

# Updated Initial Environmental Examination

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## NEP: Third Small Towns Water Supply and Sanitation Sector Project —Bardghat (Nawalparasi District)

Prepared by ITECO Nepal (P) Ltd., SILT Consultants (P) Ltd., and Unique Engineering Consultancy (P) Ltd. for the Government of Nepal and the Asian Development Bank.

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**Project Management Office (PMO)**  
Panipokhari, Maharajgunj, Kathmandu, Nepal



**Enhance Functionality in Small Towns Water Supply and Sanitation  
Sector Project (STWSSSP)**

**Updated Initial Environmental Examination Report (IEE)**

**for**

**Bardghat Small Towns Water Supply and Sanitation Sector Project  
Nawalparasi District**



*Kathmandu, July 2015*

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**Abbreviations**

°C	: Degree Centigrade
ADB	: Asian Development Bank
CBD	: Convention of Biological Diversity
CITES	: Convention on International Trade in Endangered Species of wild Fauna and Flora
cum	: Cubic Meter
DSC	: Design and Supervision Consultant
DWSO	: District Water Supply Office
DWSS	: Department of water Supply and Sewerage
EA	: Environmental Assessment
EARF	: Environmental Assessment Regional Office
EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
EPA	: Environmental Protection Act
EPR	: Environment Protection Regulations
GoN	: Government of Nepal
HHE	: Health and Hygiene Education Programs
HRF	: Horizontal Roughing Filter
IEE	: Initial Environmental Examination
JICA	: Japanese International Cooperation Agency
km	: Kilometer
BWSSSP	: Bardhaghat Water Supply and Sanitation Sub-Project
LGs	: Local Governments
lpd	: Liter per day
lps	: Liter per second
m	: Meter
MDG	: Millennium Development Goals
MOWR	: Ministry of Water Resources
MPPH	: Ministry of Physical Planning and Housing
MPPW	: Ministry of Physical Planning and Works
MoSTE	: Ministry of Science, Technology and Environment
NGO	: Non-Government Organization
NDWQS	: National Drinking Water Quality Standard
NPC	: National Planning Commission
NRs.	: Nepalese Rupees
O&M	: Operation and Maintenance
PAC	: Public Awareness Campaign
PCO	: Public Call Office
PF	: Pressure Filter
Pop.	: Population
PRA	: Participatory Rural Appraisal
PMO	: Project Management Office
RRA	: Rapid Rural Appraisal
RPMO	: Regional Project Management Office
SPSO	: Sub-Project Site Office
SSF	: Slow Sand Filter
SPS	: Safeguard Policy Statement
STWSSSP	: Small Town Water Supply and Sanitation Sector Project
TDF	: Town Development Fund
VDC	: Village Development Committee

WHO	:	World Health Organization
WSUC	:	Water Supply Users' Committee
WUSC	:	Water Users and Sanitation Committee



## **EXECUTIVE SUMMARY**

### **General**

The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will support the government of Nepal (the Government) in improving water supply and sanitation facilities and services to 24 small towns in Nepal. Out of the 265 small towns in Nepal, Asian Development Bank (ADB) has already supported the Government, through successful implementation of earlier two projects in 50 towns. These include the 24 project for enhancement.

The outcome will be inclusive and sustainable water supply and sanitation service delivery in this Bardaghat small town of Nepal. The project will implement improvements/ rehabilitation works within the service area of already completed project. There will be minor civil works necessary for the enhancement of the components without changing the original technical and social concepts.

The Project will be implemented in 6 months period starting around first week of November, 2015.

The project will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Urban Development and the implementing agency is the Department of Water Supply and Sanitation (DWSS).

The sub project IEE report was approved by government of Nepal in 2005. Now the sub project is envisaged to undergo for rehabilitation of project components such as, intake treatment plant, transmission main and distribution line etc. The proposed updated IEE is prepared as an integral part of bid document. However consultant has updated the contents of IEE report already approved from government of Nepal.

This updated IEE Report summarizes anticipated impacts and corresponding mitigation measures, monitoring and also includes cost and time frame for implementation.

In this report, all the policy, legal and administrative framework requirements of ADB including ADB Safeguard Policy and the prevailing GoN Acts/rules & regulations have been considered.

### **Categorization**

Bardaghat town subproject is classified as Environmental Category B as per the SPS as no significant impacts are envisioned. Accordingly this updated Initial Environmental Examination (IEE) has been prepared and assesses the environmental impacts and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

### **Subproject Scope**

The subproject is formulated under the 3STWSSSP to improve water supply and sanitation service delivery in the existing Bardaghat water supply and sanitation project constructed during STWSSP 1. Investments under this subproject includes; (i) rehabilitation of a piped water supply system including intake, water treatment plant, transmission main, and distribution main.

### **Implementation Arrangements**

The Ministry of Urban Development is the executing agency. The Department of Water Supply and Sewerage (DWSS) is the implementing agency. Implementation activities will be overseen by a separate Project Management Office (PMO) which will be established in DWSS head office in Kathmandu and two Regional Project Management Offices (RPMOs) in the eastern and western region. A team of technical, administrative and financial officials, including safeguards specialists, will be provided at the PMO to implement, manage and monitor project implementation activities. The RPMOs will be staffed by qualified and experienced officers and will be responsible for the day-to-day activities of project implementation in the field, and will be under the direct administrative control of the PMO. Consultant teams are responsible for subproject planning and management and assuring technical quality of design and construction; and designing the infrastructure and supervising construction; and safeguards preparation.

### **Description of the Environment**

Subproject components are located in Bardaghattown area and in its immediate surroundings. There is no presence of natural habitat in this project area. The project components will be located in

WUSC sites, public road rights-of-way (ROW) and outside the community managed forest and the protected areas. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject locations.

### **Environmental Management**

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

Locations and sitting of the infrastructures were considered in the existing sub-project to further reduce impacts. The concepts considered in design of the subproject are: (i) demand for new piped water supply; (ii) maximum population coverage with pipe layout mostly in residential areas and areas of high growth rate; (iii) avoidance of water-use conflicts; (iv) locating pipelines within ROWs to reduce acquisition of land; (v) locating pipelines at least 10 meters from latrines, septic tanks and any main drains to avoid contamination; (vi) locating Intake point 30 m upstream from sanitation facilities; (vii) locating household and public latrines and septic tanks at least 30 meters downstream from the nearest drinking water source; (viii) piloting controlled disposal of septage in accordance to WHO and US EPA standards to reduce the likelihood of uncontrolled disposal as currently practiced; and (ix) ensuring all planning and design interventions and decisions were made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

During the construction phase, impacts mainly arise from the need to dispose of moderate quantities of waste soil; and from the disturbance of residents, businesses, and traffic. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed. Traffic management will be necessary during pipe-laying on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

### **Mitigation Measures**

Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to be conducted during construction. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB and DWSS websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

The project was launched to serve ward no. 4 of Makar VDC. But now the service area lies in newly formed Bardghat Municipality. According to financial appraisal report of TDF the project was designed to serve a total population of 12,115 in base year 2008 and 20,285 in the design year 2022. Bardghat is an emerging town and the economy of the service area is shifting from rural economy to commercial and service based.

The sub-project under construction is a rehabilitation project and the mitigation measures recommended in the approved IEE in 2006 have already been successfully implemented. During the

updated IEE preparation process, all of the process mentioned above have been checked and followed. The design report has incorporated the recommended mitigation measures.

During construction phase, there are no major environmental impacts in the enhancement project. However there are minor impacts like landslide and soil erosion, impact of vegetation, chemical contamination, air and noise pollution during construction, traffic disturbances and some disturbances in household water supply distribution. In order to minimize the impacts, specific arrangements have been made in the design and incorporated in the specification of work. The contractor is responsible to follow all the instruction given by the DSC and agreed specifications.

During operational phase also, there will be no significant impacts. However there may be minor impact on water right conflict (tap distribution) and occupational health and safety of workers. These issues will be addressed by and will be the responsibility of WUSC.

### **Consultation, Disclosure and Grievance Redress**

Public consultations were done in the preparation of the project and IEE and throughout the project implementation period of the completed project.

During the preparation of this enhancement project and updated IEE, Public consultations were done at different phases. The first consultation was done during survey and design period. Further consultation was made with the stakeholders at project site after the project design report was approved.

The consultation was focused on environmental impacts, resettlement, social issues, relocation and compensation issues.

### **Monitoring and Reporting**

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

### **Conclusions and Recommendations**

The proposed subproject is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category "B" is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

## **1. INTRODUCTION**

### **1.1 BACKGROUND**

1. The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will support the government of Nepal (the Government) in improving water supply and sanitation facilities and services to 24 small towns in Nepal. Out of the 265 small towns in Nepal, Asian Development Bank (ADB) has already supported the Government, through successful implementation of earlier two projects in 50 towns. These include the 24 project for enhancement.

2. The Enhance Functionality in Small Towns Water Supply and Sanitation Sector Project (STWSSSP) will be implemented in 6 months period starting around first week of October, 2015 and will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Urban Development and the implementing agency is the Department of Water Supply and Sanitation (DWSS).

3. The outcome will be inclusive and sustainable water supply and sanitation service delivery in selected small towns in Nepal. The project will implement improvements/rehabilitation works within the service area of already completed 24 projects. There will be minor civil works necessary for the enhancement of the components without changing the original technical and social concepts.

### **1.2 OBJECTIVES OF IEE**

4. The updated IEE summarizes anticipated impacts and corresponding mitigation measures, monitoring and also includes cost and time frame for implementation.

### **1.3 RATIONAL OF IEE REQUIREMENT**

5. The sub project IEE report was approved by government of Nepal in 2005. Now the sub project is envisaged to undergo for rehabilitation of project components such as, treatment plant (specific area) of transmission and distribution line etc. The proposed IEE is prepared as an integral part of bid document. However consultant has updated the contents of IEE report already approved from government of Nepal.

### **Methodology Used in Preparing IEE**

- In the process of preparation of EMP, an extensive review of approved IEE and feasibility reports reviewed with some field based information
- Public consultations were held in the entire process of IEE study and during the disclosure of the draft IEE report to the local people. These processes have taken place and the results were documented. The involvement of the local people in EMP implementation activities have been recommended in EMP, 2000. Accordingly, in the process of EMP implementation, the following mechanism has been adopted to involve the local people in EMP activity:
  - Public Consultation and Involvement have been given highest priority in the implementation of Mitigation measures carried out by EMP; initially prior to the implementation, public consultation usually takes place and on the basis of decision of the consultation meeting, implementation of mitigation measures are being prioritized and carried out with the involvement of local people.
  - Monitoring is another component of EMP. Monitoring of Physical, Biological and Socio-economic components of Environment of the project is being carried out. In the process of compliance monitoring of the project construction, local people and construction workers are being involved and consulted

## 2. POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK

### 2.1 ADB POLICY

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

### 2.2 ADB SAFEGUARDS POLICY

7. ADB's environmental safeguards policy principles are defined in SPS, 2009, Safeguard Requirements<sup>1</sup> and the IEE is intended to meet these requirements, Table 2-1.

**Table 2-1: ADB SPS, 2009 Safeguard Requirements 1: Environment**

SPS 2009 - Safeguard Requirements	Remarks
Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment (EA) so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	REA has been undertaken (Annex A), indicating that subproject is NOT: (i) environmentally critical; and (ii) adjacent to or within environmentally sensitive/critical area.
SPS 2009 - Safeguard Requirements	Secondary influence areas. Significant adverse impacts during construction will be temporary and short-term, can be mitigated without difficulty. There is no adverse impact during operation. Hence, IEE is sufficient. The IEE including specific description of the environment and corridor of impact will be updated as necessary based on the final design and alignments.
Conduct EA to identify potential direct, indirect, cumulative, & induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary global impacts, including climate change.	IEE has been undertaken to meet this requirement. (Section VI). No transboundary & global impacts, including climate change.

<sup>1</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>

SPS 2009 - Safeguard Requirements	Remarks
Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.	Analysis of "with-subproject" or "without subproject" is presented in Section III.
Avoid, and where avoidance is not possible, minimize, mitigate, &/or offset adverse impacts and enhance positive impacts by means of environmental planning & management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.	An EMP has been prepared to address this requirement. Section IX
Carry out meaningful consultation with affected people & facilitate their informed participation. Ensure women's participation. Involve stakeholders, including affected people & concerned NGOs, early in the project preparation process & ensure that their views & concerns are made known to & understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to EA. Establish a GRM to receive & facilitate resolution of affected people's concerns & grievances on project's environmental performance.	Key informant and random interviews have been conducted (Annex C). A grievance redress mechanism for the resolution of valid project-related social and environmental issues/concerns is presented in Section VIII.
Disclose a draft IEE (including the EMP) in a timely manner, before project appraisal, in an accessible place & in a form & language(s) understandable to affected people & other stakeholders. Disclose the final EA, & its updates if any, to affected people & other stakeholders.	The draft IEE will be disclosed on ADB's website prior to project appraisal. Copies of both SPS- compliant IEE and Government of Nepal- approved IEE will be made available at the offices of the PMO, Project Implementation Support Unit (PISU) and Water Users' and Sanitation Committee (WUSC) for public consultation. For the benefit of the community, the summary of the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB

SPS 2009 - Safeguard Requirements	Remarks
Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	EMP implementation, reporting and disclosure of monitoring reports are in this IEE.
Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	The subproject does not encroach into areas of critical habitats.
Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	This requirement is only minimally applicable to the subproject in the aspect of waste generation, e.g., effluent from septic tanks and generated sludge and sludge disposal from water supply and sanitation structures. The subproject will not involve hazardous materials subject to international bans/phase outs.
Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities	EMP provides measures to mitigate health and safety hazards during construction and operation.

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 environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation	The subproject will not affect any physical cultural resource. The EMP recommends the measure/s to mitigate adverse impact on physical cultural resources (PCRs) in case of chance find.

### 2.3 NEPAL'S ENVIRONMENTAL POLICY AND LEGAL FRAMEWORK

8. The Interim Constitution of Nepal, 2007 defines the right to live in clean environment as one of the fundamental rights of its citizens (Article 16). It prescribes for the State to give priority to the protection of the environment and prevention of its further damage due to physical development activities (Clause 5 of Article 35). Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislation that provides the framework within which environmental assessment is carried out in Nepal is the:

- Environmental Protection Act (EPA), 1997, requires a proponent to undertake IEE or EIA of the proposed project and have the IEE or EIA report approved by the concerned sector agency or Ministry of Science, Technology and Environment (MoSTE), respectively, prior to implementation. The EPA: (i) sets out the review and approval process of IEE and EIA reports, that involve informing and consulting stakeholders; (ii) stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards; (iii) specifies for the Ministry in charge of environment (currently the MoSTE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA report; (iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and (v) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.
- Environmental Protection Rules (EPR), 1997, and its amendments in 1999 and 2007. Defines the implementing rule and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedules 1 and 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007.
- Other environmental and core labor policies, laws and rules that are relevant to the subproject are presented in Table 2-2.



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

Policy/Law/Guideline	Year	RelevantProvisions	Remarks
Resources Act	1992	Comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of IEE & preparation of IEE Report before granting license to use water resources for any purpose.	Governmentof Nepal environmental assessment report will be prepared based on this IEE.
		Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4).	The source is groundwater to be drawn from the deep aquifer. Prevailing water source is the shallow aquifer and water drawn has Mn, Fe, Al and coliform levels exceeding National Drinking Water Quality Standard (NDWQS). Hence, people are eager to be connected to piped water supply system.
		Article 17 requires proponents to apply for any necessary land acquisition accordingly;	Site for the intake well, treatment unit, overhead tank is government land (Dept. of Forest).
		Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	Environmental Management Plan prescribes the compliance with NDWQS and its Directives during operation.
Labor Act	1992	Chapter 5 stipulates health and safety provisions at work places, keeping work premises clean and safe, e.g., (i) with provisions for solid waste, sewage and hazardous substance management; (ii) instituting measures to prevent dust, fumes and other impure materials that would adversely affect health; (iii) with supply of potable water and water for emergency situations; (iv) with arrangements for the use of protective devices and wears; (v) with fire safety arrangements; and (vi) measures for protection from hazardous machines/equipment and from physical injury or harm from lifting of heavy weights.	EMP provides measures to mitigate workers' health and safety hazards.

Policy/Law/Guideline	Year	RelevantProvisions	Remarks
Forest Act	1993	The Act prohibits the extraction of boulders, rocks, pebbles, sand or coil from national forests, defined as all forests, excluding private forests, whether marked or unmarked with forest boundary, to include waste or uncultivated lands, or unregistered lands surrounded by the forest or situated near adjacent forests as well as paths, streams rivers, lakes, riverine lands within the forest.	Subproject will not impact on any forest. EMP stipulates no illegal quarrying of natural aggregate materials.
NationalEnvironmental Policy and Action Plan (NEPAP)	1993	Of its five objectives, most relevant to the Project are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity, within & outside protected areas.	Subproject will not impact on physical cultural heritage & biodiversity. EMP provides measures to mitigate impacts.
National Water Supply and Sanitation Policy	1998	The Policy requires the: (i) monitoring of water quality supplied by completed WSS projects; and (ii) evaluation of their benefits in improving health (e.g., reducing water-borne diseases) and in relieving the sufferings of women and other disadvantaged groups in carrying out their responsibilities over water collection and maintenance of sanitation and hygiene.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Drinking Water Rules	1998	The Rules: (i) gives the procedure for the settlement of dispute on use of water sources; (ii) requires water supplier to maintain the quality of water as prescribed in the Water Resources Act; (iii) prohibits water supplier to construct structures and conduct activities that would pollute the water source and cause significant adverse effect on the environment.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Local Self-Governance Act	1999	The Act gives Local Government the functions, duties & powers to: (i) conserve & protect their local environment & natural resources; (ii) plan, implement &/or operate & maintain local WS projects; (iii) implement or arrange for implementation local sanitation/sewerage & drainage projects; (iv) protect cultural heritage & religious sites; &/or (v) monitor project activities within their respective jurisdictions.	Provides basis for Local Government to monitor the environmental performance of the subprojects. EMP provides the responsibilities of Local Governments (LGs) in EMP implementation.

Policy/Law/Guideline	Year	RelevantProvisions	Remarks
National Urban Policy	2007	Policy gives importance to environment conservation while carrying out urban development works and natural resource use; thus, supporting the required environmental conservation and protection in donor-assisted development projects.	Government of Nepal Government of Nepal environmental assessment report, based on this IEE, will be prepared to ensure environmental conservation and protection.
National Urban Water Supply and Sanitation Sector Policy	2008	The Policy requires the IEE or EIA of proposed WSS projects in accordance with the EPA/EPR to: (i) incorporate consultations with key stakeholders, including end-point users; & (ii) specify measures to mitigate environmental impacts prior to, during construction & operation, as well as corrective measures.	Government of Nepal environmental assessment report will be prepared based on this IEE. This ADB IEE will be submitted to ADB for review and approval.
Implementation Directives for the National Drinking Water Quality Standards	2005	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Updated 15-Yr Development Plan for Small Towns Water Supply and Sanitation Sector	2009	The Plan defines the population threshold of “small towns” to be in the range of 5,000 to 40,000. Reference to Schedules 1 and 2 of the EPR, as amended in 2007, places water supply projects in small towns under Schedule 1 or within the threshold of water supply projects requiring only an IEE. The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes environmental effects and performance monitoring.
Solid Waste Management Act	2011	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco- friendly management of solid and hazardous wastes.

