection regarding the project activities that may create discomfort during pipeline excavation works as well as construction of public toilet at bazaar area?

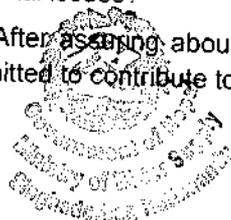
Findings: They stated "No Objection" regarding the project activities that will be carried out at core bazaar area. However, they want to be ensured that the project activities at this area should be carried out with proper care and prompt actions regarding excavation & backfilling works.

Question 7: How can we get the permission to use the land in bazaar area?

Findings: They stated that the required land shall be provided by the municipality itself.

Question 8: As a stakeholder, how can you contribute from your side to minimize the anticipated environmental issues?

Findings: After assessing about the mitigation measures for the environmental concerns they raised, they committed to contribute to support safeguard implementation of the proposed project.



Question 9: Lastly, what would you say are the most important issues you would like to express about this project?

Findings: Their positive response towards the implementation of the proposed project indicates Willingness to Pay for this project. The most important issue they raised about the proposed project is the assurance for the provision of safe, reliable and sufficient water supply system



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Engineer



**B. FOCUS GROUP DISCUSSION -2**

Date: 21 June, 2019

Project: Deurali Hupsekot Water Supply & Sanitation Project

Venue: Mayur Community forest meeting hall

Number of Participants: 8

Purpose Statement: Information Dissemination to the participants regarding Upfront cash contribution, Discussions regarding the proposed project, Environmental Concerns and Roles & Responsibilities of various Stakeholders

Question 1: You must be familiar with UWSSSP as we had already discussed about it in our earlier discussion program. Do you have to say anything regarding this?

Findings: According to the participants, they are happy that their desire for the reliable, safe & potable water supply is being fulfilled sooner.

Question 2: Now, we are here to disseminate information regarding the budget of the project. The total project budget will be covered as follows: a) 5% upfront cash collection; b) 25% TDF Loan and c) 70% from GoN Contribution for the project implementation.

Findings: Some of the participants are aware about this as WUSC has already delivered this information of the project. In response to this issue, all the participants showed positive feedback and they ensure us to contribute 5% upfront cash for the project.

Question 3: As we have already discussed about the environmental concerns regarding the proposed project in our earlier discussion programs, we like to inform you that more or less obviously some environmental issues will be raised during construction of the project; however, those issues will not be either extreme or permanent.

Findings: They still showed concerns regarding the environmental aspects that include Dust Emissions, Water Quality, Noise Pollution, Traffic Congestion, Obstruction to the vendors & passersby, Damage to the existing facilities and Construction Waste & Solid Waste Management during construction period as like in the earlier discussion programs. We assure them about the mitigation of these likely environmental impacts by adopting the proposed mitigation measures.

Question 4: As a stakeholder, how will you contribute from your side to minimize the anticipated environmental issues?

Findings: As a responsible stakeholder, apart of 5% upfront cash contribution, they committed to contribute to support safeguard implementation of the proposed project.

Question 5: Lastly, what would you like to say about this project?

Findings: Lastly, the participants expressed their aspiration to get adequate, safe, reliable and potable water supply service from the proposed project with less/avoidable environmental impacts.



*2019/06/21*  
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**ANNEX 5:  
CHLORINE USE GUIDELINES**



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\_\_\_\_\_  
Engineer



**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)**

<b>Chlorine</b>	<b>below 5 milligrams per liter (mg/L)*</b>
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\*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 haloacetic 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 bioaccumulative 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.

*Signature*  
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**ANNEX 5:  
CHLORINE USE GUIDELINES**



*[Handwritten signature]*  
Engineer



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*[Handwritten Signature]*  
Engineer



**ANNEX 5:  
CHLORINE USE GUIDELINES**



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\_\_\_\_\_  
Engineer



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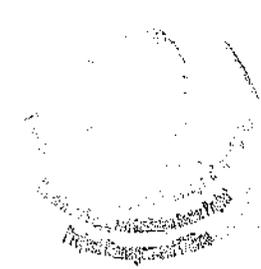
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Engineer



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*[Handwritten Signature]*  
\_\_\_\_\_  
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**Guideline values for chlorine WHO Guidelines for drinking water quality (2004)**

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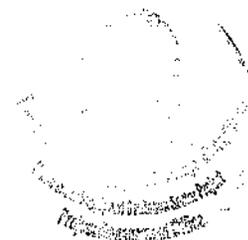
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**Chlorination does not harm aquatic environments**

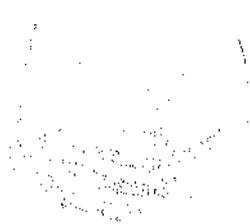
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Engineer



**ANNEX 6:  
WATER QUALITY TEST REPORTS**



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2074  
2074



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Page 1 of 1

NESS/Lab, M-03/RI.1

**QS Test Report Certificate**

**NS Accreditation No. Prd. 01/053-54**

Entry No. : NCL - 722(W) (1) - 06 - 2019 Date Received : 23 - 06 - 2019  
 Sample : River Water (Pothar Khola, Batai Khola, Girubari Khola) RVT Water Date Completed : 11 - 07 - 2019  
 Client : TAEC/ICON JV Location : Nawalpur  
 Sampled By : Client

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH @ 25°C	Electrometric, 4500-H B, APHA	7.8	6.5-8.5
2	Turbidity (NTU)	Nephelometric, 2130 B, APHA	6	5
3	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.10	6
4	Total Hardness as CaCO <sub>3</sub> (mg/L)	EDTA Titrimetric, 2440 C, APHA	152	300
5	Calcium (mg/L)	EDTA Titrimetric, 3800 - Ca B & 3500 - Mg B, APHA	47.3	200
6	Total Dissolved Solids (mg/L)	Oven Drying Method, 100°C, 2840 C, APHA	130	1000
7	Sulphate (mg/L)	Gravimetric (Method 7) with Ignition of Residue, 4500 - SO <sub>4</sub> C, APHA	28.67	250
8	*Residual Chlorine (mg/L)	Iodometric Titration, 4500 - Cl B, APHA	1.38	0.1-0.2
9	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	<0.5	250
10	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH <sub>3</sub> C, APHA	N.D. (<0.05)	1.5
11	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO <sub>3</sub> B, APHA	1.03	50
12	Aluminum (mg/L)	Eriochrome Cyanine R, 3509 - Al A, APHA	0.02	0.2
13	Fluoride (mg/L)	SPANDS, 4500 - F D, APHA	<0.05	0.5-1.5
14	Iron (mg/L)		0.13	0.3
15	Manganese (mg/L)		N.D. (<0.02)	0.2
16	Cadmium (mg/L)	Direct AAS - Acetylene AAS, 3111 B, APHA	0.004	0.003
17	Ce <sup>4+</sup> (mg/L)		0.02	0.01
18	Copper (mg/L)		0.01	1
19	Zinc (mg/L)		0.04	3
20	Arsenic (mg/L)	SODG, 3114 B, APHA	N.D. (<0.01)	0.05
21	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)	0.001

\* Non-accredited Parameter

N.D. Not Detected

Note: The gravimetric analysis was carried out in controlled temperature condition (20°C).

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

Remarks: The observed values for turbidity, cadmium and lead did not comply the prescribed NDWQS for drinking water.

(Analyzed By)

(Checked By)

(Authorized Signatory)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (018), section OPT.
  2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
  3. Liability of our institute is limited to the invoiced test parameters & amount only.
  4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
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 http://www.nesspn.com

NESS/Lab. M-03/R1.1

**QS Test Report / Certificate**  
**NS Accreditation No. Fra. 01/053-54**

Entry No. : NCL - 203 (W) (2) - 11 - 2018  
 Sample : Water (Hupsekot, Nowalparasi)  
 Client : TAEC/ICON JV  
 Source : Birbati Khola  
 Date Received : 04 - 11 - 2018  
 Date Completed : 18 - 11 - 2018  
 Sampling Date : 02 - 11 - 2018  
 Sampled By : Client

S. N	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH @ 21°C	Electronic, 4500 - H <sup>+</sup> B, APHA	7.7	6.5-8.5
2	Turbidity (NTU)	Nephelometric, 2120 B, APHA	5	5
3	Color (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.07	5
4	Total Hardness as CaCO <sub>3</sub> (mg/L)	EDTA Titrimetric, 2340 C, APHA	64	500
5	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	17.63	200
6	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	104	1000
7	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO <sub>4</sub> C, APHA	<1	250
8	Residual Chlorine (mg/L)	Iodometric Titration, 4500 - Cl B, APHA	NA	0.1-0.2
9	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	0.90	250
10	Ammonia (mg/L)	Dyeol Nesslerization, 4500 - NH <sub>3</sub> C, APHA	0.10	1.5
11	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO <sub>3</sub> B, APHA	0.37	50
12	Aluminum (mg/L)	Eriochrome Cyanine R, 3500 - Al A, APHA	0.01	0.2
13	Fluoride (mg/L)	SPANDS 3500 - F D, APHA	<0.05	0.5-1.5
14	Iron (mg/L)	Inductively Coupled Plasma Atomic Absorption Spectrometry, 3111 B, APHA	1.36	0.3
15	Manganese (mg/L)	Inductively Coupled Plasma Atomic Absorption Spectrometry, 3111 B, APHA	0.04	0.2
16	Cadmium (mg/L)	Direct Air - Acetylene AAS, 3112 B, APHA	0.00	0.001
17	Lead (mg/L)	Direct Air - Acetylene AAS, 3112 B, APHA	<0.01	0.05
18	Copper (mg/L)	Direct Air - Acetylene AAS, 3112 B, APHA	0.02	0.05
19	Zinc (mg/L)	Direct Air - Acetylene AAS, 3112 B, APHA	0.02	0.05
20	Arsenic (mg/L)	SDDC, 3114 B, APHA	N. D. (<0.01)	0.05
21	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N. D. (<0.0005)	0.001

\* Non-accredited parameter  
 N. D. Not Detected  
 Note: The gravimetric analysis was carried out in controlled temperature condition (20°C).  
 NDWQS: National Drinking Water Quality Standard - 2063, APHA: American Public Health Association, AAS: Atomic Absorption Spectrophotometer, EDTA: Ethylenediaminetetraacetic acid, NTU: Nephelometric turbidity unit, UV: Ultraviolet.