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

10. Nepal is party to the following international environmental agreements that have broad relevance to works and environmental assessment of works under the project: (i) World Heritage Convention, in 1978; (ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), in 1987; (iii) Convention on Biodiversity, in 1992, (iv) Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol and subsequent London Amendment, in 1994, and (v) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, in 1996.

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

### **3. ANALYSIS OF ALTERNATIVES**

#### **3.1 ALTERNATIVES CONSIDERED IN THE APPROVED IEE REPORT 2006**

12. A number of alternatives are identified and analyzed for the proposed water supply and sanitation project. Alternatives regarding the sources, available technologies, sittings of different system components, service levels, period of construction etc. are taken into consideration. Analysis for no action scenario has also been dealt to signal out the importance of the proposed project. The alternative listed below provides a basis for taking decision on whether the proposal should move forward for implementation to the project stakeholders.

##### **3.1.1 No Action**

13. It is assumed that the proposed water supply and sanitation project will not be considered for implementation and the ever-increasing demand on water will be managed by the existing system. In this scenario the water supply service levels will further degrade over the existing situation in years to come as the capacity of the present system is already insufficient to serve the present population of the proposed area. Likewise, sanitation situation in the service area will not improve and be a source of water pollution converting the place more unhygienic, to living than today.

14. These consequences led local people in favor of implementing water supply and sanitation project by contributing some amount of their capital in project construction with full operation and maintenance responsibilities.

##### **3.1.2 Alternative Sources of Water**

15. During the feasibility study stage, assessment of the existing water supply system and prospects for water augmentation through its improvement were looked upon before exploring other possible and cost effective feasible sources. Two different Alternatives were identified and studied. From feasibility study level with environmental appraisal and screening of all the identified sources, it is found that Alternative — A. comprising scheme I adopting existing gravity system and scheme H extracting ground water with new pumping system was found to be the best alternative. The selected alternative was found to be the best in terms of the size of the investment, operation and maintenance, level of tariff, reliability, continuity, source status, discharge, water quality, stability of site and land use and land acquisition including social and environmental ground. Hence, the detailed engineering survey, design and other studies, including environmental studies required for investment have been carried out in concurrence with the community representatives and project personnel.

##### **3.1.3 Choice of Technology**

16. Alternatives from gravity-fed river source to ground water pumping type water supply systems were identified. Based on initial investment required, water quality and treatment facilities required, safe yield of sources, availability of land for components to be constructed and choice of the WUSC etc., existing gravity water supply as well as ground water extraction by pumping system for scheme I and II respectively under Alternative —A1 was recommended for implementation. An appropriate and locally available and labor based technology with minimum or no use of equipment and machineries, for construction of the project will be adopted. Actually, both gravity and groundwater pumping system was chosen based on technical, economical and environmental grounds.

##### **3.1.4 Water Supply Service Levels**

17. Alternatives based on different water service levels ranging from the intermittent to continuous supply, untreated to treated water, per capita daily water supply, house connection facilities to private, yard and community taps, metered and un-metered supply system, progressive to flat tariff rates etc were analyzed and discussed with the consumers before finalizing the mode of water supply service levels. Finally, the water supply service levels was Fixed to provide treated water ensuring per capita daily volume of water on progressive tariff rate basis preferably with house connection facilities.

### **3.1.5 Sanitation**

18. Options on water-borne sewerage system. on-site sanitation system and toilets with septic tank and soak away pit were looked upon and were analyzed in terms of applicability, affordability, requirements, desired level of services by communities, level of pollutions and associated impacts on health and hygiene. Considering all factors, storm drainage facility on densely populated market area along both side of east-west highway and a public toilet with septic tank and soak away pit at Bus Park are taken into consideration for implementation.,

### **3.1.6 Period OF Construction**

19. Longer Period of time allocated for construction than required will no doubt 'increase the cost of construction. Thus, appropriate time for construction should be allocated. Based on the type of project, eighteen months of construction period has been recommended consulting all stakeholders associated with the project.

### **3.1.7 Choice of Alternative**

20. Based on alternative analysis, Alternative — A, consisting of scheme I (adopting existing gravity water supply system) and scheme II (newly proposed ground water pumping system) is found to be the best source amongst others considered for the study. The existing components of gravity water supply system is located at ward 9 of Makar VDC. The newly proposed ground water pumping system including associated structures is located at ward 4 of Maker VDC. The implementation modalities, which proposes for eighteen months of construction period with the assurance of supplying potable water based on daily per capita water demand combined with sanitation facilities is recommended amongst the alternative proposed.

## **3.2 ALTERNATIVES FOR THE UPDATED IEE**

21. The water supply system for the town of Bardaghat was constructed several years before under STWSSP 1, funded by ADB. The project is in operation at present. The WUSC is the operating agency. The project had anticipated a 24 hour service and water quality standards within the NDWQS. After a few years of operation, it was observed that this anticipation was not fulfilled due to some problems. The problems were observed both in technical as well as social and institutional field. Therefore some enhancement measures were necessary. This project is designed to cater for such enhancement works.

22. IEE had been carried out in accordance with the prevailing rules and regulations of ADB and the GoN incorporating the alternatives like “without –sub project or do nothing” and “with sub-project” was carried out in 2005.

23. As such, alternatives for the water supply project have not been studied in the design report.

#### **4. DESCRIPTION OF SUBPROJECT**

##### **4.1 THE STUDY AREA**

24. Bardghat town project is situated in Nawalparasi district of Lumbini Zone which in Western Development Region of Nepal. The project service area lies in newly formed Bardghat Municipality. Earlier it was a part of the Makar VDC (ward 4). Geographically the project area lies at 27°35'15" N latitude and 83°- 47'15" E longitude. The altitude of the area is 154m from mean sea level (MSL).

25. The East-West Highway connects the project area with other major cities of the country. The project area is at a distance of 25 km north from Parasi, the district headquartering of Nawalparasi. It is at a distance about 78 km west from Narayanghat and about 40 km east from Butwal. As the East West Highway passes through the project area, there is daily bus service from the Major towns of the country. The nearest airport is Bhairahawa, which is 61 km from the project area.

26. The climate of the project area is sub-tropical. The average maximum temperatures during summer fluctuates between 30° C & 42° C and the minimum temperature in winter season ranges from 6° C to 17° C. The relative humidity is in the range of 84 to 87 %. The average annual rainfall estimated at the range of 2360 to 2375 mm.

27. The project was initially launched to serve ward no. 4 of Makar VDC. But now the service area lies in newly formed Bardghat Municipality. According to financial appraisal report of TDF the project was designed to serve a total population of 12,115 in base year 2008 and 18,495 in the design year 2022. Bardghat is an emerging town and the economy of the service area is shifting from rural economy to commercial and service based. It is estimated that the design population for the year 2030 will be 22,360. Therefore the present enhancement project design population is taken as 15,229. The service area for this project remains the same.

28. The settlement patterns of the project area are of both dense and scattered types. The core project area, which includes mainly the bazaar area along both sides of the East-West Highway, is densely populated and the main economic activities carried out. Whereas semi-urban or rural settlements are in adjoining areas of the Bazaar, where the settlements are either moderately dense or scattered







**4.2 EXISTING CONDITION AND NEED FOR THE SUBPROJECT**

29. The sub-project includes the following works;

- i. Maintenance of 700 m<sup>3</sup> ground reservoir
- ii. One water treatment plant with PST facility and 6lps capacity
- iii. 4.9 km of pipe line laying
- iv. Construction of Chlorination unit
- v. One surface water intake consisting of infiltration gallery at source river

The technical details are shown in Table 4-1.

**4.2.1 General Information**

1. Name of the Project : Enhance Functionality in Small Town Water Supply and Sanitation Sector Project
2. Name of Sub-project : Bardghat Small Town Water Supply & Sanitation Project, Nawolparasi
3. Service Area of the Project : Ward no. 4 of Makar VDC Municipality.
4. Total Project Cost : NRs. 17,497,141

I. Water Supply Component : NRs. 17,497,141

**B. TECHNICAL INFORMATION**

Details of technical information are mentioned in Table 4-1.

**Table 4-1: Technical Details**

S. No.	Name of Structure	Existing	Additional	Total
1	No. and capacity of Reservoirs:	2(700cum)	None	2(700cum)
2	Treatment Facilities	1(6 lps, PST) Chlorination Unit	Chlorination Unit (Rehabilitation)	1(6 lps, PST) Chlorination Unit
3	Pipeline Length:			
3.1	Transmission	2.7 km	0.5 km	3.1 Km
3.2	Distribution	54 km	4.4 km	58.4 Km
3.3	Total	56.7 Km	4.9 Km	61.6 Kms
4	Guard House	2	None	2
5	Generator / Operator House	2	None	2
6	Chlorination Unit with lab	None	1	1
7	Office Building:	One	None	One
8	Surface Intake/Borehole Drilling	Surface Intake 2 TW 2	None, SS Rehab	4
9	Fire hydrant	four	None	None

Sr. No.	Description	Existing (2014)	Design year (2022)	Design year (2030)
10	Household connection	3,042	3,678	4,446
10.1	Fully plumbed	1,764	2,722	4,001
10.2	Yard connection	1,278	956	445
10.3	Community		4	5
10.4	Institutional	42	53	64
10.5	Total	3,084	3,735	4,515
11	Total Water Demand			
11.1	MLD	1.79	2.26	2.85
11.2	LPS	20.7	26.2	33

**C. SOCIO- ECONOMIC INFORMATION**

1. Total Household Number and Population (Pop.)
  - a) Present year (2014): 3,042/15,299
  - b) Design year (2022): 3,678/18,495

c) Design year (2030): 4,446/22,360

#### **D. FINANCIAL INFORMATION**

1. The financial planning for the enhancement project is as follows;

- i. Total investment 100%
- ii. Government: Grant 70%
- iii. WUSC Contribution: 5 – 10% of total investment as cash (% to be decided later)
- iv. TDF Loan: 20 – 25% of total investment to be provided to the WUSC (% to be decided later)

2. Weighted Average Tariff NRs 17per cum

3. Cost Per Capita and per household

Description	Base year 2014	Design Year 2022	Design Year 2030
Cost per Capita	1,143.68	946.05	782.52
Cost per House hold connection	5,751.85	4,757.24	3,935.48

#### **4.3 SUB PROJECT CONSTRUCTION SCHEDULE**

30. It is expected that the contract will be awarded by the last week of November 2015 and the construction work will be completed by the last week of May 2016. The detail of work is shown in Figure 4.2.

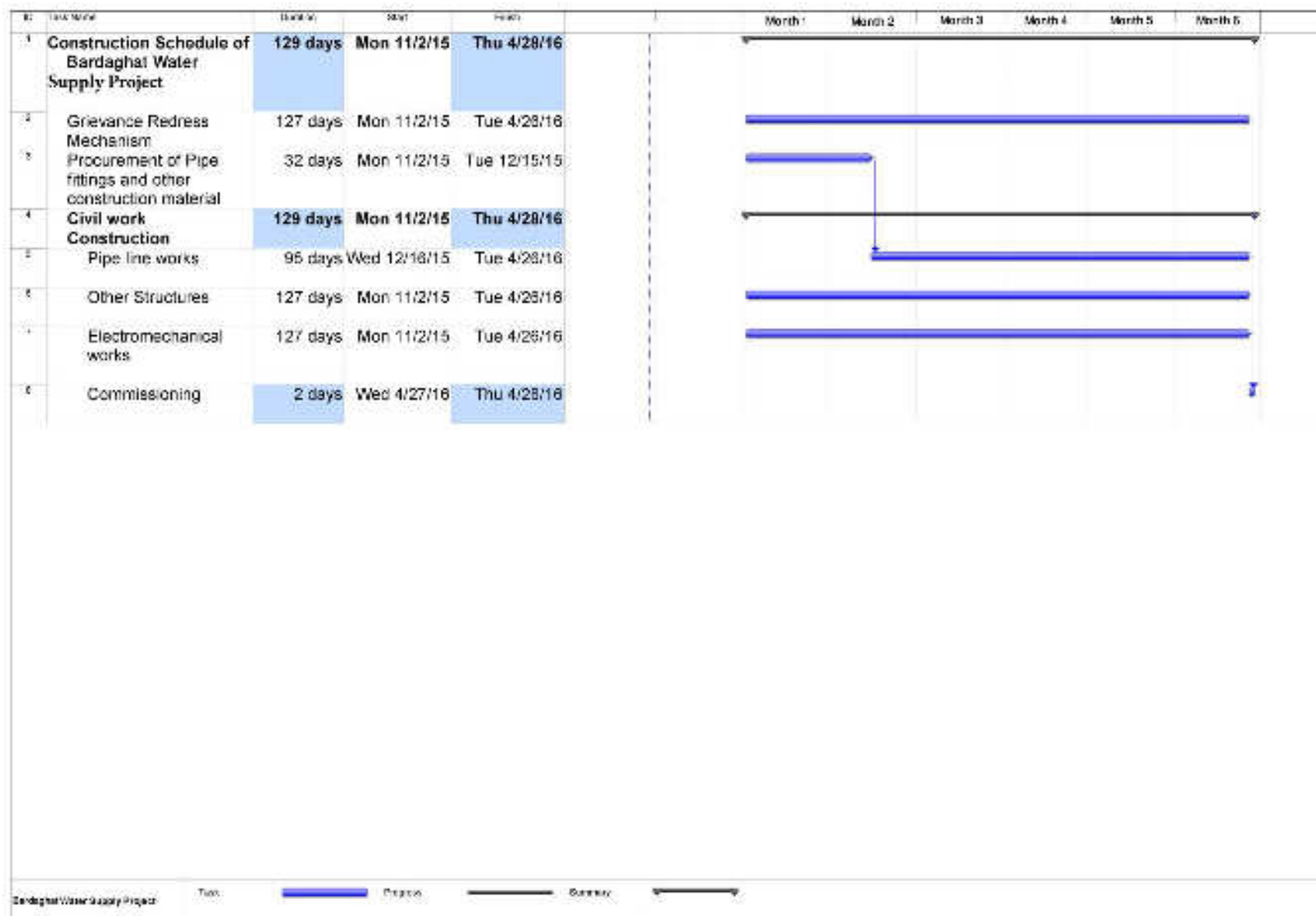


Figure 4-2: Construction Schedule

## **5. DESCRIPTION OF THE ENVIRONMENT**

### **5.1 PHYSICAL PROFILE**

#### **5.1.1 Topography**

31. Bardaghat is located at 27°-35'-15" N latitude and 83°-47'-15" E longitude and is situated in the northern part of terai in the central development region along the foothill of the Siwalik Range. The proposed water supply components covers both plain terai low land and gentle Siwalik hill slope. The project area is formed by the accumulation of gravel, boulders, stone and sand that are washed down from the foothill and constitutes boulder bed with hard formation of sandstones, conglomerates, pebble and clays. This is a Bhabar zone located above or north of spring line and consist of shallow to deep water level. Hydro-geologically, the western part of the district is less water retaining than the eastern.

#### **5.1.2 Land Use**

32. 65% of the population lives in core market area (dense settlement) situated along both sides of the East-West Highway where main economic activities are carried out. Agriculture settlement dominates the land use in the rural area. Rural settlements are along inner gravel roads in the north and south of highway posing scattered to moderate dense settlement pattern. Ward no. 9 in northern part of the Makar VDC constitutes forest and rangeland, where ThareKhola/Keraghari intake and two spring sources namely ChisapaniMul I & II are located,

#### **5.1.3 Drainage**

33. There is no proper surface drainage facilities established so far at Bardaghat. However, there exists 2 km long storm water drain mainly in the main market area. Since the project area is situated at flat terrain, the water logging in rainy season is encountered frequently. There is no perennial river system in and around the service area.

#### **5.1.4 Climate and Rainfall**

34. The climate of the project area is sub-tropical and temperature fluctuation in summer and winter ranges from 30°C to 42°C and 6°C to 17°C respectively. The relative humidity ranges from 84 to 87% with estimated average annual rainfall of 2360 - 2375mm. The maximum rain fall within 24 hours is noted to be 177-175mm.

#### **5.1.5 Landslide and Slope Stability**

35. The location of existing intake, reservoir, trunk transmission line and sites proposed for Sedimentation tank, Boreholes/overhead tank, collection chambers and distribution line for construction are stable and do not exists within landslide zones.

#### **5.1.6 Mining and Quarry Sites**

36. Minor localized stone quarry activities are confined to flood plains of ThareKhola stream. The effects in the stream watercourses are not visible. Hence, it can be said that mining activities of construction materials have no impact on stream environment until the equilibrium is maintained by the riverbed load during different seasons of the year.

#### **5.1.7 Water Quality Analysis**

37. Existing gravity supply from Jalkune Khola (stream source) having safe yield of 2.61 lps has been discarded as incrustation in pipe line is noted due to calcium problem and the required flow to Dibya Nagar will be fulfilled by proposed scheme H. Water sample from the existing sources. Thare Khola/Keraghari (stream), two Chisapani (spring) and two ground water borehole at Department of Road Office and Armed Police Force Office were collected and tested. The water analysis of tested source samples indicates turbidity to be on the higher side of recommended WHO guideline values. The turbidity for river source no doubt will further increase during rainy season. The turbidity on ground water implicates that the tested wells are shallow and are not developed fully. The source samples of the river and spring indicates bacteriological contamination. Disinfection of water prior to the supply is mandatory to ensure safe water quality.

38. In case of recently completed deep test well (150m) at Division Road Office, the test result shows that the observed values of all the tested physical, chemical and bacteriological parameters are found to be within the limit of WHO guideline values.

39. In the enhancement project additional units of SSF and Chlorination are proposed. The detail analysis of the water quality report is presented in Annex 2 of this report.

40. Water quality analysis were done for all critical sub project components such as intake, water before and after treatment plant. Samplings were also done in the distribution networks as well as randomly selected HHs taps to assure the quality. Mainly Physical component testing was done as pH, Turbidity, Electrical conductivity temperature. Similarly the various chemical components were also tested mostly like Calcium, Iron, Magnesium, Arsenic, Ammonia, Chromium, Nitrate, Sulphate, Chloride, Fluoride and Total Hardness as well.

41. In biological mainly parameter like Total Coliform and Fecal Coliform were tested for. If any contamination is encountered simultaneously the chlorination unit, pressure filter unit, slow sand filter treatment units should be provided. In case of this Water supply sub project due to the presence of Coliform, SSF and Chlorination units are constructed and now functioning.

#### **5.1.8 Air Quality**

42. The air pollution sources in the water supply service area includes smoke emitted from biomass burning, cooking, vehicular emission and agricultural farming activities. Fugitive dust pollution, which varies from one to the other season, is the major contributor in deteriorating air quality in the town. During unsaturated soil condition situation along with farming activities dust particles rises and the air quality deteriorates. This is a seasonal effect and it neutralizes naturally during the monsoon period.

#### **5.1.9 Noise and Vibration**

43. The noise generated by the vehicular operations, industrial activity and other human activities are the main source of noise pollution as well as the source of vibration. But there is no effect of vibration due to these sources. In general, the level of noise pollution and vibration are within the threshold value.

### **5.2 ECOLOGICAL PROFILE**

#### **5.2.1 Conservation Status**

44. The proposed project development site is not a designated site of nature conservation interest and there are no other such ecologically important sites in the project area.

#### **5.2.2 Forest and Vegetation**

45. Ward no. 9 in northern part of the Makar VDC constitutes forest and rangeland, where Tharekhola/Keraghari intake, two spring sources namely Chisapani Mul I & H, existing transmission main and reservoir are located. No felling of trees are required in the construction of intake structure excluding minor clearance work. As the proposed improvement on gravity supply considers re-use of existing infrastructures with minor repair works, there will be no major implication on forest and vegetation.