Remarks: The observed values for turbidity, iron and cadmium did not comply the prescribed NDWQS for drinking water.

(Analyzed By) \_\_\_\_\_ (Checked By) \_\_\_\_\_ (Authorized Signature) \_\_\_\_\_

- Note:
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Engineer  
 Government of Nepal  
 Ministry of Water Supply  
 Santharbar, Kathmandu



**Nepal Environmental & Scientific Services (P) Ltd.**

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http://www.nesspltd.com

NESS/Lab, M-03/R1.1

**QS Test Report / Certificate**

**NS Accreditation No. Pra. 01/053-54**

Entry No. : NCL - 203 (W) (2) - 11 - 2018  
 Sample : Water (Hupsekot, Nawalparasi)  
 Client : TAEC/ICON JV  
 Source : Phalthar Khola

Date Received : 04 - 11 - 2018  
 Date Completed : 16 - 11 - 2018  
 Sampling Date : 02 - 11 - 2018  
 Sampled By : Client

S. No.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH @ 21°C	Electronic, 4500 - H <sup>+</sup> B, APHA	7.9	6.5-8.5
2	Turbidity (NTU)	Nephelometric, 2130 B, APHA	4	5
3	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.07	5
4	Total Hardness as CaCO <sub>3</sub> (mg/L)	EDTA Titrimetric, 2346 C, APHA	134	500
5	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	44.89	200
6	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	142	1000
7	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO <sub>4</sub> <sup>2-</sup> C, APHA	27.15	250
8	Residual Chlorine (mg/L)	Iodometric Titration, 4500 - Cl B, APHA	NR	0.1-0.2
9	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	1.07	250
10	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH <sub>4</sub> <sup>+</sup> C, APHA	0.05	1.0
11	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO <sub>3</sub> B, APHA	0.68	50
12	Aluminum (mg/L)	Eriochrome Cyanine R, 3500 - Al A, APHA	0.01	0.2
13	Fluoride (mg/L)	SPADMS, 4500 - F G, APHA	0.05	0.5-1.5
14	Iron (mg/L)	SPADMS, 4500 - F G, APHA	0.41	0.3
15	Cadmium (mg/L)	SPADMS, 4500 - F G, APHA	0.002	0.2
16	Cobalt (mg/L)	Direct - Cobalt AAS, 3111 B, APHA	0.01	0.003
17	Lead (mg/L)	Direct - Lead AAS, 3111 B, APHA	0.01	1
18	Copper (mg/L)	Direct - Copper AAS, 3111 B, APHA	0.02	5
19	Zinc (mg/L)	Direct - Zinc AAS, 3111 B, APHA	N.D. (<0.01)	0.05
20	Arsenic (mg/L)	SGSCG, 3114 B, APHA	N.D.	0.05
21	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	1-0.005	0.001

\* Non-accredited Parameter

N. D.: Not Detected

Note: The gravimetric analysis was carried out in controlled temperature condition (20°C).  
 NDWQS: National Drinking Water Quality Standard - 2063; APHA: American Public Health Association; AAS: Atomic Absorption Spectrophotometer; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; UV: Ultraviolet.

Remarks: The observed values for Iron, cadmium and lead did not comply the prescribed NDWQS for drinking water.

*[Signature]*  
 (Analyzed By)

*[Signature]*  
 (Checked By)

*[Signature]*  
 (Authorized Signature)

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**QS Test Report / Certificate**

**NS Accreditation No. Pra. 01/053-54**

Entry No. : NCL - 203 (W) (2) - 11 - 2018 Date Received : 04 - 11 - 2018  
 Sample : Water (Hupsekot, Nawalparasi) Date Completed : 18 - 11 - 2018  
 Client : TAEC/ICON JV Sampling Date : 02 - 11 - 2018  
 Source : Giribari Khola Sampled By : Client

S.N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1	pH @ 21°C	Electrometric, 4500 - H B, APHA	7.7	6.5-8.5
2	Turbidity (NTU)	Nephelometric, 2130-B, APHA	6	5
3	Color, (Chromatic Unit)	Spectrophotometric, 2120 C, APHA	6.07	5
4	Total Hardness as CaCO <sub>3</sub> (mg/L)	EDTA Titrimetric, 2840 C, APHA	64	500
5	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	17.63	200
6	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	104	1000
7	Sulphate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO <sub>4</sub> C, APHA	<1	250
8	Residual Chlorine (mg/L)	Iodometric Titration, 4500 - Cl B, APHA	ND	0.1-0.2
9	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	0.99	250
10	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH <sub>3</sub> C, APHA	0.10	1.5
11	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO <sub>3</sub> B, APHA	0.37	50
12	Aluminum (mg/L)	Electrode Cyanide R, 3500 - Al A, APHA	0.01	0.2
13	Fluoride (mg/L)	SPANDS, 4500 - F D, APHA	<0.05	0.5-1.5
14	Iron (mg/L)		1.38	0.3
15	Manganese (mg/L)		0.04	0.2
16	Cadmium (mg/L)	Direct Air - Acetylene AAS, 5112 B, APHA	0.03	0.003
17	Lead (mg/L)		<0.01	0.05
18	Copper (mg/L)		0.02	1
19	Zinc (mg/L)		0.02	3
20	Arsenic (mg/L)	SDDC, 3114 B, APHA	N.D. (<0.01)	0.05
21	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)	0.001