46. The vegetation type around the project area is dominantly subtropical forest associations. Dominant species are Shorea robusta (sal), Michelia Champaca, Bombax Ceiba, Trewia Neudiflora (Gutel) and acacia catechu dalbergiasissoo. The grass lands are grazed almost all the year round.

#### **5.2.3 Wildlife**

47. The project area habitat is disturbed and is seldom visited by wild mammals. Occasional visited wild animals are Jackal, Jungle cat, Wood rat etc. Birds living in and around the settlement areas are crow (Corvus macrorhynchos), Common cuckoo (Cuculus canorus), House sparrow (Passer domesticus) etc.

#### **5.2.4 Aquatic Life**

48. Lakes, pond and perennial river does not exist in and around the vicinity of the service area except for dry stream namely Bisaya Ghol, noted to pass through the service area. Hence the area is

devoid of biologically significant fish. However, the inventory was not carried out about the species that exist in these rivers as the project scope is limited to small activities of physical intervention.

### **5.3 SOCIO ECONOMIC CONDITION**

#### **5.3.1 Population, Communities and Occupation**

49. The project was completed under STWSSP – 1 in 2008. Bardhaghat is the fastest growing town in eastern Nepal, where in-migration trend is very high due to the prevailing security situation in neighboring hill districts of Ilam, Taplejung, Panchthar and Terthum. Also there are high opportunities of employment and business opportunities in Bardhaghat. Market area of Anarmani (Bardhaghat and Birta Bazar) is compact. The neighboring VDCs of Arjundhara, Charpane etc. are also developing at a rapid pace.

50. Initially the project was launched to serve ward no. 4 of Makar VDC. But now the service area lies in newly formed Bardghat Municipality. According to financial appraisal report of TDF the project was designed to serve a total population of 12,115 in base year 2008 and 20,285 in the design year 2022. Bardghat is an emerging town and the economy of the service area is shifting from rural economy to commercial and service based.

51. Construction of houses is gaining momentum albeit haphazardly. Consequently there is rapid population growth in the proposed areas.

52. The major sources of income in the service area are business, agriculture and remittance. The dependency on nonagricultural activity in the VDC is around 75 %. There are several industries in the area. The major industry is agro-based. Tea is a significant one. Tea estates and small tea packaging are operating in the area. Rice mills, oil mills are important industries. This is the main transport centre of the area. Garages and repair shops for motor vehicles abound the main road area. Other industries under operation are construction, service industry including computer and IT. There is a significant part of the population depending upon transport service.

53. The major ethnic castes in the proposed project area are Brahman, Chhetri, Magar, Limbu, Kami, Damai, Sarki, Newar, Gurung, Rai etc. Similarly, there are also minority ethnic groups such as Rajbansi, Choudhary, and Muslim etc. residing in the proposed service area.

#### **5.3.2 Health and Sanitation**

54. There is a sub Health Post in the VDC with 8 staff, a Village clinic, a vaccination clinic, and number of women Health volunteers and trained midwife. Besides a Mary Stopes Centre and Nepal Family Planning Association Clinic are providing service. There is a good water supply system in the main bazaar area. Of the 3260 households 1181 have connection from the town supply. 1939 HH have only tubewell for drinking water. 140 have dug wells. Even those HH, which have connection to the town supply, have tube well.

55. The prevalent infectious disease is diarrhea. The numbers of children affected in the year 2057/58, 058/059, and 059/060 are 705, 693 and 1392, indicating poor sanitary status. The population without toilets is 771 of the total 3260 HHs. The spread of the infectious disease stem from the defecation at unsafe locations by those without toilets.

56. There is a system of daily cleaning of Bardhaghat Bazaar. There is a regular weekly collection of the solid waste from the area. The waste is dumped at an identified dumping site. But this area still needs a high degree of development.

57. There is no public latrine in the municipality. Those without toilets go the riverside for defecation, which increases the chance of the river being polluted.

#### **5.3.3 Economic Characteristics**

##### **Industries**

58. Although not adequate to give full employment to the total population, the project area is economically the most active location in the region. There are a number of industries in the area. Most of them are agro based. Tea appears to be thriving industry. There are six major tea gardens registered in Anarmani VDC. Two produce fully processed tea, whereas the remaining four produce green leaves, which are, processed elsewhere.

#### **5.3.4 Agricultural Development**

59. The land is fertile for agriculture and the rate of production is good. The main crops are paddy and maize. Two crops of paddy or one each of paddy and maize are planted in a year. Besides wheat, oilseeds, pulses are grown here. Cultivation of vegetables including off seasonal is conducted commercially. Tea gardens have been established in the eastern part of the area and is substantial. The total area under tea plantation is about 165 hectares in Anarmani VDC.

#### **5.3.5 Mineral Development**

60. Mineral exploitation activities are nonexistent.

#### **5.3.6 Infrastructure Facilities**

61. All major infrastructural facilities like water supply, roads, electricity and telephones/communication are available to the consumers in the service area. Such facilities are of course better within the Bardhaghat Bazaar area within Anarmani VDC, which lies on the East-West Highway.

#### **5.3.7 Institutions**

62. There are banks, 4 cooperative banks a primary health post, a police office, a post-office, a forestry office, a veterinary centre, irrigation office, municipality office and an agriculture services centre. The educational institutes consist of 5 primary schools (2 government, 3 private), 4 high schools (1 government, 3 private, and a private higher secondary school of commerce.

#### **5.3.8 Transportation**

63. Bardhaghat is situated on the East-West Highway (Mahendra Rajmarga) and is 32 km west of the Bhartapur and is easily accessible. Bharatpur airport is the nearest airport. It is accessible from different parts of the district by a number of gravel and black-topped roads. Means of transport are buses, trucks, cars, motorcycles, tractors and bicycles.

64. Existing black-topped roads are the East West High Way, Bardhaghat Road and some subroads within Bardhaghat. The rest of the network comprises of gravel and dirt roads.

#### **5.3.9 Land Use Planning**

65. There is no scientific land use planning at the moment and that is why ribbon development is occurring at a fast pace. The most extensive land use in the market area is residential/commercial along the East West Highway. The houses along the other roads are more scattered.

#### **5.3.10 Quality of Life Values**

66. The Project is not expected to adversely affect any cultural or recreational resources but will increase the existing quality of life values due to the improvement in personal, household and community hygiene practices and community health.

#### **5.3.11 Cultural and religious sites**

67. The town is relatively new development. It was started only during the Rana period. Historically important sites are not existent.

### **5.4 RESETTLEMENT, RELOCATION AND COMPENSATION ISSUE**

68. The various project components do not require resettlement of households or relocation. The system network has followed public property line and hence the issue of resettlement or relocation is not evident. The minutes of stakeholder consultation meeting also suggests that there is no need of resettlement or relocation. The land required for construction of treatment plant and reservoir has been purchased by the WUSC and there is no need to provide compensation from the project side.

## **6. DESCRIPTION OF IMPACT ASSESSMENT**

69. No significant impacts of project construction and operation were anticipated (IEE, 2005), but the following impacts were likely to occur. The project is now in operational phase and that all the physical and biological and socio-economic cultural impacts have been mitigated. In the enhancement project as well the same type of impacts are likely to occur.

### **6.1 PHYSICAL ENVIRONMENT**

70. Physical Impact covers impacts on physical resources such as air, water, soil, rocks etc. The positions of a water table keep on fluctuating up and down in relation to wet and dry weather. Porous sand and gravel aquifers yield more water than silt or clay deposits. Hence physical testing of soil structure will help understanding the water availability.

#### **6.1.1 Impact on land use pattern**

71. Tube well, reservoir and treatment plant would require some land area in addition to permanent site to facilitate construction activities, which is envisaged to alter the land use during construction period. The implications of such land use may affect on soil, productivity and land use pattern.

#### **6.1.2 Flooding and Stagnant Water Problem**

72. During monsoon season the project area will be affected from flooding and may create the condition of stagnant water. Absence of drainage system in the project area will create flooding problems. This might create public health problem due to increase in number of vector species like mosquito, snails and others.

#### **6.1.3 Impact on water/land quality**

73. Excavation and construction spoils are the major outcomes of construction activity. Besides, the workforce camps and their sanitary behavior might produce unwanted waste materials. The spoils and waste materials may have adverse implications on adjoining water sources.

#### **6.1.4 Impacts of sediments and Disinfecting Chemicals**

74. Issues like release of sediments from treatment plants, and the use of disinfecting chemicals might affect the water quality. Such effects are minor in nature and can be easily mitigated during the operational phase.

#### **Water Volume/Quality**

75. Over extraction water may decrease the volume of water and improper treatment of water also decrease the quality of water which may arise issues affecting the ground water sources of water.

#### **6.1.5 Impacts on Air Quality**

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

#### **6.1.6 Impacts on Acoustic Environment**

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



### **6.1.7 Impacts on Traffic and Temporary disturbance**

78. During construction phase, implementation of distribution network pipeline will create disturbance to local transport system. The significant impact will be seen in market and busy area only. These impacts will be temporary and short term.

## **6.2 BIOLOGICAL ENVIRONMENT**

### **6.2.1 Impact on natural vegetation and ecology**

79. The natural vegetation and ecology of the project area may be disturbed due to construction activities of the different project components. Besides, the activities of workforce on the adjoining forest may affect the habitat of wildlife.

### **6.2.2 Impact on aquatic life**

80. The source being ground water no impact on aquatic life is envisaged due to implementation of the project

### **6.2.3 Loss of habitat**

81. Clearance of vegetation along the bulk distribution pipeline, and trunk transmission pipeline, may result loss of some forested habitat of wild life and consequently affect the endangered species.

## **6.3 SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT**

82. Many of the adverse impacts on socio-economic and cultural aspects will be limited to construction stage. The following socio-economic issues have been considered in IEE.

### **6.3.1 Land acquisition**

83. The land required for the construction of permanent facilities has been managed by WUSC and no disputes are observed. Similarly there is no necessity of relocation or resettlement.

### **6.3.2 Outside workforce conflict/health/pollution/culture**

84. Involvement of outside workforce in the local area may initiate conflict between the locals and outsiders due to cultural reasons. Disease transmission, pollution and competition for the available resources with outsiders might arise.

### **6.3.3 Workers' Health and Safety Hazards**

85. Like communities, workers will also be exposed to the cross-cutting threats of the aforementioned impacts during construction. Inadequate supply of safe/potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and nonobservance of health and safety measures, pose additional threats to the health and safety of construction workers. Construction workers may also be potentially exposed to communicable and transmittable diseases in the community and in the workforce.

### **6.3.4 Water right Conflict**

86. Involvement of outside workforce in the local area may initiate conflict between the locals and outsiders due to cultural reasons. Disease transmission, pollution and competition for the available resources with outsiders might arise.

## **6.4 BENEFICIAL IMPACTS**

87. However there are some benefits of the project implementation; particularly on the following:

- Increase in agricultural and livestock products
- Employment generation
- Maintaining the health and sanitation activities
- Increase in quality of life values
- Change in cropping pattern

## **7. DESCRIPTION OF MITIGATION MEASURES**

### **7.1 PHYSICAL ENVIRONMENT**

#### **7.1.1 Impact on land use pattern**

88. The STWSSSP is located in ward no 6 of Bardhaghat municipality in the private land of about 2ropanis owned by WUSC, and with boundary wall constructed. The WUSC also owns its land for the construction of WTP and RVT(already constructrd)and it was ensured in design, that the tube wells and other water retaining structures are well protected with good drainage to be located on stable ground. Therefore, the project implementation would have less or no effect on soil, productivity and on the land use pattern.

#### **7.1.2 Flooding and Stagnant Water Problem**

89. Proper management of drainage system needs to be improved. Contractor should be instructed not to store construction materials along the water ways.

#### **7.1.3 Water/land quality**

90. The project uses sub surface water that will be taken from below the water bed of the river by using infiltration gulley technique. Therefore the quality of water is expected to be clean. However the pollution in the surface water may have negative effect. The intake point is upstream from the settlement area and hence external pollution is also not foreseen. Thereforethere is ground water pumping, there is less or minimum effect on water quality. Proper drainage system should be made to avoid water logging and the quality of water sources should be protected. Urination, defecation and dumping of solid and liquid waste in open areas, and water ways may be the potential cause of the pollution of surface and sub-surface water and such activities should be strictly prohibited.

#### **7.1.4 Impacts of sediments and Disinfecting Chemicals**

91. The water quality should be maintained within WHO/NDWQS standards. Filtration and chlorination should be provided to bring the water quality to acceptable levels. Similarly, a manual on water testing and chlorine dosing should be prepared and provided to WUSC.

#### **7.1.5 Water volume**

92. The water should be equally distributed to all the users in a controlled way. The amount of water that required should only be extracted.

#### **7.1.6 Impacts on Air Quality**

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

#### **7.1.7 Impacts on Acoustic Environment**

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

### **7.1.8 Traffic and Temporary disturbance**

95. Some mitigation measures include: (i) distribution pipeline work will be done during night time, (ii) diversion need to be made if work is of long duration.

## **7.2 BIOLOGICAL ENVIRONMENT**

### **7.2.1 Impact on natural vegetation and habitat**

96. The loss of vegetation from construction activities of contractors and construction workforce is recommended to be minimized through the enforcement of the following provisions.

- Prohibition on illegal felling of trees and encroachment of the community forest should be made mandatory.
- Progressive rehabilitation and afforestation of the areas not acquired by the project structures after the completion of the construction activities should be carried out. Such afforestation program is recommended to plant saplings of trees, shrubs and herbs by establishing a nursery or pre-arrangements of such saplings from the local or district level nurseries.
- To enhance the conservation of endangered, protected and threatened species, it is recommended to plant the saplings 2 times the number of felled trees.

## **7.3 SOCIO-ECONOMIC AND CULTURAL ENVIRONMENT**

### **7.3.1 Land acquisition**

97. The land required for the construction of permanent facilities has been managed by WUSC and no disputes are observed. Similarly there is no necessity of relocation or resettlement. Vegetation and agricultural products should be compensated through the afforestation and agricultural enhancement programs in the STWSSSP area.

### **7.3.2 Outside workforce conflict/health/pollution/culture**

98. Outside workers should be provided with the facilities of camps and should be instructed to not to; i) indulge with local people ii) involve themselves for hunting of wildlife iii) involve themselves in social disharmony activities.

### **7.3.3 Workers' Health and Safety Hazards**

99. Some of the mitigation measures for community health and safety hazards: (i) strictly enforce on workers the use of protective wears; (ii) provide safe access to and from work sites; (iii) provide adequate housing at the workers' camp with adequate basic services and provide adequate water supply and sanitation facilities at work sites; (iv) arrange with nearest health center and hospital for health care and emergency care of workers. Overall, the contractor should comply with IFS EHS Guidelines on Occupational Health and Safety.

### **7.3.4 Water right Conflict**

100. The temporary settlement for the workers should be provided with temporary water taps. Open defecation should be controlled. Temporary toilets need to be constructed.

## **7.4 ENHANCEMENT OF BENEFICIAL IMPACTS**

101. Some of the beneficial impacts from the implementation of the project should be enhanced by;

- Community mobilization and people's participation in health and sanitation programs should be promoted,
- Training an awareness programs in health and uses of water and its importance (water cost, saving, reuse, recycle, water pollution etc.) should be given,
- Technical training to the local people on plumbing, chlorination, water testing, pump maintenance and repair should be conducted.

## **7.5 ACTIVITIES FOR REHABILITATION WORK AND ITS MITIGATION MEASURES**

102. As this rehabilitation project is for previously implemented and operated in a satisfactory order with minimal rectification works. Physical, Biological and Social environment are described respectively in Section 7.1, 7.2 and 7.3. Slight changes are in social that is increased population, number of stakeholders for which additional distribution lines with ancillary works are to be done. Major focused were given for the technical rectification which need to be done during enhancement work are summarized in Table 7-1 in details. Most of the recommended mitigation measures will be incorporated in the contractual obligations and constructions works to be completed by the contractors. Facilities like water treatment plant, water testing laboratory etc are also either existing or to be installed is also included in the contract. Mitigation measures and monitoring plan of each rehabilitation activities is mentioned in Table 10-2, in Chapter 10.

**Table 7-1: Activities for Rehabilitation Work**

S.No	Name of Structure	Type	Existing Capacity (Q=lps, RVT=cum, WTP lps)	Design Capacity (lps)	Major problems	Required Intervention
1	Civil Structures					
1.a	TW 1, Outside Off Compd	DTW(40HP Pump)	27	24	<ul style="list-style-type: none"> <li>No Bulk Water Meter, Pressure Gauge and air valve in both TW.</li> </ul>	<ul style="list-style-type: none"> <li>New Bulk Water Meter, Pressure Gauge and air valve will be proposed.</li> <li>New TW is proposed.</li> </ul>
1.b	TW 2, Off Compd	DTW(25HP Pump)	17			
	<b>Total</b>		<b>44</b>	<b>24</b>		
1.c	Intake 1	Chisapani-1 Gravity system.	3.4	3.4	<ul style="list-style-type: none"> <li>Pollution due to Runoff entering during rainfall because of depressed land.</li> </ul>	<ul style="list-style-type: none"> <li>Construction of new intake</li> </ul>
1.d	Intake 2	Chisapani-2 Gravity System.	2.6	2.6		
	<b>Total</b>		<b>6</b>	<b>6</b>		
2	Reservoir					
2.a	Reservoir 1	OHT	450	450	<ul style="list-style-type: none"> <li>Bulk water meter is absent</li> <li>The water from 250m RVT connected to OHT has created inefficiency in storage capacity</li> <li>Washout valve of OHT is buried</li> </ul>	<ul style="list-style-type: none"> <li>Install bulk meter(12")</li> <li>The connection will be cutoff.</li> <li>Valve chamber will be constructed.</li> </ul>
2.b	Reservoir 2	GRT	250	250	<ul style="list-style-type: none"> <li>Front side (south) stone masonry wall leaking.</li> <li>Absence of Bulk meter</li> </ul>	<ul style="list-style-type: none"> <li>Water proof treatment in the leakage wall.</li> <li>Install Bulk meter (4")</li> </ul>
	<b>Total</b>		<b>700</b>	<b>700</b>		
3	Treatment Plant					
3.a	PST				<ul style="list-style-type: none"> <li>Inlet and outlet pipe are exposed.</li> <li>No provision of bypass of the incoming flow</li> </ul>	<ul style="list-style-type: none"> <li>HDPE pipe must be replaced by GI pipes.</li> <li>Inlet valve will relocate.</li> </ul>
3.b	Chlorination				<ul style="list-style-type: none"> <li>Dosing pump is malfunctioned.</li> </ul>	<ul style="list-style-type: none"> <li>A complete set of chlorination lab will be installed.</li> </ul>
4	Transmission Line				<ul style="list-style-type: none"> <li>Land Slide in Support of GI pipe support in gully crossing near chisapani-1.</li> <li>The HDPE pipe is uncovered in suspended crossing in Chisapani1&amp; 2</li> </ul>	<ul style="list-style-type: none"> <li>Gabion support wall is proposed.</li> <li>Cover pipe is proposed</li> </ul>
5	Pipes & pipe fittings	HDPE, GI, DI			<ul style="list-style-type: none"> <li>Laxmi-Nagar-1 does not get water.</li> </ul>	<ul style="list-style-type: none"> <li>Network has been designed to cater for 24 hrs supply.</li> </ul>

S.No	Name of Structure	Type	Existing Capacity (Q=lps, RVT=cum, WTP lps)	Design Capacity (lps)	Major problems	Required Intervention
					<ul style="list-style-type: none"> <li>• HDPE pipe crossing in BisayaKhola and Haat bazaar Khola is unsafe and prone to pollution</li> <li>• Fire Hydrant not in existence</li> </ul>	<ul style="list-style-type: none"> <li>• The pipe will be changed to GI &amp; DI and safely laid through the bridge deck level.</li> </ul>

## 8. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

### 8.1 CONSULTATION

103. Stakeholder consultation and participation was an essential process in project preparation and this updated IEE. The process in engaging stakeholders and affected people during the conduct of the IEE involved key informant interviews, joint sites reconnaissance and on-site discussions with WUSC, and field random interview of stakeholders.

### 8.2 INITIAL CONSULTATION: THE EXISTING PROJECT

104. During the Feasibility Study, consultations were undertaken by the Design and Supervision Consultants. Stakeholder consultations have been continued through subprojects implementation and operation. All stakeholders were invited and encouraged to participate in community consultations. To facilitate the engagement of stakeholders, the PMO and RPMOs maintained good communication and collaboration with the WUSC and VDC. The PMO, RPMOS, Contractors and/or WUSC were opened to contact by the public on matters concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances.

- Prior to construction, the PMO and TPO have conducted information, education and communication (IEC) campaign to ensure sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and TPO, and status of compliance with Government's environmental safeguard requirements, among others, are attained/provided. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO, TPO and Contractors have been set up at strategic locations within the subprojects' main areas of influence. The grievance redress procedure and details will have been posted at the offices of the PMO, TPO, WUSC and VDC.
- During construction, regular random interviews were conducted by the TPO every month to monitor environmental concerns of subproject communities.
- During operation, periodic random interviews were conducted by the PMO and
- TPO and WUSC to monitor the environmental concerns of subproject communities.

### 8.3 THE CONSULTATION DURING IEE UPDATE

105. The consultation was done in two phases

#### 8.3.1 Phase I

106. During the engineering survey and design phase, the consultations met with the top level management of DWSS, WUSC officials, WS division officials in Kathmandu and concerned municipality offices, WS customers and general public in field. The main persons consulted during this phase are listed below;

**Table 8-1: Lists of People and Institutions Consulted**

S No.	Name	Designation
1	Mr. Ram Deep Sah	Director General
2	Mr. Tires Prasad Khatri	Acting Project Director
3	Mr. Dr. Mahesh Bhattarai	PMC, Project Co-ordinator
4	Mr. Keshav Raj Bista	Deputy Project Director
5	Mr. Kaman Man Singh	Chairman
6	Mr. Shyam Kumari Kunwar	V. Chairman
7	Mr. Indrakumar Rana	Secretary
8	Mr. Kamal Thapa	Member

### **8.3.2 Phase II**

107. After approval of Detail Design report, second level of public consultation was made to discussion issues regarding the environmental impact, resettlement, relocation and compensation with immediate stakeholders. Meeting was held on 2072/06/06 at site. In this phase overall project outcomes were discussed with all concerned stakeholders. Details of participants are presented in Annex 4.

### **8.4 COSTS**

108. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/town) level will be borne by the concerned focal organizations at each level: WUSC at town level; PIU at regional level and PMO at central level.



## **9. GRIEVANCE REDRESS MECHANISM**

### **9.1 PURPOSE OF THE GRIEVANCE REDRESS MECHANISM**

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

110. 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. Every grievance shall be registered and careful documentation of process with regard to each grievance undertaken, as explained below. The environmental and social safeguards officer (ESO/SSO) at project management office (PMO) will have the overall responsibility for timely grievance redress on environmental and social safeguards issues. The Social Development Officer at the Regional Project Management Office (RPMO) will be the focal person for facilitating the grievance redress at VDC/Municipality level.

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

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

113. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from environmental or social disruption; asset acquisition (if necessary); and eligibility for entitlements, compensation and assistance; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 15 days of receipt of complaint by WUSC; and (iii) ensure feedback to the aggrieved parties about developments regarding their grievances and decisions of the GRC. The grievance redress mechanism and procedure is depicted in Figure 9-1.

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

#### **9.1.1 First Level of GRM (WUSC-level)**

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

### **9.1.2 Second Level of GRM (VDC/Municipality level)**

116. The complainant will be notified by the WUSC that the grievance is forwarded to the VDC/Municipality –level GRM. The Grievance Redress Committee (GRC) will be called for a meeting. The GRC meeting will be called and chaired by the District chief of WSS. The GRC will recommend corrective measures at the field level and assign clear responsibilities for implementing its decision within 10 days of receipt of complaint by WUSC. If the grievance remains unresolved within 10 days of receipt of complaint by WUSC, the matter will be referred to the third level. The RPMO SDO will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued and the decisions carried out. If the complaints are related with IP/dalits/other vulnerable groups, specific NGO/CBO that actively involved in development of these communities should be involved.

### **9.1.3 Third Level of GRM (PMO Level)**

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

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

119. 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.

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

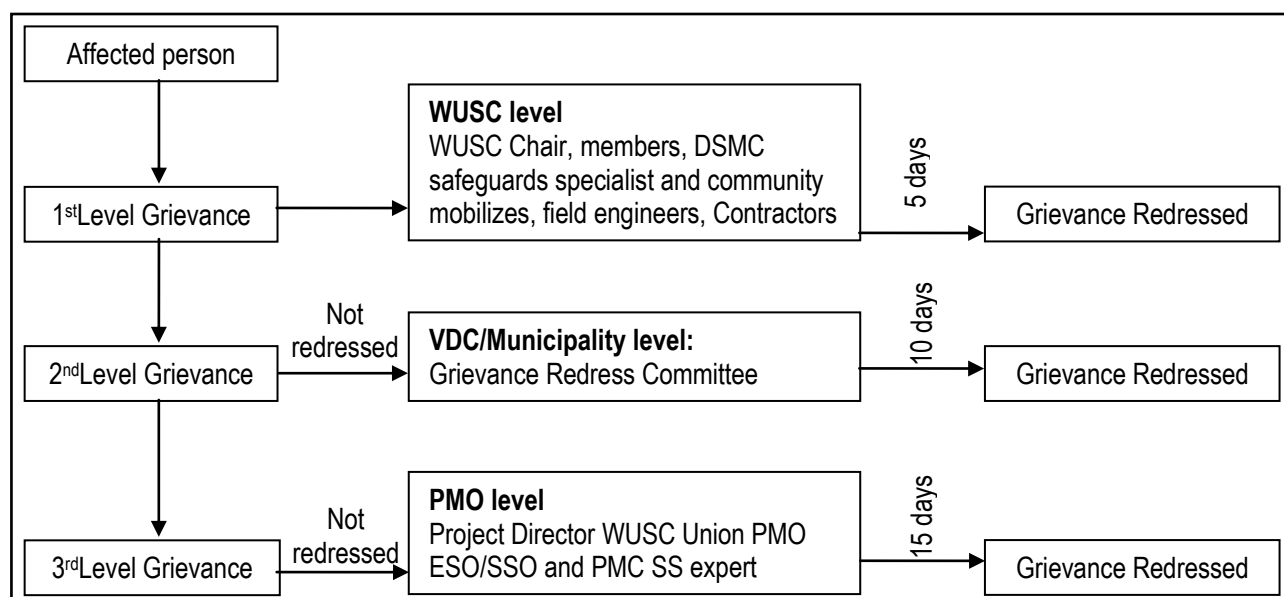


Figure 9-1: Grievance Redress Process

DSMC: Design, supervision and management consultant; ESO: Environmental and social safeguardsofficer;  
 GRC: Grievance redress committee; PD: Project director; PMC: Project management consultant;  
 PMO: Project management office; WUSC: Water user and sanitation committee.

### Record keeping and disclosure

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

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

### Periodic review and documentation of lessons learned

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

### Costs

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

## **10. ENVIRONMENT MANAGEMENT PLAN**

125. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

### **10.1 INSTITUTIONAL ARRANGEMENT**

#### **10.1.1 Executing and implementing agencies.**

126. The Ministry of Urban Development (MUD) will be the executing agency with responsibility of subproject execution delegated to the Department of Water Supply and Sewerage (DWSS). The Water Supply and Sanitation Division/Sub-division Office (WSSDOs) are the subproject implementing agencies. Water Users' and Sanitation Committees of participating towns are the implementing agencies.

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

#### **Prior to construction**

- The MUD will deputize a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- The MUD will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environment Division of the MUD will be responsible for reviewing the IEE Report prior to submission to the Ministry of Science, Technology and Environment (MoSTE) for review and approval.
- The DWSS will review the IEE Report prepared by the Design and Supervision Consultants' Team's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MUD.
- The DWSS will prepare the ToRs for the Environmental Safeguard Specialist that will be engaged to support the PMO and for the Environmental Safeguard Specialists of the two Design and Supervision Consultants that will be appointed to prepare the subprojects.

#### **During construction and operation**

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

#### **10.1.2 Safeguard Implementation Arrangement**

##### **Project Management Office (PMO)**

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

- i. confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and government rules;
- ii. confirm whether EMPs are included in bidding documents and civil works contracts;
- iii. provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by regional project management offices (Eastern RPMO and Western RPMO) and contractors;

- iv. establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- v. facilitate and confirm overall compliance with all Government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- vi. supervise and provide guidance to the RPMOs to properly carry out the environmental monitoring and assessments as per the EARF;
- vii. review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
- viii. consolidate monthly environmental monitoring reports from RPMOs and submit semi-annual monitoring reports to ADB;
- ix. ensure timely disclosure of final IEEs/EMPs in project locations and in a form accessible to the public; and
- x. address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs.

### **Regional Project Management Offices (Eastern and Western RPMOs)**

129. The regional DWSS engineers and social development officers of the RPMOs will receive support from; (i) the PMO safeguards officers (environmental and social); and (ii) the safeguards specialists (environmental and social), the social mobilizes and environmental management plan (EMP) monitors of the design, supervision and management consultant (DSMC) teams as specified below:

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

### **Civil Works Contracts and Contractors**

130. EMP is to be included in bidding and contract documents and verified by the PMO and RPMOSs. The contractor will be required to designate an environment supervisor to ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract. The government will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities, on (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste, and on (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. Contractors will only start the civil works activities in the section/subproject sites that has IR/IPP impacts upon the completion of RP/IPP implementation and after receiving clearance from the WUSC and endorsed by RPMO's SDO.

### **Capacity Building**

131. The PMC safeguards experts (environmental and social) will be responsible for training the; (i) PMO's safeguards officers (environmental and social); (ii) RPMOs' engineers and social development officers. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

- i. sensitization;
- ii. introduction to environment and environmental considerations in water supply and wastewater projects;
- iii. review of IEEs and integration into the project detailed design;

- iv. improved coordination within nodal departments; and
- v. Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to worksites.

### **Water Users and Sanitation Committees (WUSCs)**

132. WUSCs are the eventual operators of the completed subprojects. The key tasks and responsibilities of the WUSCs are, but not limited to:

#### **Prior to construction**

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

#### **During construction**

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

#### **During operation**

- Implement the EMP and the Water Safety Plan.
- Regularly monitor the water quality
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism

### **Licensed and accredited laboratory**

133. 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.

#### **10.1.3 Institutional Capacity Development Program**

134. 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.

135. WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Albeit monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSS has five regional laboratories; however some are not functioning fully due to lack of manpower. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with the WUSC actively participating to develop WUSC capacity. The conduct of water quality monitoring should be carried out in such a way that WUSC will be "learning by doing". After the engagement period, there should be continuing periodic training of new persons to ensure capacity of the WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engaged for both the monitoring requirements and to train the WUSC. A Water Safety Plan is included in subproject design and will oblige the operator to carry out water quality monitoring accordingly. The amount of NPR 500,000 will be provided annually to implement the Plan. There will be sufficient fund to include training by the licensed and accredited lab, while monitoring water quality.

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

#### **10.1.4 Staffing Requirement and Budget**

137. 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.

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

139. The cost of mitigation measures and surveys during construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.

140. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of the WUSC. All monitoring during the operation and maintenance phase will be conducted by WUSC. The Water Safety Plan, included in each subproject design, will allocate NPR 500,000 annually for operation and maintenance particularly water quality monitoring. If a licensed laboratory will be engaged for the first 2-3 years of operation for training purposes, the cost can be accommodated under the Water Safety Plan.

### **10.2 MONITORING AND REPORTING**

141. RPMOs will monitor and measure the progress of EMP implementation with assistance from DMSC. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEE for the projects. In addition to recording

### **10.3 ENVIRONMENTAL MONITORING MECHANISM**

142. Under the chairmanship of Bardhaghat municipality, a Monitoring Committee should be formed. The committee should be represented by the chairman of concerned service wards of the VDC, representative from environment related NGOs, local community, Water Users' Committee and local entrepreneur. Secretary of the Bardhaghat municipality should act as member secretary of the Monitoring Committee. This committee should be assigned following duties and responsibilities:

- The committee should meet at least twice a month;
- The committee should collect all complaints from the local people concerning distribution, pipeline etc and should discuss in the meeting for the final decisions;
- The monitoring committee should identify the mistakes and deficiency regarding the project and should discuss in the meeting for the purpose of correction;
- Any negligence regarding the water quality should be considered and take necessary action;
- The committee should also supervise and provide instructions for activities such as:
  - Distribution of qualitative water,
  - Storage of water in the reservoir tanks,
  - Treatment plant,
  - Handling of toxic/chemical matters,
  - Training for the locals, and
- Examine monitoring reports periodically and take necessary actions if required etc.

#### **10.4 MONITORING REPORTING MECHANISM**

143. As proposed by approved EMP, the reporting system should include site supervision and reporting as well and primarily connected with Monitoring plan. The construction contractors are responsible for implementing approved EMP. The supervising consultants are responsible for monitoring to oversee whether or not the contractors have complied with the approved conditions as stated in EMP and also receive the monthly progress report from construction contractors. Based on this information the consulting engineers prepare the front line monitoring report and submit to DWSS for review

#### **10.5 MONITORING COST, PARAMETERS, LOCATION AND SCHEDULE**

144. During rehabilitation, the cost for monitoring will be minimum and it should be allocated as and when required from the project contingency.

#### **10.6 CONTRACTORS COMPLIANCE ON EMP**

145. The recommended mitigation measures are shown in the Table 10-1. The contractor should comply with the recommended mitigation activities.

#### **10.7 INSTITUTIONAL CAPACITY DEVELOPMENT PROGRAM**

146. 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.

147. In the Table 10-1 given below, the types of impact as predicted, corresponding mitigation measures, monitoring parameters, monitoring indicators, location and sources, responsibility and frequencies of monitoring have been included. The monitoring protocols given below are based on the Environmental Management Plan (IEE Bardhaghat, 2005) approved by Government of Nepal 2005.

#### **10.8 ENVIROMENT MITIGATION COST**

148. Most of the recommended mitigation measures are incorporated in the contractual obligations and constructions works to be completed by the contractors. Facilities like water treatment plant, water testing laboratory etc are also either existing or to be installed is also included in the contract. Therefore mitigation cost of the enhancement project will be negligible. However in order to strengthen the existing facilities 2% of total project cost is proposed should be allocated.



**Table 10-1: Mitigation measures and corresponding Monitoring plan**

Impact and Mitigation Prescription		Monitoring plan for Implementation						Status	
Environmental Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present <sup>2</sup>
Physical Environment									
Construction Phase									
Land use pattern	Acquire only required land	Change in cropping pattern	Quality and quantity of yield	Project area	Local people	WUSC	Half yearly	Completed	Not applicable
Flooding and water stagnant	Drainage management	Observation of the project area	Increase in mosquito Increase in vector born diseases	Project area	Field inspection	DSC/Contractor	During and after monsoon	Completed	Recommended
	The excavated material must be safely disposed.	Ensure proper management of excessive spoil materials in place	Evidence of landscape erosion and river turbidity undisturbed	Project area	Field inspection	DSC/Contractor	After monsoon	Completed	Recommended
Impacts of sediments and Disinfecting Chemicals	Safe disposal	Water quality	Chemicals and pathogen exceeding national standards	Project area	Water quality test	DSC/Contractor	Quarterly	Completed	Recommended
Water Volume/ Quality	Limited extraction/ regular testing	Measurement of River flow and underground water table level	Change in quantity	Project area	River and ground water	DSC/Contractor	Quarterly	Completed	Recommended
Air Quality	Confine earthworks according to a staking plan and excavation segmentation plan and a part of the document	Visibility due to presence of dust	Location of stock pile	Project area	Local people and surrounding environment	DSC/Contractor	Twice in a week	Completed	Recommended
		Amount of dust present in surrounding environment	Number of complaint from sensitive receptors	Project area	Local people and surrounding environment	Contractor	Twice in a week	Completed	Recommended

<sup>2</sup>Recommended for EMP compliance

Impact and Mitigation Prescription		Monitoring plan for Implementation						Status	
Environmental Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present <sup>2</sup>
Acoustic environment	Restrict noisy activities to daytime. Overtime work should avoid using noisy/high noise generating equipment.	Sound intensity during day and night time	Number of complaints from sensitive receptors;	Project area	Local people and surrounding environment	Contractor	Twice in a week	Completed	Recommended
		Sound intensity at and nearby of source	Use of silencers in noise-producing equipment and sound barriers;	Project area	Local people and surrounding environment	Contractor	Twice in a week	Completed	Recommended
Traffic movement	Pipe line work need to be done during night and during less traffic time	Number of vehicles diverted	Number of vehicles movement	Project area	Local people and surrounding environment	WUSC/Contractor	During pipeline work	Completed	Recommended
Biological Environment									
Impact on natural vegetation and habitat	Construction area should be well demarked and proper instruction to be given for the workers.	Vegetation density, number and types of wild animals	Change in vegetation density and number of wild life	Project area	Project area	WUSC/DSC/Contractor	Quarterly	Completed	Recommended
Socio-economic and cultural environment									
Impairment to Infrastructure	Not applicable								
Land acquisition	Project has to make sure that adequate compensation for the land acquired from private citizens (if required) is made	Compensation measures	All affected	Project area	Records and Interview	WUSC/Contractor	Yearly	Completed	Completed
Outside workforce conflict/ health/ pollution/ culture	Disease transmission, pollution and competition for the available resources to outsiders should be thoroughly checked.	Situation of social disharmony Awareness program	Decreased social disharmony Effective awareness program	Project area	Records and Interview	WUSC/Contractor	Yearly	Completed	Recommended
Operation Phase									
Water right Conflict	Public taps should be	Number of public taps	Adequate water	Project	Field	WUSC	Quarterly	Completed	Recommended

Impact and Mitigation Prescription		Monitoring plan for Implementation						Status	
Environmental Impact	Mitigation action	Parameter to be Monitored	Indicators	Location	Sources	Responsibility	Frequency	Previous	Present <sup>2</sup>
	established in appropriate places.	installed	supply to the public	area	inspection and Interview				
Workers health and safety	Comply with requirements of Labor Act of GoN and standards on workers' health and safety (H&S).	Health of workers Dress and first-aid facilities stations	Site-specific H&S Plan	Project area	Workers health status and Interview	WUSC	Quarterly	Completed	Recommended
	Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances	Health of workers Dress and first-aid facilities stations	Condition of sanitation facilities for workers	Project area	Workers health status and Interview	WUSC	Quarterly	Completed	Recommended