\* Non-accredited Parameter

N. D.: Not Detected

Note: The bacteriological analysis was carried out in controlled temperature condition (20°C).

NDWQS: National Drinking Water Quality Standard - 2063, APHA: American Public Health Association, AAS: Atomic Absorption Spectrophotometer, EDTA: Ethylenediaminetetraacetic acid, NTU: Nephelometric turbidity unit, UV: Ultraviolet.

Remarks: The observed values for turbidity, iron and cadmium did not comply the prescribed NDWQS for drinking water.

*[Signature]*  
(Analyzed By)

*[Signature]*  
(Checked By)

*[Signature]*  
(Authorized Signature)

- Note:
- This report/certificate is in reference to Laboratory Quality Control Manual, QS (017), section DPT.
  - The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
  - Liability of our institute is limited to the invoiced test parameters & amount only.
  - Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
  - This report should not be reproduced wholly / partially for any advertizing media without our permission.
  - The clients are requested to take back their hazardous samples along with the report/certificate.



*[Signature]*  
Engineer





**Nepal Environmental & Scientific Services (P) Ltd.**

G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal

Phone: +977-1-4244989, 4241001, Fax No: +977-1-4226028, Email: ness@mos.com.np

Page 2 of 2

http://www.nessnepal.com

NESS/Lab. M-03/R1.1

**QS Test Report / Certificate**  
**NS Accreditation No. Pra: 01/053-54**

Entry No. : NCL - 203 (W) (2) - 11 - 2018 Date Received : 04 - 11 - 2018  
 Sample : Water (Hupsekot, Nawalparasi) Date Completed : 18 - 11 - 2018  
 Client : TAEC/ICON JV Accreditation No. for 21/11/2018 Sampling Date : 02 - 11 - 2018  
 Source : Phathar Khola Sampled By : Client

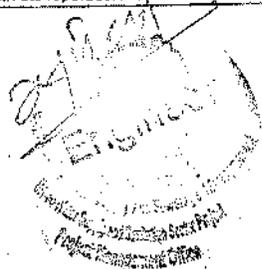
S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH @ 21°C	Electrometric, 4500 - HI B, APHA	7.9	6.5-8.6
2.	Turbidity (NTU)	Nephelometric, 2130 B, APHA	4	5
3.	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	0.07	5
4.	Total Hardness as CaCO <sub>3</sub> (mg/L)	EDTA Titrimetric, 2340 C, APHA	134	500
5.	Calcium (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	44.88	200
6.	Total Dissolved Solids (mg/L)	Oven Drying Method, 180°C, 2540 C, APHA	142	1000
7.	Sulfate (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO <sub>4</sub> C, APHA	27.16	250
8.	Residual Chlorine (mg/L)	Iodometric Titration, 4500 - Cl B, APHA	N/D	0.4-0.7
9.	Chloride (mg/L)	Argentometric Titration, 4500 - Cl B, APHA	1.97	250
10.	Ammonia (mg/L)	Direct Nesslerization, 4500 - NH <sub>4</sub> C, APHA	0.05	1.5
11.	Nitrate (mg/L)	UV Spectrophotometric Screening, 4500 - NO <sub>3</sub> B, APHA	0.66	50
12.	Aluminum (mg/L)	Fluorometric, 4500 - Al A, APHA	0.01	0.2
13.	Fluoride (mg/L)	SPANDS, 4500 - F D, APHA	0.05	0.5-1.5
14.	Iron (mg/L)		0.41	0.3
15.	Cadmium (mg/L)		0.01	0.2
16.	Lead (mg/L)		0.01	0.05
17.	Copper (mg/L)		0.01	0.2
18.	Zinc (mg/L)		0.02	5
19.	Arsenic (mg/L)	SDDC, 3114 B, APHA	N.D. (<0.01)	0.05
20.	Mercury (mg/L)	Cold Vapor AAS, 3112 B, APHA	N.D. (<0.0005)	0.001

\* Non-accredited Parameter N.D. Not Detected  
 Note: The gravimetric analysis was carried out in controlled temperature condition (20°C)  
 NDWQS: National Drinking Water Quality Standard - 2063: APHA: American Public Health Association; AAS: Atomic Absorption Spectrophotometer; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; UV: Ultraviolet

Remarks: The observed values for iron, cadmium and lead did not comply the prescribed NDWQS for drinking water.

(Analyzed By) \_\_\_\_\_ (Checked By) \_\_\_\_\_ (Authorized Signature) \_\_\_\_\_

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (017), section OPT.
  2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
  3. Liability of our institute is limited to the invoiced test parameters & amount only.
  4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
  5. This report should not be reproduced wholly / partially for any advertising media without our permission.
  6. The clients are requested to take back their hazardous samples along with the report/certificate.



## ANNEX 7: PHOTOGRAPHS



*[Handwritten signature]*  
\_\_\_\_\_  
Engineer



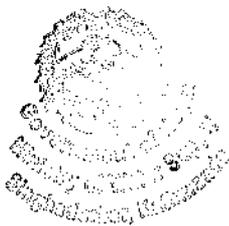


## ANNEX 7: PHOTOGRAPHS



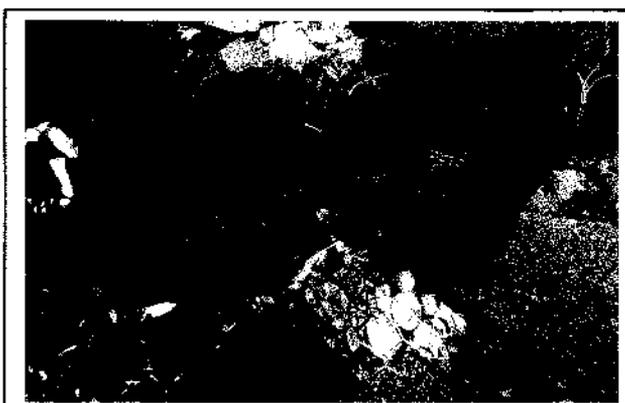
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\_\_\_\_\_  
Chairman







1. Proposed/ Existing Intake, Betai Khola



2. Proposed/ Existing Intake, Pathar Khola



3. Proposed/ Existing Intake, Girubari Khola (Satakon)



4. Proposed Sumpwell Site, Girubari Khola in between Badahare kholsi and Chepari Gaira



5. Existing Collection Chamber, Betai Khola



6. Existing Water Treatment Plant, Pathar Khola (Shivalaya)



*[Handwritten signature]*  
[Illegible text]







7. Existing RVT-2, Pathar Khola (Shivalaya)



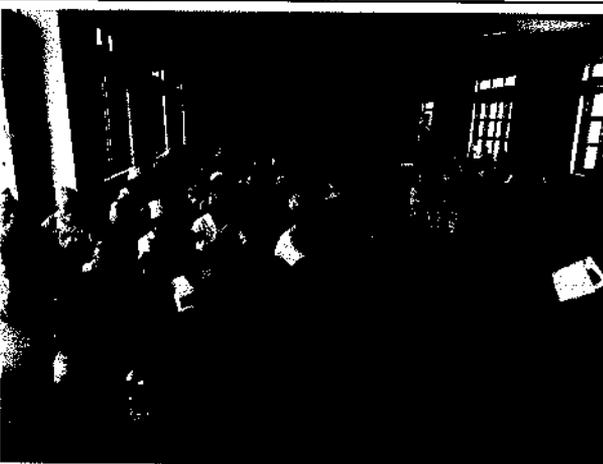
8. Existing Water Treatment Plant, RVT-1 site(Dihi Danda)



9. A view of Community Settlement



10. Detailed Design Report Presentation



11. Detailed Design Report Presentation



12. Detailed Design Report Presentation



*Handwritten signature*  
*Secretary*



## ANNEX 8: COMMENT RESPONSE MATRIX

  
Government of Nepal  
Ministry of Water Supply  
Singhadurbar, Kathmandu

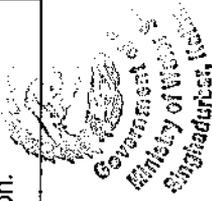


  
Engineer

**Comment and Response Matrix**  
**Deurali Hupsekot Water Supply & Sanitation Project, Nawalpur**

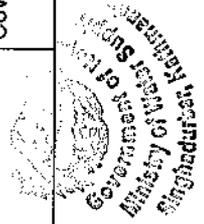
S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
<b>A. By Prem Nidhi KC, Social Development Expert</b>				
1	Executive Summary (Nepali)	Please edit the Nepali Summary of the report		This has been incorporated.
2	Chapters 3 & 4	Please incorporate Policy, Legal and Administrative Framework in Chapter 3 instead of Chapter 4 and Methodology in Chapter 4	Chapter 3 & 4	This has been incorporated.
3		Methodology		
a)	Chapter 3, Section 3.3, Sub Section 3.3.3., Line 125, Page 35	Direct Observation and Transect Walk Method are not same method	Chapter 4, Section 4.3, Sub Section 4.3.3, Line 142, Page 51	This has been incorporated.
4	Chapter 5, Section 5.3, Page 61 to 72	Socio-economic and Cultural Environment  A) Please maintain socio-economic and cultural data presentation in the following order:  <b>Economic Features</b> -Local Price Information: Land, Agriculture, Forest Products, etc. <b>Education &amp; Skills</b> Skill Human Resource <b>Community Infrastructure</b> -Irrigation, Transportation, Communication and Electricity etc. <b>Archaeological Areas/Sites:</b> Historic, Religious or Cultural Places etc. <b>Local Institutions:</b> GOs, NGOs, Cooperatives, CBOs	Chapter 5, Section 5.3, Pages 59 to 72	This has been incorporated.