Source: IEE Bardhaghat 2005

2. Recommended for EMP compliance

**Table 10-2: Mitigation Measures and Monitoring Plan for Rehabilitation Activities**

Overview of Impacts		Required mitigation measures			Monitoring plan for implementation				
Project activities	Possible impacts (on all baseline parameters)	Mitigation associated with project location	Mitigation in project design features	Residual mitigation measures (not addressed by location and design)	Parameter to be Monitored	Indicators	Location	Responsibility	Frequency
<b>Water source</b>									
Tube well maintenance	No significant impact								
Construction of new intake	Landslide and erosion	Construction of check dam, gabion and bioengineering works	Protection measures are included in drawing		Landslide and slope stability	Reduction in landslide and erosion	Site specific	Contractor and WUSC	During construction and operation
	Impact on vegetation	Removal of vegetation	Not applicable		Density of vegetation to be removed	Number of removed vegetation	Site specific	Contractor	During construction
Protection and maintenance	Diversion of spring	Construction of check dam and gabion	Protection measures are included in drawing		River flow	River flow intensity	Site specific	Contractor	During construction
<b>Transmission line</b>									
Landslide stabilization work	Landslide and erosion	Construction of check dam, gabion and bioengineering works	Protection measures are included in drawing		Landslide and slope stability	Reduction in landslide and erosion	Site specific	Contractor and WUSC	During construction and operation
Pipe line change	Impact on vegetation	Removal of vegetation	Not applicable		Density of vegetation to be removed	Number of removed vegetation	Site specific	Contractor	During construction
Leakage improvement	Not significant impact								
<b>Treatment plant</b>									
Plain sedimentation tank	No any significant impact								
Installation of chlorination unit	Excessive use may be detrimental	Avoid excessive use							
	Leakage through storage	Maintain proper storage to avoid leakage			Chlorine contamination	Health problem in local people	Site specific	WUSC	Operation

## **Annexes**

**Annex 1: Project Location Map and Water Supply Plan**

**Annex 2: Water Tested Laboratory Analysis Report**

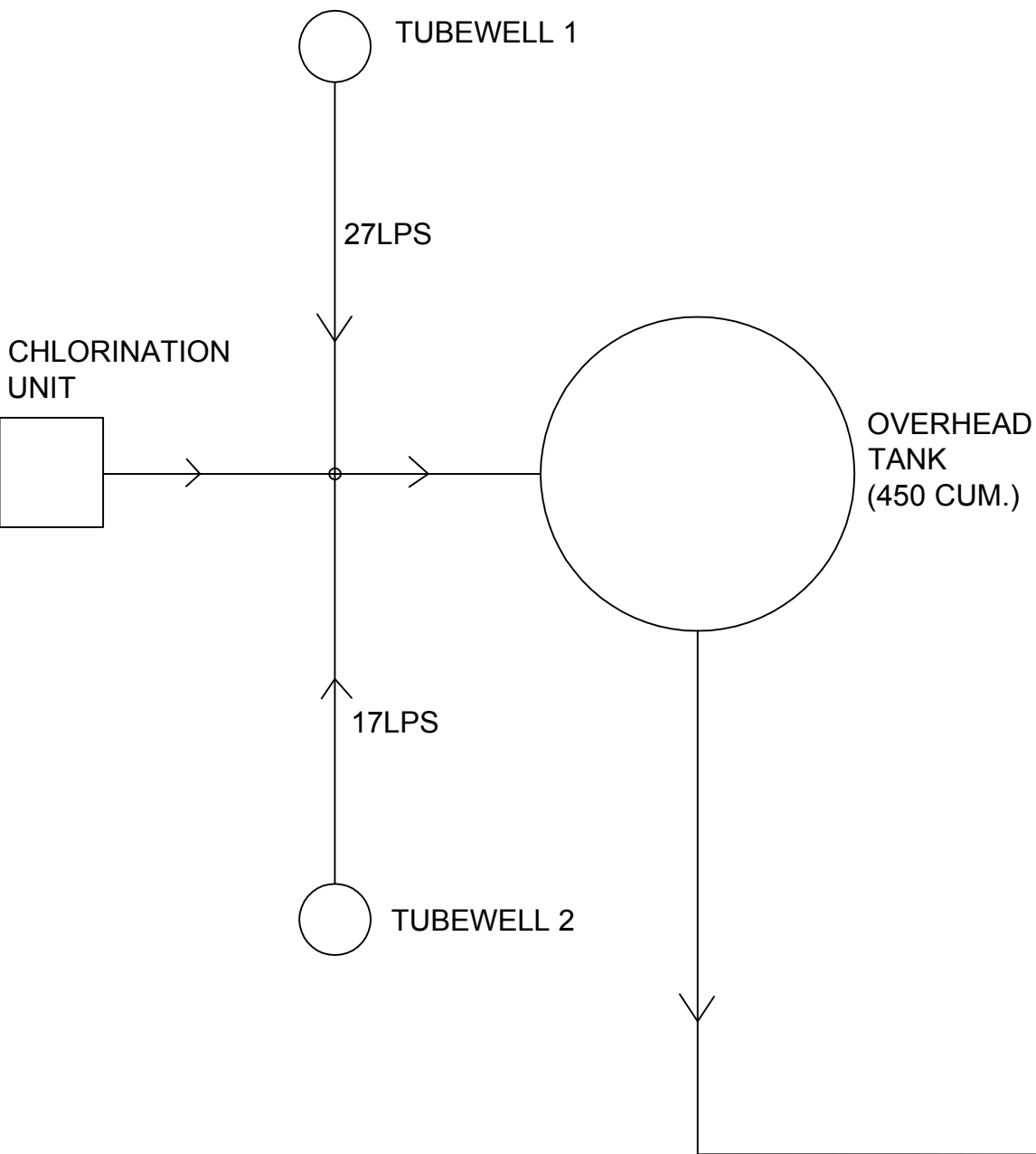
**Annex 3: Rapid Environmental Assessment (REA) Checklist**

**Annex 4: Minute of Meeting**

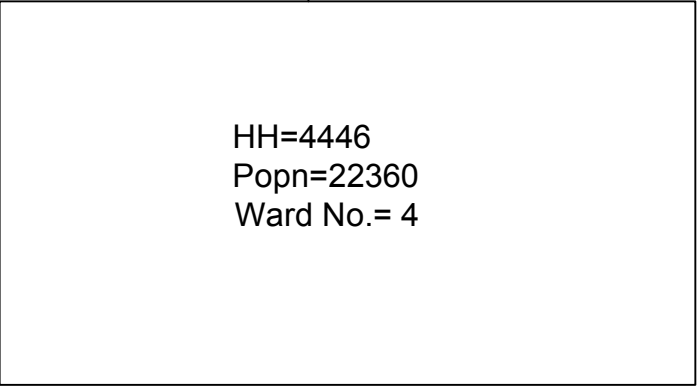
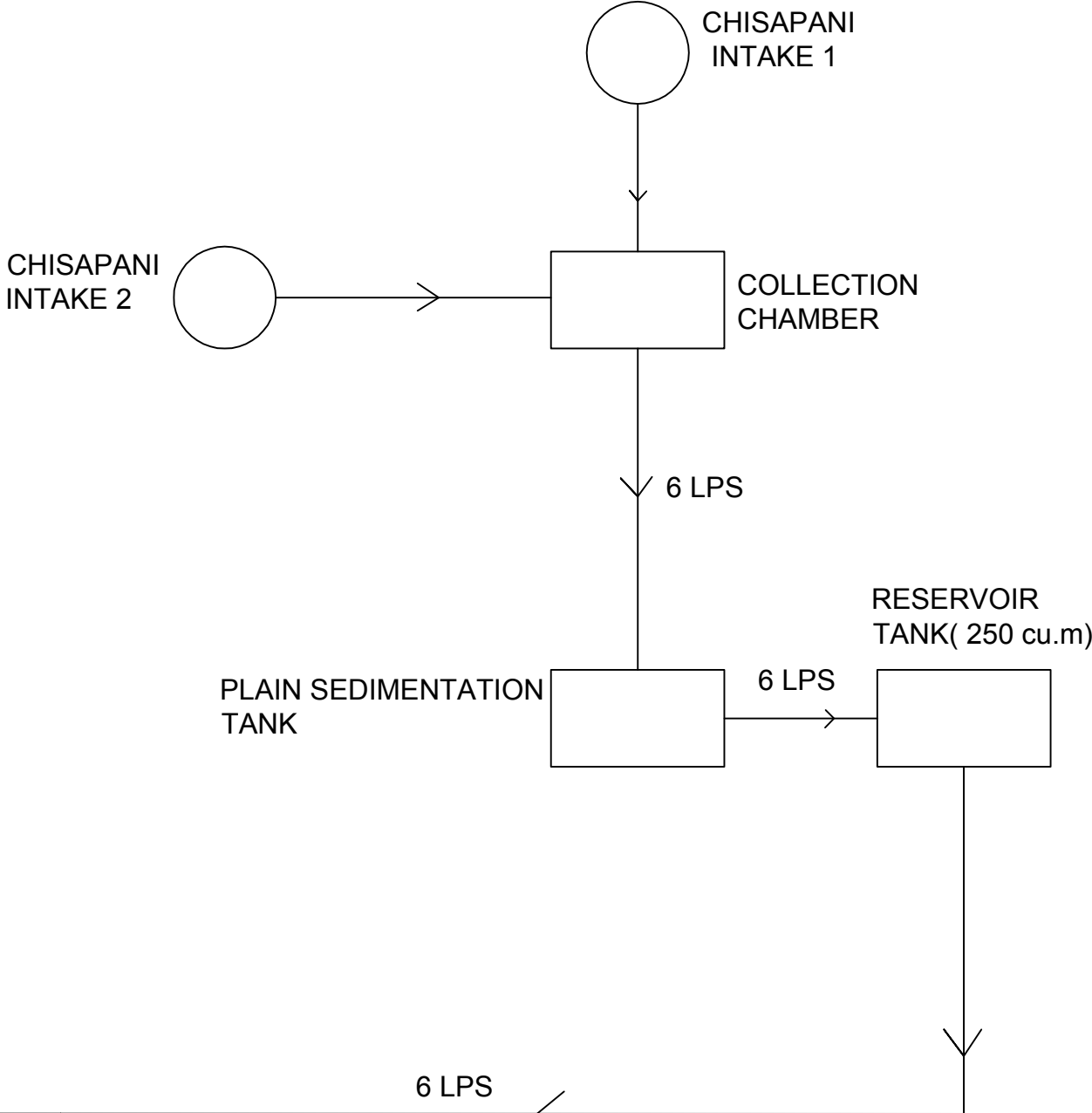




# TUBE WELL SYSTEM



# GRAVITY SYSTEM



# BARDAGHAT



## **Annex - 2: Water Tested Laboratory Analysis Report**



# Water

Engineering & Training Centre (P.) Ltd.

Laboratory R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

Name of Sender: SULTITEKO UNICORN JV		Name of Project: Bardaghat STWSSP		Date of Collection: 19/08/2014	
Sample No: 301/0714072		Type of Source: Spring Source (Mixed)		Sampling Point: After BPT (Mixed)	
Date of Receipt: 01/08/2014		Name of Source: Free Well		Field Temperature (°C): 27.0	
Analyzed date: 01/08/2014-04/09/2014		No. of Samples: 01		Field pH: 6.5	
Sampled by: WETC		Location: Jungle Area		Field Electrical Conductivity (µS/cm): 593.0	
Parameters	Units	WHO GV	NDWQS	Result	Method used
<b>PHYSICAL</b>					
pH	-	6.5-8.5	6.5-8.5	6.5	4300 H, APHA, 21 <sup>st</sup> EDITION
Color	NTU	0	5 (10)	<1.0	2100 H, APHA, 21 <sup>st</sup> EDITION
Electrical Conductivity	µS/cm	-	1500	593.0	2500 H, APHA, 21 <sup>st</sup> EDITION
Water Temperature	°C	-	-	27.0	2550 H, APHA, 21 <sup>st</sup> EDITION
<b>CHEMICAL</b>					
Calcium	mg/L as Ca <sup>2+</sup>	-	100	59.2	3500 H, APHA, 21 <sup>st</sup> EDITION
Magnesium	mg/L as Mg <sup>2+</sup>	-	-	14.0	3500 H, APHA, 21 <sup>st</sup> EDITION
Iron	mg/L as Fe	0.3	0.3 (0.1)	<0.01	3510 H, APHA, 21 <sup>st</sup> EDITION
Manganese	mg/L as Mn	0.4	0.2	<0.01	3510 H, APHA, 21 <sup>st</sup> EDITION
Arsenic	mg/L as As	0.05	0.05	<0.005	3510 H, APHA, 21 <sup>st</sup> EDITION
Ammonia	mg/L as NH <sub>4</sub> <sup>+</sup>	1.5	1.5	0.06	4500 H, APHA, 21 <sup>st</sup> EDITION
Sodium	mg/L as Na <sup>+</sup>	-	-	51.6	3110 H, APHA, 21 <sup>st</sup> EDITION
Potassium	mg/L as K	-	-	1.3	3110 H, APHA, 21 <sup>st</sup> EDITION
Total Chlorine	mg/L as Cl <sub>2</sub>	0.05	0.05	<0.01	3110 H, APHA, 21 <sup>st</sup> EDITION
Bromate	mg/L as BrO <sub>3</sub> <sup>-</sup>	-	-	270.8	2520 H, APHA, 21 <sup>st</sup> EDITION
Cyanide	mg/L as CN <sub>2</sub>	-	-	9.6	2520 H, APHA, 21 <sup>st</sup> EDITION
Hydroxide Alkalinity	mg/L as OH <sup>-</sup>	-	-	ND	2520 H, APHA, 21 <sup>st</sup> EDITION
Free Alkalinity	mg/L as CaCO <sub>3</sub>	50	-	138.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Carbonate Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	16.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Non Carbonate Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	222.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Orthophosphate	mg/L as P	-	-	0.17	4500 H, APHA, 21 <sup>st</sup> EDITION
Nitrate	mg/L as NO <sub>3</sub> <sup>-</sup>	50	50	0.05	4500 H, APHA, 21 <sup>st</sup> EDITION
Nitrite	mg/L as NO <sub>2</sub> <sup>-</sup>	3	-	<0.02	4500 H, APHA, 21 <sup>st</sup> EDITION
Sulfate	mg/L as SO <sub>4</sub> <sup>2-</sup>	250	250	<5.0	4500 H, APHA, 21 <sup>st</sup> EDITION
Chloride	mg/L as Cl <sup>-</sup>	250	250	5.0	4500 H, APHA, 21 <sup>st</sup> EDITION
Fluoride	mg/L as F <sup>-</sup>	1.5	0.5-1.5	0.51	4500 H, APHA, 21 <sup>st</sup> EDITION
Silica	mg/L as SiO <sub>2</sub>	-	-	17.5	4500 H, APHA, 21 <sup>st</sup> EDITION
Total Hardness	mg/L as CaCO <sub>3</sub>	500	500	190.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Non Carbonate Hardness	mg/L as CaCO <sub>3</sub>	-	-	8.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Total Dissolved Solids	mg/L	1000	-	361.0	2520 H, APHA, 21 <sup>st</sup> EDITION
Laugher Sanitization Index	-	-	-	-0.14	2520 H, APHA, 21 <sup>st</sup> EDITION
<b>BIOLOGICAL</b>					
Total Coliforms	CFU/100ml	ND	N	24	9223 B, APHA, 21 <sup>st</sup> EDITION
Fecal Coliforms	CFU/100ml	ND	N	ND	9223 B, APHA, 21 <sup>st</sup> EDITION

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water, WETC, World Health Organization, 1995, 2000 Update, NDWQS, National Drinking Water Quality Standard, 2002 (Nepal). \* These values are lower and upper limits. ND does in the parenthesis refers the acceptable values only when alternative is not available. \*\* Not accredited Test Method

**Comment: Bacteriologically, unsatisfactory. The tested chemical parameters indicate the NDWQS range water quality.**

Analysed by

13  
Checked by

Authorized Signature

- Notes:
- The result refers only to the parameters listed of the samples provided to our laboratory or collected by us for analysis as per the requirement of the problem is neither intended nor implied.
  - Any duplicating of this report can not be used as evidence in the court of law and should not be used in any advertising media without prior permission to us.
  - The sole liability of our company for the product is limited to the invoiced amount only.



# Water

Engineering & Training Centre (P.) Ltd.

Laboratory, R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

Name of Sender: SILENT FLY ENGINEERING		Name of Project: Bardaghat STWSSSP		Date of Collection: 22/08/2014	
Sample No: 302/071072		Type of Source: Bore Well & Spring Source		Sampling Point: Bore Well & Spring Source	
Date of Receipt: 01/08/2014		(Mixed)		Field Temperature (°C): 28.2	
Analyzed date: 01/08/2014-04/09/2014		Name of Source: Tap Water		Field pH: 7.5	
Sampled by: WETC		No. of Samples: 01		Field Electrical Conductivity (µS/cm): 594.0	
Location : Bardaghat (Tap No. 1600)					
Parameters	Units	WHO GV	NDWQS	Results	Method used
PHYSICAL					
pH	-	6.5-8.5	6.5-8.5*	7.5	4500-H <sup>+</sup> B, APHA, 21 <sup>st</sup> EDITION
Turbidity	NTU	5	20 FTU	<1.0	2190 D, APHA, 21 <sup>st</sup> EDITION
Electrical Conductivity	µS/cm	-	1500	594.0	2540 B, APHA, 21 <sup>st</sup> EDITION
Lab. Temperature	°C	-	-	28.2	2550 B, APHA, 21 <sup>st</sup> EDITION
CHEMICAL					
Calcium	mg/L as Ca <sup>2+</sup>	-	75	59.2	2550 C, APHA, 21 <sup>st</sup> EDITION
Magnesium	mg/L as Mg <sup>2+</sup>	-	-	14.6	2550 A, APHA, 21 <sup>st</sup> EDITION
TDS	mg/L as TDS	0.5	2.3 (3)	<0.01	2111 B, APHA, 21 <sup>st</sup> EDITION
Sulfate	mg/L as SO <sub>4</sub> <sup>2-</sup>	2.5	0.2	<0.01	2111 D, APHA, 21 <sup>st</sup> EDITION
Acidity	mg/L as H <sup>+</sup>	2.0	0.15	<0.005	0150 A, APHA, 21 <sup>st</sup> EDITION
Ammonia	mg/L as NH <sub>3</sub>	1.5	1.5	0.06	4500-NH <sub>3</sub> C, APHA, 17 <sup>th</sup> EDITION
Sodium	mg/L as Na <sup>+</sup>	-	-	51.6	2511 B, APHA, 21 <sup>st</sup> EDITION
Potassium	mg/L as K <sup>+</sup>	-	-	1.3	2111 B, APHA, 21 <sup>st</sup> EDITION
Total Chlorine	mg/L as Cl <sub>2</sub>	0.05	0.10	<0.01	2111 B, APHA, 21 <sup>st</sup> EDITION
Bicarbonate	mg/L as HCO <sub>3</sub> <sup>-</sup>	-	-	383.0	2520 B, APHA, 21 <sup>st</sup> EDITION
Carbonate	mg/L as CO <sub>3</sub> <sup>2-</sup>	-	-	12.0	2520 A, APHA, 21 <sup>st</sup> EDITION
Hydroxide Alkalinity	mg/L as OH <sup>-</sup>	-	-	ND	2520 C, APHA, 21 <sup>st</sup> EDITION
Total Alkalinity	mg/L as CaCO <sub>3</sub>	ND	-	334.0	2520 D, APHA, 21 <sup>st</sup> EDITION
Carbonate Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	20.0	2520 B, APHA, 21 <sup>st</sup> EDITION
Non Carbonate Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	314.0	2520 B, APHA, 21 <sup>st</sup> EDITION
Dissolved Solids	mg/L as TDS	-	-	0.17	2500-2, APHA, 21 <sup>st</sup> EDITION
Nitrate	mg/L as NO <sub>3</sub> <sup>-</sup>	50	50	0.05	4500-NO <sub>3</sub> B, APHA, 21 <sup>st</sup> EDITION
Nitrite	mg/L as NO <sub>2</sub> <sup>-</sup>	5	-	<0.02	4500-NO <sub>2</sub> B, APHA, 21 <sup>st</sup> EDITION
Sulfide	mg/L as S <sup>2-</sup>	0.5	0.20	<0.0	4500-SO <sub>4</sub> , APHA, 21 <sup>st</sup> EDITION
Chloride	mg/L as Cl <sup>-</sup>	250	250	5.9	15000 D, APHA, 21 <sup>st</sup> EDITION
Fluoride	mg/L as F <sup>-</sup>	1.5	0.5-1.5*	0.57	4500-F, APHA, 21 <sup>st</sup> EDITION
Iron	mg/L as Fe	-	-	18.3	4500-Fe, APHA, 21 <sup>st</sup> EDITION
Total Hardness	mg/L as CaCO <sub>3</sub>	300	500	190.0	2540 C, APHA, 21 <sup>st</sup> EDITION
Mineral Content Hardness	mg/L as CaCO <sub>3</sub>	-	-	10.0	Calculation
Total Dissolved Solids	mg/L	1000	-	361.0	2540 C, APHA, 21 <sup>st</sup> EDITION
Total Suspended Solids	mg/L	-	-	1.0	2540 B, APHA, 21 <sup>st</sup> EDITION
BIOLOGICAL					
Total Coliforms	CFU/100ml	ND	ND	10	4500 E, APHA, 21 <sup>st</sup> EDITION
Fecal Coliform	CFU/100ml	ND	ND	ND	5211 D, APHA, 21 <sup>st</sup> EDITION

APHA: American Public Health Association. Standard Methods for the Examination of Water & Waste Water. WHO GV: World Health Organization Guidelines. Value 2000 µS/cm. NDWQS: National Drinking Water Quality Standard, 2002 (Nepal). \*These values show lower and upper limits. ( ) Values in the parentheses refers the sample is not as per water alternative is not available. \*\*Not Specified Test Method

**Comment:** Bacteriologically, unsatisfactory. The tested chemical parameters indicate the NDWQS range water quality.

Analyzed by

Checked by

Authorized Signature

**Notes:** The result refers only to the parameters tested of the samples provided to our laboratory or collected by us for analysis. Specified Endorsement or the principal is neither intended nor implied.