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
		etc. Other Development Activities: (Industries)		
<b>B. By Mr. B.R. Manandhar (Environmental Engineer &amp; Freelancer Expert)</b>				
1	Cover Page	The name of the proposed project doesn't give any indication of upgradation/extension of an already existing water supply project.	Cover Page	The name of the project is as per the contract document. There is no practice of mentioning the project name as up gradation /extension of the existing project.
2	Chapter 2, Section 2.6-a), Table 2-VI, Page 26	Land requirement data do not seem to include all components e.g. internal access road, laboratory building, WUSC office building, generator house and guard house.	Chapter 2, Section 2.6, Sub Section 2.6.1, Table 2-VI, Pages 24 & 25	This has been incorporated.
3	Chapter 2, Section 2.8, Sub Section 2.8.1 & 2.8.2, Pages 31 & 32	Component-wise construction activities are not necessary. Activities undertaken for construction of any project component should rather be broken down into detailed sub-activities e.g. earthwork/excavation, transportation of construction materials to stockpiling yard, storage of construction materials, transportation of stored materials to construction sites, concrete mixing/batching, metal works, laying of pipes in trenches, earthwork/backfilling. Impact mitigating activities and environmental monitoring activities should not be included.	Chapter 2, Section 2.7, Sub Section 2.7.1 & 2.7.2, Page 30	This has been incorporated.
4	Chapter 3, Section 3.1, Line 115, Page 33	All documents and reports reviewed should be listed out with their titles and year of publication.	Chapter 4, Section 4.1, Line 127, Page 47	This has been incorporated.



S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
5	Chapter 3, Section 3.2, Line 117 & 118, Page 33	Core area is associated with high magnitude impacts whereas surrounding area is associated with medium/low magnitude impacts as spill-over effects of those that occur within the core area.	Chapter 4, Section 4.2, Line 130, 131 & 132, Pages 47 & 48	This has been incorporated.
6		Why water samples were collected by the IEE study team for potability tests based on NDWQS is not clear.		Collection of water sample is a part of collection of baseline information. Hence, during field study, water sampling is done to monitor the existing water quality with respect to NDWQS as per GoN.
7	Chapter 3, Section 3.3, Sub Section 3.3.1, Line 120, Page 34	For collection of baseline information, use of a Simple Interaction Matrix, which utilizes mutual interaction between activity and environmental component, instead of a Simple Checklist would be a more convenient and effective.	Chapter 4, Section 4.3, Sub Section 4.3.1, Line 135, Page 50	This will be considered in other projects.
8	Chapter 3, Section 3.3, Sub Section 3.3.1, Page 34 Chapter 3, Section 3.6, Page 36	Methods used to quantify identified impacts (adverse) on physical environment, if any, should have been mentioned as well.	Chapter 4, Section 4.3, Sub Section 4.3.1, Line 138, Page 50 Chapter 4, Section 4.6, Line 145 & 146, Page 51 & 52	This has been incorporated.
9	Chapter 5, Section 5.1, Sub Section 5.1.1, Line 152, Page 56	Information given is about location of the project site rather than topography and landform of the area.	Chapter 5, Section 5.1, Sub Section 5.1.1, Line 153, Page 54	This has been incorporated.
10	Chapter 5, Section 5.1, Sub Section 5.1.3, Line 154, Page 56	Will it be possible to present percentage distribution of various land uses within the core area if not for the entire project area?	Chapter 5, Section 5.1, Sub Section 5.1.3, Line 155, Page 54	This has been incorporated.

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
11	Chapter 5, Sub Section 5.1.6, Page 57	What are the anthropogenic sources of water pollution?	Chapter 5, Sub Section 5.1.6, Line 162, Page 55	This has been incorporated.
12	Chapter 2, Sub Section 2.8.1, Page 31	Effort to associate anticipated adverse impacts with some construction activities is good. The detailed activities given here should have featured in section 2.8.1 as well.	Chapter 2, Sub Section 2.7.1, Page 30	This has been incorporated.
13	Chapter 7, Sub Section 7.2.1.2 g), Line 283 & 284, Pages 82 & 83	Impact on land use could have been quantified based on land area requirement for various project structures/components given in section 2.6 (a)	Chapter 7, Sub Section 7.2.1.2 g), Line 300, Page 81	This has been incorporated.
14	Chapter 8, Section 8.1, Sub Section 8.1.1.2 c), Line 350, Page 94	National Ambient Air Quality Standards (NAAQS) is not emission standard!! What would be the methods/equipment to be used for measuring ambient concentration of particulate matter?	Chapter 8, Section 8.1, Sub Section 8.1.1.2 c), Line 366, Page 91	This has been incorporated.
15	Chapter 8, Section 8.1, Sub Section 8.1.1.2 d), Line 351, Page 94	National Noise Standard Guideline, 2012 is for ambient noise level standards and not for noise emission standards. Please check and confirm.	Chapter 8, Section 8.1, Sub Section 8.1.1.2 d), Line 367, Page 91	This has been incorporated.
16	Chapter 8, Section 8.1, Sub Section 8.1.1.2 e), Line 352, Page 95	How environmentally safe final disposal of bio-degradable solid waste will be undertaken is not clear.	Chapter 8, Section 8.1, Sub Section 8.1.1.2 e), Line 368, Page 91 & 92	This has been incorporated.
17	Chapter 8, Section 8.1, Sub Section 8.1.3.2 b), Line 363, 1 <sup>st</sup> & 2 <sup>nd</sup> Bullet, Page 99	It is not clear as to whether there has been an understanding/agreement with the Municipality office for final disposal of raw sludge, supposedly produced by the water treatment plant, in the municipal landfill, if one exists at all. Use of raw sludge, which primarily comprises inert matter, for agriculture won't be a good idea.	Chapter 8, Section 8.1, Sub Section 8.1.3.2 b), Line 379, 1 <sup>st</sup> Bullet, Page 95	This has been incorporated.
<b>C. Comments by MoWS</b>				
1.	Cover Page	Add name of province in cover page.	Cover Page	This has been incorporated.



S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
2.	Executive Summary and Annex 3	In bullet 24 d of English executive summary as well as Nepali executive summary, correct the date of notice publication, likewise in the same paragraph it seems like notice has pasted prior publication but as per annex it was pasted on same day and on another day, so correct it.	Executive Summary and Annex 3	The public notice for Deurali Hupsekot WSSP was given to the newspaper for publication for the date 2076/08/02. Similarly, the notice for Panchkhal WSSP was scheduled for the date 2076/08/04. However, the newspaper published both of the public notice at the same date i.e., 2076/08/04 without updating the date in the notice of Deurali Hupsekot. Hence, it is a print mistake.
3.	Executive Summary and कार्यकारी सारांश	Make consistency in Nepali and English executive summary.	Executive Summary and कार्यकारी सारांश	This has been incorporated.
4.	कार्यकारी सारांश, Page xxiv and Executive Summary Page xv	Mention about 3644 connections in 16 bullet of Nepali executive summary as per English executive summary.	कार्यकारी सारांश, Page xxiv and Executive Summary xiv	This has been incorporated.
5.	Chapter 2, Section 2.2, Line 24, Page 8	In 2.2, as proposed project is an extension of the existing one, elaborate more about existing system.	Chapter 2, Section 2.2, Line 24, Page 7 & 8	This has been incorporated.
6.	Chapter 2, Section 2.3, Table 2-III, Pages 10 & 11	In table 2-III, salient feature, remove 3 <sup>rd</sup> bullet, study level, likewise add impact area and include ward no. 5, Girubari, in same table 8a, number of HHs connection-3652 and institutional connections-39 has been mentioned, but in executive summary it is 3644	Chapter 2, Section 2.3, Table 2-III, Pages 10 & 11	This has been incorporated.

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant	
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks
		including institutional connection, correct it.		
7.	Chapter 2, Section 2.3, Table 2-III S No. 8a), 9 & 10, Pages 11 & 12	In table 2-III, mention about access road-5m along with its width, include depth of trench, cut and fill volume of spoil, river crossings, road crossings (if any)	Chapter 2, Section 2.3, Table 2-III S No. 8a), 9 & 10, Pages 11 & 12	This has been incorporated.
8.	Chapter 2, Section 2.4, Sub Section 2.4.1, Line 32, Page 13	In bullet 32, 3 <sup>rd</sup> line add a word 'respectively'.	Chapter 2, Section 2.4, Sub Section 2.4.1, Line 32, Page 13	This has been incorporated.
9.	Chapter 2, Section 2.6 a), Line 93, Page 25 Chapter 2, Sub Section 2.6.1, Table 2-VI-D, Page 25 & 26	In table 2-VI, mention clearly about ownership-GoN, barren land, whether the proposed project requires forest area or not should be clear. Mention the land in total, also mention about temporary requirement of land for campsite and stockpiling site along with its ownership.	Chapter 2, Sub Section 2.6.1, Line 93, Page 23 Chapter 2, Sub Section 2.6.1, Table 2-VI-D, Page 25	This has been incorporated.
10.	Chapter 2, Section 2.6, h), Line 103, Page 28	In bullet 103, landfill site has been mentioned, if it is so the information about landfill site of town is missing in baseline environment, as per baseline it seems like there is no landfill site in project district, then the information of bullet 103 needs to be corrected.	Chapter 2, Section 2.6, Sub Section 2.6.8, Line 103, Page 28	This has been incorporated.
11.	Chapter 2, Sub Section 2.8.1, Line 110, Page 31	In 2.8.1, construction activities section, add about toilets and SWM component of sanitation.	Chapter 2, Sub Section 2.7.1, Line 105, Page 30	This has been incorporated.
12.	Chapter 2, Section 2.7, Page 29 Chapter 3, Section 3.2, Page 33	Merge 2.7, project impact area and 3.2, impact area delineation	Chapter 4, Section 4.2, Pages 47 & 48	This has been merged and kept in Chapter 4.