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# Water

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Laboratory, R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

Name of Sender: SILENT WALKER UNICORN JV		Name of Project: Kandasagar STWSSSP		Date of Collection: 22/08/2014	
Sample No: 303/071/072		Type of Source: Bore Well		Sampling Point: Office Compound Tap Field	
Date of Receipt: 01/08/2014		Name of Source: Bore Well		Temperature (°C): 25.7	
Analyzed date: 01/08/2014-04/09/2014		No. of Samples: 01		Field pH: 6.9	
Sampled by: WKTC		Location: Kandasagar (Office Compound Tap)		Field Electrical Conductivity (µS/cm): 547.0	
Parameters	Units	WHO GV	NDWQS	Result	Methods used
<b>PHYSICAL</b>					
pH		6.5-8.5	6.5-8.5	6.9	1500 B, APHA, 21 <sup>ST</sup> EDITION
Turbidity	NTU	5	500	<1.0	2100 B, APHA, 21 <sup>ST</sup> EDITION
Electrical Conductivity	µS/cm	-	1500	547.0	2510 B, APHA, 21 <sup>ST</sup> EDITION
Lab Temperature	°C	-	-	25.7	1500 B, APHA, 21 <sup>ST</sup> EDITION
<b>CHEMICAL</b>					
Calcium	mg/L as Ca <sup>2+</sup>	-	200	62.4	3500 C, APHA, 21 <sup>ST</sup> EDITION
Magnesium	mg/L as Mg <sup>2+</sup>	-	-	61.7	3500-Mg, B, APHA, 21 <sup>ST</sup> EDITION
Iron	mg/L as Fe	0.3	0.3-1.0	<0.01	3110 B, APHA, 21 <sup>ST</sup> EDITION
Manganese	mg/L as Mn	0.4	0.2	<0.05	3110 B, APHA, 21 <sup>ST</sup> EDITION
Arsenic	mg/L as As	0.05	0.05	<0.005	3110 B, APHA, 21 <sup>ST</sup> EDITION
Ammonia	mg/L as NH <sub>4</sub> <sup>+</sup>	1.5	1.5	0.03	4500 NH <sub>4</sub> -N, APHA, 21 <sup>ST</sup> EDITION
Sodium	mg/L as Na <sup>+</sup>	-	-	4.5	3110 B, APHA, 21 <sup>ST</sup> EDITION
Potassium	mg/L as K	-	-	1.4	3110 B, APHA, 21 <sup>ST</sup> EDITION
Total Chlorine	mg/L as Cl <sub>2</sub>	0.05	0.05	<0.01	3110 B, APHA, 21 <sup>ST</sup> EDITION
Chloride	mg/L as Cl <sup>-</sup>	-	-	322.1	4500 Cl <sup>-</sup> , APHA, 21 <sup>ST</sup> EDITION
Cyanide	mg/L as CN <sup>-</sup>	-	-	NIL	2520 A, APHA, 21 <sup>ST</sup> EDITION
Hydroxide Alkalinity	mg/L as OH <sup>-</sup>	-	-	NIL	2520 A, APHA, 21 <sup>ST</sup> EDITION
Calcium Alkalinity	mg/L as CaCO <sub>3</sub>	NIL	-	264.0	2520 B, APHA, 21 <sup>ST</sup> EDITION
Total Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	NIL	2520 B, APHA, 21 <sup>ST</sup> EDITION
Non-carbonate Alkalinity	mg/L as CaCO <sub>3</sub>	-	-	264.0	2520 B, APHA, 21 <sup>ST</sup> EDITION
Orthophosphate	mg/L as P	-	-	0.06	4500 P, APHA, 21 <sup>ST</sup> EDITION
Nitrate	mg/L as NO <sub>3</sub> <sup>-</sup>	50	50	0.1	4500 NO <sub>3</sub> <sup>-</sup> , B, APHA, 21 <sup>ST</sup> EDITION
Nitrite	mg/L as NO <sub>2</sub> <sup>-</sup>	3	-	<0.02	4500 NO <sub>2</sub> <sup>-</sup> , B, APHA, 21 <sup>ST</sup> EDITION
Sulphate	mg/L as SO <sub>4</sub> <sup>2-</sup>	250	250	<5.0	4500 SO <sub>4</sub> <sup>2-</sup> , APHA, 21 <sup>ST</sup> EDITION
Chloride	mg/L as Cl <sup>-</sup>	250	250	2.9	4500 Cl <sup>-</sup> , B, APHA, 21 <sup>ST</sup> EDITION
Fluoride	mg/L as F <sup>-</sup>	1.5	0.5-1.5	0.12	1520 F, B, APHA, 21 <sup>ST</sup> EDITION
Silica	mg/L as SiO <sub>2</sub>	-	-	13.5	1520 SiO <sub>2</sub> , B, APHA, 21 <sup>ST</sup> EDITION
Total Hardness	mg/L as CaCO <sub>3</sub>	300	350	286.0	2540 C, APHA, 21 <sup>ST</sup> EDITION
Mineral Hardness	mg/L as CaCO <sub>3</sub>	-	-	<2.0	Calculation
Total Dissolved Solids	mg/L	1000	-	528.0	2540 C, APHA, 21 <sup>ST</sup> EDITION
Langlier Saturation Index	-	-	-	-0.6	2120 B, APHA, 21 <sup>ST</sup> EDITION
<b>BIOLOGICAL</b>					
Total Coliforms	CFU/100ml	NIL	NIL	NIL	9222 B, APHA, 21 <sup>ST</sup> EDITION
Fecal Coliforms	CFU/100ml	NIL	NIL	NIL	9222 B, APHA, 21 <sup>ST</sup> EDITION

APHA: American Public Health Association, Standard Methods for the Examination of Water & Wastewater, WHO GV: World Health Organization Guideline Value, NDWQS: National Drinking Water Quality Standard, \*Not Applicable, \*\*These values are shown as lower and upper limits, (1) Values in the parentheses are acceptable values only when alternatives are not available, \*\*Not Accredited Test Method

**Comment:** Bacteriologically, satisfactory. The tested chemical parameters indicate the NDWQS range water quality.

Analysed by:

Checked by:

Authorized Signature:

- Note: 1. This report refers only to the parameters tested in the samples provided to our laboratory or collected by us for analysis as specified. Endorsement of the product is not intended or implied.  
2. Any expiration of this report can not be used as evidence in the court of law and should not be used in any advertising circle without prior written permission from us.  
3. The total liability of our company for the product is limited to the invoiced amount only.

**Annex - 3: Rapid Environment Assessment  
(REA) Checklist**



## ADB'S REA Checklist

## Rapid Environmental Assessment (REA) Checklist

## WATER SUPPLY

## Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) Involuntary resettlement, (ii) Indigenous peoples planning, (iii) Poverty reduction, (iv) Participation and (v) Gender and development.
- ☐ 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:** Bardaghat Small Town Water Supply Rehabilitation Sub-Project, Nawalparasi

**Sector Division:** Water Supplys

SCREENING QUESTIONS	Yes	No	REMARKS
<b>A. Project Siting</b> Is the project area...			
• Densely populated?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Heavy with development activities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The subproject components are not within locations in or near sensitive and vulnerable ecosystems and protected areas.
• Protected area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Wetland	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Mangrove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Estuarine	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Buffer zone of protected area	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Special area for protecting biodiversity	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
• Bay	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>B. Potential Environmental Impacts</b> Will the Project cause ...			
• Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Deep boaring and Spring Water
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Absence of historical monuments
• Hazard of land subsidence caused by excessive ground water pumping?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<ul style="list-style-type: none"> <li>• Excessive pumping should be controlled</li> <li>• Spring water (ChisaPaniMul I and II)</li> <li>• Reservoir (ThareKhola and Kerabari Stream)</li> </ul>
• Social conflicts arising from displacement of communities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not anticipated. The proposed sites of the deep tube well and new overhead tank will not require acquisition of private land. There are no

SCREENING QUESTIONS	Yes	No	REMARKS
			encroachers/squatters or residential/commercial structures at the proposed sites where infrastructure is to be established.
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not anticipated. Water quantity is sufficient.
• Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Arsenic problem occurs in the area, a health hazard
• Delivery of unsafe water to distribution system?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be mitigated
• Inadequate protection of intake works or wells, leading to pollution of water supply?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be mitigated
• Over pumping of ground water, leading to salinization and ground subsidence?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	High cost involved in pumping will constrain over pumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit.
• Excessive algal growth in storage reservoir?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Treatment will come in existence
• Increase in production of sewage beyond capabilities of community facilities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be mitigated
• Inadequate disposal of sludge from water treatment plants?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be mitigated
• Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Groundwater pumps are submersible and all other pump equipment in the water treatment plan will be housed in a pump shed.
• Impairments associated with transmission lines and access roads?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	To be consider in design stage
• Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Training for operator to be provided
• Dislocation or involuntary resettlement of people	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not anticipated
• Social conflicts between construction workers from other areas and community workers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Noise and dust from construction activities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Increased road traffic due to interference of construction activities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Continuing soil erosion/silt runoff from construction operations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• 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?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Training for operator to be provided
• Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.
• Accidental leakage of chlorine gas?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Bleaching power is used in Nepal
• Excessive abstraction of water affecting downstream water users?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
• Competing uses of water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable

SCREENING QUESTIONS	Yes	No	REMARKS
<ul style="list-style-type: none"> <li>Increased sewage flow due to increased water supply</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Frequency of septage pumping to be increased; regular testing of ground water for microbiological pollution
<ul style="list-style-type: none"> <li>Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Can be mitigated and improved
<ul style="list-style-type: none"> <li>Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Its small project, so limited number of worker will increase, and can be managed
<ul style="list-style-type: none"> <li>Social conflicts if workers from other regions or countries are hired?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Priority in employment will be given to local residents.
<ul style="list-style-type: none"> <li>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?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<b>Sanitation</b>			
<b>C. Potential environmental impacts</b>			
Will the project cause...			
<ul style="list-style-type: none"> <li>Impairment of historical/cultural monuments/areas and loss/damage to these sites?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No such areas near the subproject sites.
<ul style="list-style-type: none"> <li>Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Dislocation or involuntary resettlement of people?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<ul style="list-style-type: none"> <li>Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<ul style="list-style-type: none"> <li>Impairment of downstream water quality due to inadequate Sewage treatment or release of untreated sewage?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Toilets will be connected to septic tanks that will be designed to achieve maximum retention.
<ul style="list-style-type: none"> <li>Overflows and flooding of neighboring properties with raw sewage?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
<ul style="list-style-type: none"> <li>Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Noise and vibration due to blasting and other civil works?</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
<ul style="list-style-type: none"> <li>Inadequate buffer zone around pumping and treatment plants to alleviate noise and other</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact



SCREENING QUESTIONS	Yes	No	REMARKS
possible nuisances, and protect facilities?			
• Road blocking and temporary flooding due to land excavation during the rainy season?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable as construction work will be done during off rainy seasons
• Noise and dust from construction activities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Traffic disturbances due to construction material transport and wastes?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor and temporary impact
• Temporary silt runoff due to construction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not applicable
• Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact
• Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
• Contamination of surface and ground waters due to sludge disposal on land?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
• Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unsterilized sludge?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
• Large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable
• Social conflicts between construction workers from other areas and community workers?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Priority in employment will be given to local residents.
• Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not applicable.
• Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Minor and temporary impact



## **English Translation of Minute of Meeting - Phase II**

Bardghat Small Town Water Supply Sanitation and User's Committee organized a public hearing workshop on 2072/6/6. Participation were made from all concerned stakeholders. After discussion in the public hearing it was observed that there will be no negative impacts on the environment, no necessity of land acquisition and no need of resettlement while implementing the proposed "Enhance Functionality" in Small Town Water Supply and Sanitation Sector Project. As such it was decided to inform this conclusion to the concerned authorities.

# Phase 1

बर्फदार खानेपानी तथा व्यवस्था उपमोहा  
संस्था बर्फदार - ४ तबलपराही

मानाबहरी खानेपानी आयोजना का उपनिर्देशक  
की सेवाएं निम्न ज्यू, डेटा, सिस्टम, मूनेड  
जु का सिस्टम लिडर ज्यू, मगर लिडर डेटा  
का की सुकायत पल्लव, प्रारंभिक ज्यू हू  
२ के आयोजना से बर्फदार उपस्थित रहने  
जएडा अहमदा ज्यू एवं पदाधिकारी तथा  
समय ज्यू, चक्राहका ज्यू, धर्मकापड  
ज्यू, दिनांक बर्तमान का प्रतिकीर्तन जने  
भांडा इतिहास ज्यू एवं हू एवं का नम  
रहता ।

विशेष बर्तमान का नम जने  
आयोजना से मा जने आयोजना मा देखा  
जएडा अवस्था जने जने हू कार्य हू  
का अध्ययन एवं रिपोर्ट से मा मय  
न बर्फदार एवं से मा जएडा इति  
आवश्यक कार्य हू मा प्राथमिकता  
का आधार का हू मा मा बाकी  
हू न गरी २०२२ से २०३० के Design  
गरी रिपोर्ट तथा गरी हू पाइपलाइन  
समय हू हू रिपोर्ट आयोजना का  
उपमा देखा । तथा रिपोर्ट सुधार

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840.

①  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$   $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$   $\frac{1}{16} \times \frac{1}{16} = \frac{1}{256}$   $\frac{1}{256} \times \frac{1}{256} = \frac{1}{65536}$

(७) उद्योग सुख साधन का विचार साधन  
प्रसार का विचार साधन विचार  
साधन का विचार साधन विचार  
साधन का विचार साधन विचार

24/12/2020

[illegible]

Management Prob.

(1) Billing Software का मालिक  
Full Account Software का  
मालिक।

2500 पैसे का मालिक का पैसा है।

(2) बिलिंग सॉफ्टवेयर का मालिक का पैसा  
बिलिंग सॉफ्टवेयर का मालिक का पैसा  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।

(3) बिलिंग सॉफ्टवेयर का मालिक का पैसा  
बिलिंग सॉफ्टवेयर का मालिक का पैसा  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।

(4) बिलिंग सॉफ्टवेयर का मालिक का पैसा  
बिलिंग सॉफ्टवेयर का मालिक का पैसा  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।  
मालिक का पैसा का मालिक का पैसा।

# **Phase 2**



आज दिनांक 20/09/2012 को वरदघाट शाना शहरी नगरपालिका तथा नगरपालिका  
उपमहानगरपालिका आकाशवाणी समन्वयकालाई सम्मानित एक मन्त्रालय कार्यालय माथि । को सेवाको  
प्रदान हुने गर्दै आएको हुने कारणले सम्मानित शाना शहरी नगरपालिका (Sanitized Functionality in Small  
Town Water Supply and Sanitation Sector Project) कार्यक्रममा रहेको अवसरमा जुन प्रत्येक घरमा नगाने,  
जसको अभावमा रहेको छ । पुरानोको अवस्थाको समेत सम्मानित शाना शहरी नगरपालिकाको अभावमा सम्मानित लक्ष्य  
सम्पन्न गराउनुमा सहयोग गर्ने गर्दछौ ।

सम्मानित

| क्र.सं. | नाम, घर                | संस्था      | हस्ताक्षर          |
|---------|------------------------|-------------|--------------------|
| १-      | श्री कमल सिंह थापा     | आकाशवाणी    | श्री. सिंह         |
| २-      | श्री राम कुमार कुँवर   | आकाशवाणी    | श्री. कुँवर        |
| ३-      | श्री इन्द्र कुमार शाना | आकाशवाणी    | श्री. शाना         |
| ४-      | श्री दिल कुमार कुँवर   | आकाशवाणी    | श्री. कुँवर        |
| ५-      | श्री कमल थापा          | आकाशवाणी    | श्री. थापा         |
| ६-      | श्री ललिता शर्मा       | आकाशवाणी    | श्री. शर्मा        |
| ७-      | श्री हिरा कुँवर चौधरी  | आकाशवाणी    | श्री. हिरा         |
| ८-      | श्री राजेन्द्र शाना    | आकाशवाणी    | श्री. शाना         |
| ९-      | श्री जोग ब. थापा       | आकाशवाणी    | श्री. थापा         |
| १०-     | श्री रामजी लोडारी      | आकाशवाणी    | श्री. लोडारी       |
| ११-     | श्री जुन कुमार शर्मा   | आकाशवाणी    | श्री. शर्मा        |
| १२-     | श्री शकुन्तला चौधरी    | आकाशवाणी    | श्री. शकुन्तला     |
| १३-     | श्री धीरज शर्मा        | आकाशवाणी    | श्री. शर्मा        |
| १४-     | श्री सुद प्रकाश थापा   | आकाशवाणी    | श्री. थापा         |
| १५-     | श्री शेष बाल पाठे      | आकाशवाणी    | श्री. पाठे         |
| १६-     | श्री हरि प्रसाद बाल    | ITECO Nepal | श्री. बाल          |
| १७-     | श्री (18/09/2012)      | आकाशवाणी    | श्री. (18/09/2012) |