Chapter/ Section/ Page		Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change	
				Remarks	
13.	<ul style="list-style-type: none"> <li>Chapter 3, Sub Section 3.3.3, Line 125, Page 35</li> <li>Chapter 3, Section 3.4, Page 35</li> <li>Chapter 3, Section 3.5, Line 127, Page 36</li> </ul>	<p>Correct word as 'focus' on bullet 125, in bullet 126 correct the date of notice publication as 2076/08/02. After bullet 127, deed of inquiry section, mention about recommendation letter collection from Hupsekot Rural Municipality.</p>	<ul style="list-style-type: none"> <li>Chapter 4, Section 4.3, Sub Section 4.3.3, Line 141, Page 51</li> <li>Chapter 4, Section 4.4, Line 142, Page 51</li> <li>Chapter 4, Section 4.5, Line 144, Page 51</li> </ul>	<p>This has been incorporated. Regarding the date of public notice, the public notice was given to the magazine to get it published on 2076/08/02. However, the magazine published it on 2076/08/04 without updating the date. Hence, the actual publication date is 2076/08/04. For confirmation, full page of newspaper in which the notice has been published, has been attached herewith.</p>	
14.	<ul style="list-style-type: none"> <li>Chapter 4, Section 4.1, Page 38</li> <li>Chapter 4, Section 4.1, Page 38</li> <li>Chapter 4, Section 4.1, Table 4-I, Pages 40 to 47</li> <li>Chapter 4, Section 4.1, Table 4-I, S No. 2, 5<sup>th</sup> Row, Page 44</li> </ul>	<p>Shift plan and policy after constitution, add Environment Protection Act, 2076, if forest area is needed for this project then only forest related legislations are relevant, correct the date of land acquisition act, 2034. If the proposed project requires forest area, then review Work Procedure with standard for the use of national forest area by national priority projects, 2076.</p>	<ul style="list-style-type: none"> <li>Chapter 3, Section 3.1 &amp; 3.2, Page 31</li> <li>Chapter 3, Section 3.2, Sub Section 3.2.1, Page 31</li> <li>Chapter 3, Section 3.2, Sub Section 3.2.2, Table 3-I, Pages 32 to 39</li> <li>Chapter 3, Section 3.2, Table 3-I, S No. 2, 5<sup>th</sup> Row, Page 36</li> </ul>	<ul style="list-style-type: none"> <li>The date of EPA is 2075 instead of 2076 and this has been incorporated. Along with this, other comments are also incorporated.</li> <li>The proposed project does not require forest area; hence, there is no need to review "Work Procedure with standard for the use of national forest area by national priority</li> </ul>	

Ministry of Water Supply  
Kathmandu

29/08/2021

S.N.	Chapter/ Section/ Page	Comment/Suggestions	Response from Consultant		
			In chapter/ section/ paragraph no. / page no.	Description of change Remarks	
15.	Chapter 4, Section 4.4, Sub Section 4.4.2, Table 4-VIII, Page 55	Revisit the formatting of table 4-VIII.		projects, 2076".	
16.	Chapter 5, Section 5.1, Sub Section 5.1.3, Line 154, Page 56	In bullet 154, no specific data regarding land use pattern has been mentioned, why is it so? What about Rural Municipality Profile or data from field visit?	Chapter 5, Section 5.1, Sub Section 5.1.3, Line 155, Page 54	This has been incorporated.	
17	Chapter 5, Section 5.1, Sub Section 5.1.9, Line 163, Page 57	In bullet 163, no record of occurrence of landslide has been mentioned which contradicts with bullet number 9 of executive summary, where possibility of landslide at Girubari Khola Gravity System has been mentioned due to which sump well is taken as an option, clarify.	Chapter 5, Section 5.1, Sub Section 5.1.9, Line 165, Page 55	This has been incorporated.	
18.	Chapter 5, Section 5.3	Add about water use right and downstream water users in existing socioeconomic environment.	Chapter 5, Section 5.3, Sub Section 5.3.7, Lines 229 & 230, Page 70	This has been incorporated.	
19.	Chapter 8, Section 8.1, Sub Section 8.1.2.2 i), Line 356, Page 96	Mention about final disposal of waste in bullet 356.	Chapter 8, Section 8.1, Sub Section 8.1.1.2 i), Line 372, Last Bullet, Page 93	This has been incorporated.	
20.	Chapter 8, Section 8.1, Sub Section 8.1.4.2 b), Line 369, Page 100	Mention latest labor act in bullet 369.	Chapter 8, Section 8.1, Sub Section 8.1.4.2 b), Line 385, Page 96	This has been incorporated.	
<b>D. Beside these comments, some other changes within the report were made as per the report requirement that was felt necessary during the report incorporation.</b>					