आकाशवाणी  
सम्मानित शाना शहरी  
नगरपालिका



| क्र.सं | नाम धर                  | ठेगाना           | हस्ताक्षर       |
|--------|-------------------------|------------------|-----------------|
| १८-    | श्री मैत्र शंकर जिरी    | वर्दघाट-४ उपमंडल | मजबूत           |
| १९-    | श्री मैत्र न. के.सी.    | वर्दघाट-४ "      | मैत्र न. के.सी. |
| २०-    | श्री शम्भा देवि चौधरी   | वर्दघाट-४ "      | माधा            |
| २१-    | श्री उमाकला पराजुली     | वर्दघाट-४ "      | उमा कला         |
| २२-    | श्री विजु रणोड          | वर्दघाट-४ "      | विजु रणोड       |
| २३-    | श्री बुद्धि लाल धिमिरे  | वर्दघाट-४ "      |                 |
| २४-    | श्री श्रीभारत आधिकारी   | वर्दघाट-४ "      | श्रीभारत        |
| २५-    | श्री कमला चुंदली        | वर्दघाट-४ "      | कमला            |
| २६-    | श्री रम प्रसाद युपिदी   | वर्दघाट-४ "      | रम प्रसाद       |
| २७-    | श्री जयि कलदुर पापा     | वर्दघाट-४ "      | जयि क           |
| २८-    | श्री कृष्ण मगर          | वर्दघाट-४ "      |                 |
| २९-    | श्री उमाकला पंगेरी      | वर्दघाट-४ "      | उमा             |
| ३०-    | श्री राम कलदुर शता      | वर्दघाट-४ "      |                 |
| ३१-    | श्री पविता शर्मा धिमिरे | वर्दघाट-४ "      | पविता शर्मा     |
| ३२-    | श्री बाबु राम धिमिरे    | वर्दघाट-४ उपमंडल |                 |
| ३३-    | श्री प्रकाश शर्मा       | " "              |                 |
| ३४-    | श्री तुलसी शिवाली       | " "              |                 |
| ३५-    | श्री गिता शर्मा         | " "              | गिता शर्मा      |
| ३६-    | श्री राज कुमार चौधरी    | वर्दघाट-४ "      |                 |
| ३७-    | श्री कल्पना कुवरे       | वर्दघाट-४ "      |                 |
| ३८-    | श्री विवेक कुमार मुनि   | आर्यालप डंगलसाम  |                 |



म. ग. क. २७  
कमला सिंह शापा  
अध्यक्ष





# **Project Photographs**

## Photos on Public Gathering Meeting on Environmental and Social Issues

### BARDGHAT



*Photo No. 1*



*Photo No. 2*





*Photo No. 3*



*Photo No. 4*



*Photo No. 5*



*Photo No. 6*



| Overview of Impacts                                                   |                                                   | Required mitigation measures                     |                                       |                                                                     | Monitoring plan for implementation                    |                                                    |               |                             |                     |
|-----------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------|---------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------|---------------|-----------------------------|---------------------|
| Project activities                                                    | Possible impacts (on all baseline parameters)     | Mitigation associated with project location      | Mitigation in project design features | Residual mitigation measures (not addressed by location and design) | Parameter to be Monitored                             | Indicators                                         | Location      | Responsibility              | Frequency           |
|                                                                       |                                                   |                                                  |                                       |                                                                     |                                                       |                                                    |               |                             |                     |
| <b>Reservoir</b>                                                      |                                                   |                                                  |                                       |                                                                     |                                                       |                                                    |               |                             |                     |
| Maintenance of reservoir                                              | No significant impact                             |                                                  |                                       |                                                                     |                                                       |                                                    |               |                             |                     |
| <b>Distribution line</b>                                              |                                                   |                                                  |                                       |                                                                     |                                                       |                                                    |               |                             |                     |
| Network rehabilitation activities/<br>Additional distribution network | Traffic disturbance                               | Arrangement for traffic diversion with traffic   | Traffic diversion                     |                                                                     | Arrangement of vehicular movement during construction | Smooth running of vehicles through diversion       | Site specific | Contractor                  | During construction |
|                                                                       | Air pollution due to operation of power generator | Dust reduction and emission should be controlled | Not applicable                        |                                                                     | Air quality                                           | Particulate matter in air                          | Site specific | Contractor, WUSC and Locals | During construction |
|                                                                       | HHs water distribution                            | Intermittent supply                              | Supply water through other sources    |                                                                     | Water supply continued                                | Adequate amount of water supply in each households | Site specific | Contractor and WUSC         | During construction |

Note: Table 10-2 is prepared according to Table 7-1 of Chapter 7.



## **11. CONCLUSIONS AND RECOMMENDATIONS**

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

- The proposed subproject, its components, are not within or adjacent to environmentally sensitive areas.
- The extent of adverse impacts is expected to be local, confined within the subprojects' main areas of influence, quarry or borrowing sites, waste disposal sites, and the routes to and from these sites. Fine aggregates, sediments and/or wastes would not be transported beyond the aforementioned sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed prior to the onset of the rainy season, the potential adverse impacts during construction would be highly/more site-specific.
- The few adverse impacts of high magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction period). These will not be sufficient to threaten or weaken the surrounding resources. The preparation and implementation of a Contractor's EMP that would address as minimum the requirements of the SPS-compliant subproject EMP will mitigate the impacts and lower their residual significance to acceptable levels. Simple/uncomplicated mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are known to Contractors. Hence, mitigation measures would not be difficult to design and institute.
- During operation, the potential delivery of unsafe water can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as prescribed in the National Drinking Water Quality Standards Directives.
- The proposed subproject will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced public health, improved quality of life and safe communities as outcomes.

150. Based on the above findings, the classification of the 3rdSTWSSSP as Category B is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with the Safeguard Policy Statement of the ADB. The Government of Nepal will incorporate the findings and recommendations of this IEE and prescribed environmental management in the EMP.

**12. COMMENTS INCORPORATION MATRIX**

## **Annexes**

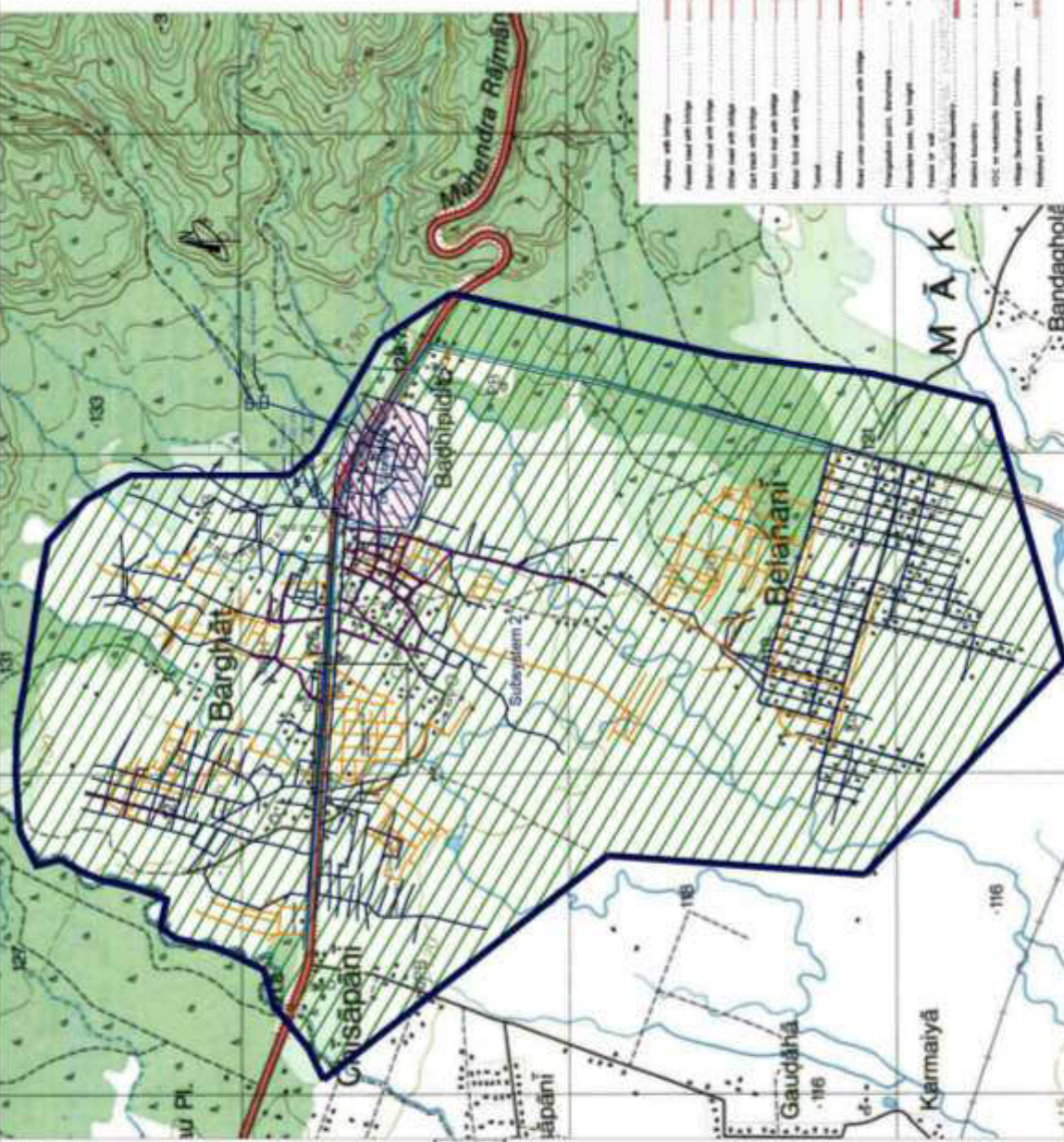
**Annex 1: Project Location Map and Water Supply Plan**

**Annex 2: Water Tested Laboratory Analysis Report**

**Annex 3: Rapid Environmental Assessment (REA) Checklist**

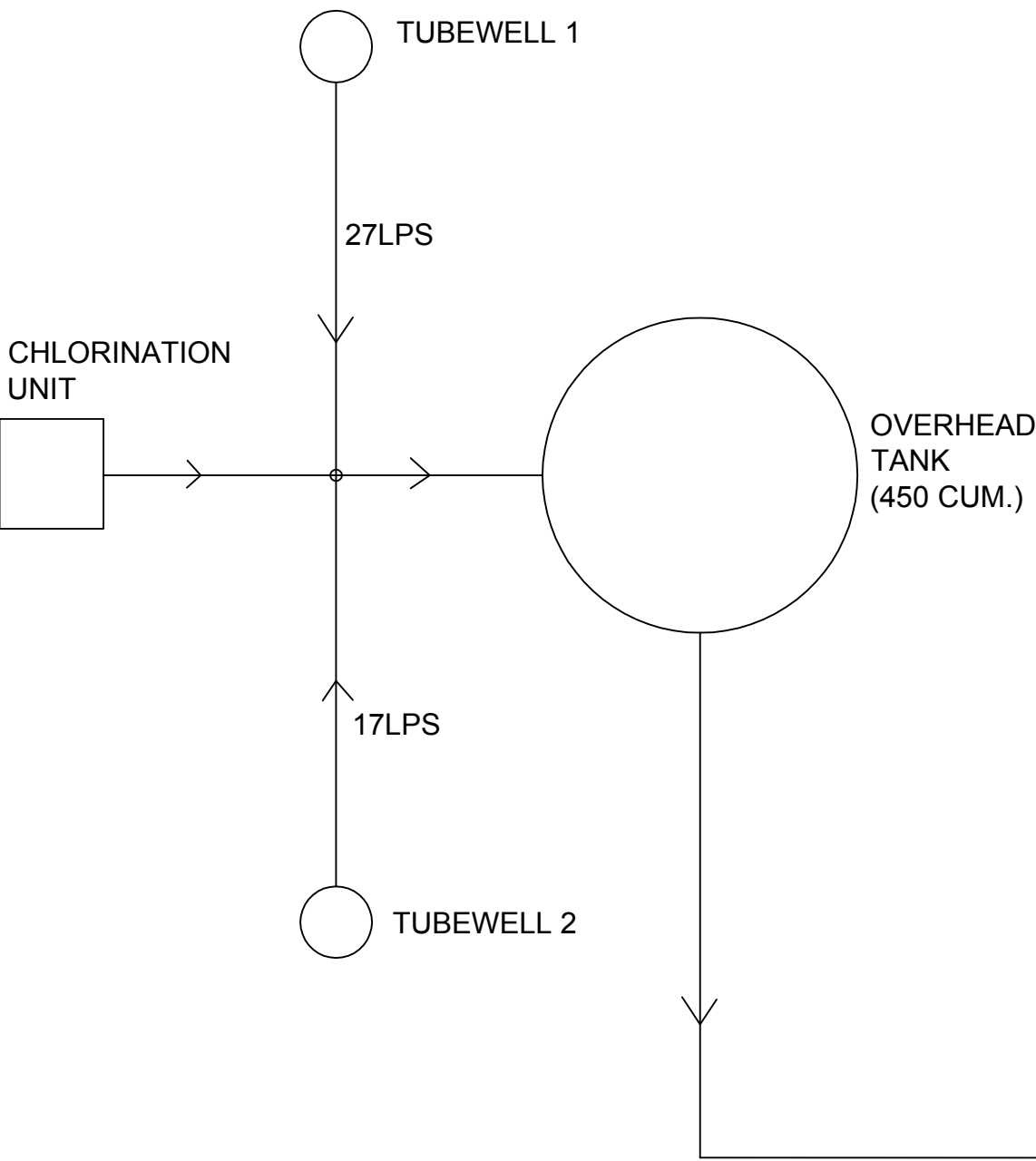
**Annex 4: Minute of Meeting**



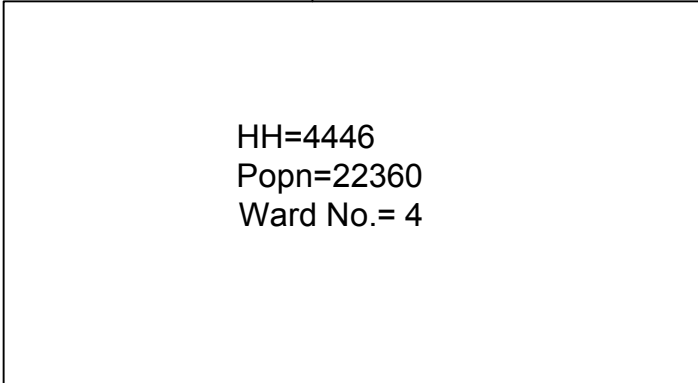
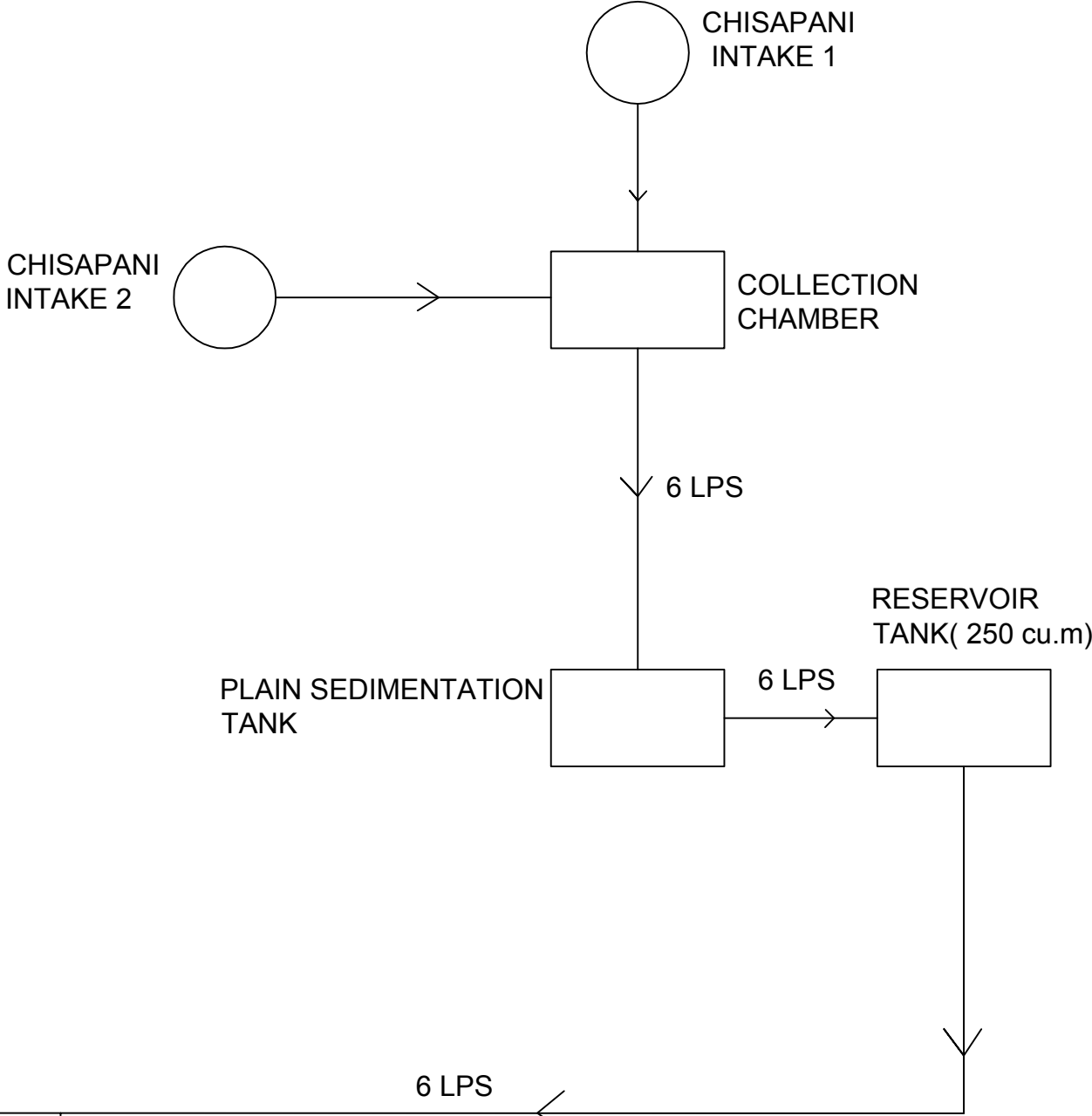


|                                                                                                                                                                                  |                                                                                            |                                                                                      |  |              |              |               |                                                                                                                                                                                                                     |                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--|--------------|--------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| LAYOUT PLAN OF SYSTEM                                                                                                                                                            | ENHANCE FUNCTIONALITY<br>IN<br>SMALL TOWN WATER SUPPLY<br>AND<br>SANITATION SECTOR PROJECT | PROJECT AREA MAP<br>OF<br>BARDGHAT, NAWALPARASI                                      |  | DESIGNED BY: | CHECKED BY:  | SCALE (1/100) | BARDGHAT<br>P. S. No. 271/13<br>Dist. Barabanki<br>Block Barabanki<br>Post Barabanki<br>Na 871-1-401134/134/134 (na)<br>Na 871-1-402208<br>Na 871-1-402208<br>Na 871-1-402208<br>Na 871-1-402208<br>Na 871-1-402208 | DATE May, 2013<br>SNO. NO. 1<br>SHEET NO. 1 |
|                                                                                                                                                                                  |                                                                                            |                                                                                      |  | DRAWN BY:    | APPROVED BY: | 1:20000       |                                                                                                                                                                                                                     |                                             |
| GOVERNMENT OF NEPAL<br>MINISTRY OF URBAN DEVELOPMENT<br>SMALL TOWN WATER SUPPLY AND SANITATION SECTOR PROJECT<br>PROJECT BARDGHAT OFFICE<br>PARTUNOUR, MINERALOGICAL, VITAMINOUS |                                                                                            |  |  |              |              |               |                                                                                                                                                                                                                     |                                             |

TUBE WELL SYSTEM



GRAVITY SYSTEM



**BARDAGHAT**

## **Annex - 2: Water Tested Laboratory Analysis Report**





# Water

Engineering & Training Centre (P.) Ltd.

Laboratory R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

| Name of Sender: SULTITEKO UNICORN JV |                                       | Name of Project: Bardaghat STWSSP     |           | Date of Collection: 19/08/2014               |                                        |
|--------------------------------------|---------------------------------------|---------------------------------------|-----------|----------------------------------------------|----------------------------------------|
| Sample No: 301/0714072               |                                       | Type of Source: Spring Source (Mixed) |           | Sampling Point: After BPT (Mixed)            |                                        |
| Date of Receipt: 01/08/2014          |                                       | Name of Source: Free Well             |           | Field Temperature (°C): 27.0                 |                                        |
| Analyzed date: 01/08/2014-04/09/2014 |                                       | No. of Samples: 01                    |           | Field pH: 6.5                                |                                        |
| Sampled by: WETC                     |                                       | Location: Jungle Area                 |           | Field Electrical Conductivity (µS/cm): 593.0 |                                        |
| Parameters                           | Units                                 | WHO GV                                | NDWQS     | Result                                       | Method used                            |
| <b>PHYSICAL</b>                      |                                       |                                       |           |                                              |                                        |
| pH                                   | -                                     | 6.5-8.5                               | 6.5-8.5   | 6.5                                          | 4300 H, APHA, 21 <sup>st</sup> EDITION |
| Colority                             | NTU                                   | -                                     | 5 (10)    | <1.0                                         | 2100 H, APHA, 21 <sup>st</sup> EDITION |
| Electrical Conductivity              | µS/cm                                 | -                                     | 1500      | 593.0                                        | 2500 H, APHA, 21 <sup>st</sup> EDITION |
| Water Temperature                    | °C                                    | -                                     | -         | 27.0                                         | 2550 H, APHA, 21 <sup>st</sup> EDITION |
| <b>CHEMICAL</b>                      |                                       |                                       |           |                                              |                                        |
| Calcium                              | mg/L as Ca <sup>2+</sup>              | -                                     | 100       | 59.2                                         | 3500 H, APHA, 21 <sup>st</sup> EDITION |
| Magnesium                            | mg/L as Mg <sup>2+</sup>              | -                                     | -         | 14.0                                         | 3500 H, APHA, 21 <sup>st</sup> EDITION |
| Iron                                 | mg/L as Fe                            | 0.3                                   | 0.3 (0.1) | <0.01                                        | 3510 H, APHA, 21 <sup>st</sup> EDITION |
| Manganese                            | mg/L as Mn                            | 0.4                                   | 0.2       | <0.01                                        | 3510 H, APHA, 21 <sup>st</sup> EDITION |
| Arsenic                              | mg/L as As                            | 0.05                                  | 0.05      | <0.005                                       | 3510 H, APHA, 21 <sup>st</sup> EDITION |
| Ammonia                              | mg/L as NH <sub>4</sub> <sup>+</sup>  | 1.5                                   | 1.5       | 0.06                                         | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Sulfate                              | mg/L as SO <sub>4</sub> <sup>2-</sup> | -                                     | -         | 51.6                                         | 3100 H, APHA, 21 <sup>st</sup> EDITION |
| Fluoride                             | mg/L as F <sup>-</sup>                | -                                     | -         | 1.3                                          | 3100 H, APHA, 21 <sup>st</sup> EDITION |
| Total Chlorine                       | mg/L as Cl <sub>2</sub>               | 0.05                                  | 0.05      | <0.01                                        | 3100 H, APHA, 21 <sup>st</sup> EDITION |
| Bromate                              | mg/L as BrO <sub>3</sub> <sup>-</sup> | -                                     | -         | 270.8                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Cyanide                              | mg/L as CN <sup>-</sup>               | -                                     | -         | 9.6                                          | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Hydrogen Sulfide                     | mg/L as H <sub>2</sub> S              | -                                     | -         | ND                                           | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Free Alkalinity                      | mg/L as CaCO <sub>3</sub>             | 50                                    | -         | 138.0                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Carbonate Alkalinity                 | mg/L as CaCO <sub>3</sub>             | -                                     | -         | 16.0                                         | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Non Carbonate Alkalinity             | mg/L as CaCO <sub>3</sub>             | -                                     | -         | 222.0                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Orthophosphate                       | mg/L as P                             | -                                     | -         | 0.17                                         | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Nitrate                              | mg/L as NO <sub>3</sub> <sup>-</sup>  | 50                                    | 50        | 0.05                                         | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Nitrite                              | mg/L as NO <sub>2</sub> <sup>-</sup>  | 3                                     | -         | <0.02                                        | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Nitrogen                             | mg/L as N                             | 250                                   | 250       | <5.0                                         | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Chloride                             | mg/L as Cl <sup>-</sup>               | 250                                   | 250       | 5.0                                          | 2500 H, APHA, 21 <sup>st</sup> EDITION |
| Fluoride                             | mg/L as F <sup>-</sup>                | 1.5                                   | 0.5-1.5   | 0.51                                         | 2500 H, APHA, 21 <sup>st</sup> EDITION |
| Silica                               | mg/L as SiO <sub>2</sub>              | -                                     | -         | 17.5                                         | 4500 H, APHA, 21 <sup>st</sup> EDITION |
| Total Hardness                       | mg/L as CaCO <sub>3</sub>             | 500                                   | 500       | 190.0                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Non Carbonate Hardness               | mg/L as CaCO <sub>3</sub>             | -                                     | -         | 8.0                                          | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Total Dissolved Solids               | mg/L                                  | 1000                                  | -         | 361.0                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| Laugher Sanitization Index           | -                                     | -                                     | -         | -0.14                                        | 2520 H, APHA, 21 <sup>st</sup> EDITION |
| <b>BIOLOGICAL</b>                    |                                       |                                       |           |                                              |                                        |
| Total Coliforms                      | CFU/100ml                             | ND                                    | N         | 24                                           | 9223 B, APHA, 21 <sup>st</sup> EDITION |
| Fecal Coliforms                      | CFU/100ml                             | ND                                    | N         | ND                                           | 9223 B, APHA, 21 <sup>st</sup> EDITION |

APHA: American Public Health Association, Standard Methods for the Examination of Water & Waste Water, WETC, World Health Organization, 1995, 2000 Update, NDWQS, National Drinking Water Quality Standard, 2002 (Nepal). \* These values are lower and upper limits. ND does in the parenthesis refers the acceptable values only when alternative is not available. \*\* Not accredited Test Method

**Comment: Bacteriologically, unsatisfactory. The tested chemical parameters indicate the NDWQS range water quality.**

Analysed by

13  
Checked by

Authorized Signature

- Notes:
- The result refers only to the parameters listed in the samples provided to our laboratory or collected by us for analysis as per the instructions of the problem is neither intended nor implied.
  - Any duplicating of this report can not be used as evidence in the court of law and should not be used in any advertising media without prior written permission to us.
  - The sole liability of our company for the product is limited to the invoiced amount only.





# Water

Engineering & Training Centre (P.) Ltd.

Laboratory, R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

|                                        |                                       |                                           |          |                                              |                                                        |
|----------------------------------------|---------------------------------------|-------------------------------------------|----------|----------------------------------------------|--------------------------------------------------------|
| Name of Sender: SILENT FLY ENGINEERING |                                       | Name of Project: Bardaghat STWSSSP        |          | Date of Collection: 22/08/2014               |                                                        |
| Sample No: 302/071072                  |                                       | Type of Source: Bore Well & Spring Source |          | Sampling Point: Bore Well & Spring Source    |                                                        |
| Date of Receipt: 01/08/2014            |                                       | (Mixed)                                   |          | Field Temperature (°C): 28.2                 |                                                        |
| Analyzed date: 01/08/2014-04/09/2014   |                                       | Name of Source: Tap Water                 |          | Field pH: 7.5                                |                                                        |
| Sampled by: WETC                       |                                       | No. of Samples: 01                        |          | Field Electrical Conductivity (µS/cm): 594.0 |                                                        |
| Location : Bardaghat (Tap No. 1600)    |                                       |                                           |          |                                              |                                                        |
| Parameters                             | Units                                 | WHO GV                                    | NDWQS    | Results                                      | Method used                                            |
| PHYSICAL                               |                                       |                                           |          |                                              |                                                        |
| pH                                     | -                                     | 6.5-8.5                                   | 6.5-8.5* | 7.5                                          | 4500-H <sup>+</sup> B, APHA, 21 <sup>st</sup> EDITION  |
| Turbidity                              | NTU                                   | 5                                         | 20 FTU   | <1.0                                         | 2190 D, APHA, 21 <sup>st</sup> EDITION                 |
| Electrical Conductivity                | µS/cm                                 | -                                         | 1500     | 594.0                                        | 2540 B, APHA, 21 <sup>st</sup> EDITION                 |
| Lab. Temperature                       | °C                                    | -                                         | -        | 28.2                                         | 2550 B, APHA, 21 <sup>st</sup> EDITION                 |
| CHEMICAL                               |                                       |                                           |          |                                              |                                                        |
| Calcium                                | mg/L as Ca <sup>2+</sup>              | -                                         | 75       | 59.2                                         | 2550 C, APHA, 21 <sup>st</sup> EDITION                 |
| Magnesium                              | mg/L as Mg <sup>2+</sup>              | -                                         | -        | 14.6                                         | 2550 A, APHA, 21 <sup>st</sup> EDITION                 |
| TDS                                    | mg/L as TDS                           | 0.3                                       | 2.3 (3)  | <0.01                                        | 2111 B, APHA, 21 <sup>st</sup> EDITION                 |
| Sulfate                                | mg/L as SO <sub>4</sub> <sup>2-</sup> | 2.5                                       | 0.2      | <0.01                                        | 2111 D, APHA, 21 <sup>st</sup> EDITION                 |
| Acidity                                | mg/L as H <sup>+</sup>                | 2.0                                       | 0.15     | <0.005                                       | 0150 A, APHA, 21 <sup>st</sup> EDITION                 |
| Ammonia                                | mg/L as NH <sub>3</sub>               | 1.5                                       | 1.5      | 0.06                                         | 4500-NH <sub>3</sub> C, APHA, 17 <sup>th</sup> EDITION |
| Sodium                                 | mg/L as Na <sup>+</sup>               | -                                         | -        | 51.6                                         | 2511 B, APHA, 21 <sup>st</sup> EDITION                 |
| Potassium                              | mg/L as K <sup>+</sup>                | -                                         | -        | 1.3                                          | 2511 D, APHA, 21 <sup>st</sup> EDITION                 |
| Total Chlorine                         | mg/L as Cl <sub>2</sub>               | 0.05                                      | 0.10     | <0.01                                        | 2511 B, APHA, 21 <sup>st</sup> EDITION                 |
| Bicarbonate                            | mg/L as HCO <sub>3</sub> <sup>-</sup> | -                                         | -        | 383.0                                        | 2520 B, APHA, 21 <sup>st</sup> EDITION                 |
| Carbonate                              | mg/L as CO <sub>3</sub> <sup>2-</sup> | -                                         | -        | 12.0                                         | 2520 D, APHA, 21 <sup>st</sup> EDITION                 |
| Hydroxide Alkalinity                   | mg/L as OH <sup>-</sup>               | -                                         | -        | ND                                           | 2520 C, APHA, 21 <sup>st</sup> EDITION                 |
| Total Alkalinity                       | mg/L as CaCO <sub>3</sub>             | ND                                        | -        | 334.0                                        | 2520 D, APHA, 21 <sup>st</sup> EDITION                 |
| Carbonate Alkalinity                   | mg/L as CaCO <sub>3</sub>             | -                                         | -        | 20.0                                         | 2520 B, APHA, 21 <sup>st</sup> EDITION                 |
| Non Carbonate Alkalinity               | mg/L as CaCO <sub>3</sub>             | -                                         | -        | 314.0                                        | 2520 B, APHA, 21 <sup>st</sup> EDITION                 |
| Dissolved Solids                       | mg/L as TDS                           | -                                         | -        | 0.17                                         | 2500-2, APHA, 21 <sup>st</sup> EDITION                 |
| Nitrate                                | mg/L as NO <sub>3</sub> <sup>-</sup>  | 50                                        | 50       | 0.05                                         | 4500-NO <sub>3</sub> B, APHA, 21 <sup>st</sup> EDITION |
| Nitrite                                | mg/L as NO <sub>2</sub> <sup>-</sup>  | 5                                         | -        | <0.02                                        | 4500-NO <sub>2</sub> B, APHA, 21 <sup>st</sup> EDITION |
| Sulfide                                | mg/L as S <sup>2-</sup>               | 0.5                                       | 0.20     | <0.0                                         | 4500-SO <sub>4</sub> , APHA, 21 <sup>st</sup> EDITION  |
| Chloride                               | mg/L as Cl <sup>-</sup>               | 250                                       | 250      | 5.9                                          | 15000 D, APHA, 21 <sup>st</sup> EDITION                |
| Fluoride                               | mg/L as F <sup>-</sup>                | 1.5                                       | 0.5-1.5* | 0.57                                         | 4500-F, APHA, 21 <sup>st</sup> EDITION                 |
| Iron                                   | mg/L as Fe                            | -                                         | -        | 18.3                                         | 4500-Fe, APHA, 21 <sup>st</sup> EDITION                |
| Total Hardness                         | mg/L as CaCO <sub>3</sub>             | 300                                       | 500      | 190.0                                        | 2540 C, APHA, 21 <sup>st</sup> EDITION                 |
| Mineral Content Hardness               | mg/L as CaCO <sub>3</sub>             | -                                         | -        | 10.0                                         | Calculation                                            |
| Total Dissolved Solids                 | mg/L                                  | 1000                                      | -        | 361.0                                        | 2540 C, APHA, 21 <sup>st</sup> EDITION                 |
| Total Suspended Solids                 | mg/L                                  | -                                         | -        | 1.0                                          | 2540 B, APHA, 21 <sup>st</sup> EDITION                 |
| BIOLOGICAL                             |                                       |                                           |          |                                              |                                                        |
| Total Coliforms                        | CFU/100ml                             | ND                                        | ND       | 10                                           | 4500 E, APHA, 21 <sup>st</sup> EDITION                 |
| Fecal Coliform                         | CFU/100ml                             | ND                                        | ND       | ND                                           | 5211 D, APHA, 21 <sup>st</sup> EDITION                 |

APHA: American Public Health Association. Standard Methods for the Examination of Water & Waste Water. WHO GV: World Health Organization Guidelines. Value 2000 µS/cm. NDWQS: National Drinking Water Quality Standard, 2002 (Nepal). \*These values show lower and upper limits. ( ) Values in the parentheses refers the sample is not as per water alternative is not available. \*\*Not Specified Test Method

**Comment:** Bacteriologically, unsatisfactory. The tested chemical parameters indicate the NDWQS range water quality.

Analyzed by

Checked by

Authorized Signature

**Notes:** The result refers only to the parameters tested of the samples provided to our laboratory or collected by us for analysis. Specified Endorsement or the principal is neither intended nor implied.

Any replication of this report can not be used as evidence in the court of law and should not be used in any advertising media without our written permission in writing.

1. The total liability of our company for the product is limited to the analyzed amount only.



# Water

Engineering & Training Centre (P.) Ltd.

Laboratory, R & D on Total Water Management, Treatment & Consultancy

## LABORATORY ANALYSIS REPORT

| Name of Sender: SILENT WALKER UNICORN JV |                           | Name of Project: Kandasagar STWSSSP        |         | Date of Collection: 22/08/2014               |                                                         |
|------------------------------------------|---------------------------|--------------------------------------------|---------|----------------------------------------------|---------------------------------------------------------|
| Sample No: 303/071/072                   |                           | Type of Source: Bore Well                  |         | Sampling Point: Office Compound Tap Field    |                                                         |
| Date of Receipt: 01/08/2014              |                           | Name of Source: Bore Well                  |         | Temperature (°C): 25.7                       |                                                         |
| Analyzed date: 01/08/2014-04/09/2014     |                           | No. of Samples: 01                         |         | Field pH: 6.9                                |                                                         |
| Sampled by: WKTC                         |                           | Location: Kandasagar (Office Compound Tap) |         | Field Electrical Conductivity (µS/cm): 547.0 |                                                         |
| Parameters                               | Units                     | WHO GV                                     | NDWQS   | Result                                       | Methods used                                            |
| <b>PHYSICAL</b>                          |                           |                                            |         |                                              |                                                         |
| pH                                       |                           | 6.5-8.5                                    | 6.5-8.5 | 6.9                                          | 1500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Turbidity                                | NTU                       | 5                                          | 500     | <1.0                                         | 2100 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Electrical Conductivity                  | µS/cm                     | -                                          | 1500    | 547.0                                        | 2500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Lab Temperature                          | °C                        | -                                          | -       | 25.7                                         | 1500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| <b>CHEMICAL</b>                          |                           |                                            |         |                                              |                                                         |
| Calcium                                  | mg/L as Ca <sup>2+</sup>  | -                                          | 200     | 62.4                                         | 3500 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Magnesium                                | mg/L as Mg <sup>2+</sup>  | -                                          | -       | 61.7                                         | 3500-Mg, B, APHA, 21 <sup>ST</sup> EDITION              |
| Iron                                     | mg/L as Fe                | 0.3                                        | 0.3-1.0 | <0.01                                        | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Manganese                                | mg/L as Mn                | 0.4                                        | 0.2     | <0.05                                        | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Arsenic                                  | mg/L as As                | 0.05                                       | 0.05    | <0.005                                       | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Ammonia                                  | mg/L as NH <sub>3</sub>   | 1.5                                        | 1.5     | 0.03                                         | 4500 NH <sub>3</sub> -N, APHA, 21 <sup>ST</sup> EDITION |
| Sodium                                   | mg/L as Na <sup>+</sup>   | -                                          | -       | 4.5                                          | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Potassium                                | mg/L as K                 | -                                          | -       | 1.4                                          | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Total Chlorine                           | mg/L as Cl <sub>2</sub>   | 0.05                                       | 0.05    | <0.01                                        | 3110 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Total Hardness                           | mg/L as CaCO <sub>3</sub> | -                                          | -       | 322.1                                        | 3500 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Chlorine                                 | mg/L as Cl <sub>2</sub>   | -                                          | -       | NIL                                          | 3500 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Hydroxide Alkalinity                     | mg/L as OH <sup>-</sup>   | -                                          | -       | NIL                                          | 2500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Calcium Alkalinity                       | mg/L as CaCO <sub>3</sub> | NIL                                        | -       | 264.0                                        | 2500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Total Alkalinity                         | mg/L as CaCO <sub>3</sub> | -                                          | -       | 264.0                                        | 2500 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Orthophosphate                           | mg/L as P                 | -                                          | -       | 0.06                                         | 4500 P, APHA, 21 <sup>ST</sup> EDITION                  |
| Nitrate                                  | mg/L as NO <sub>3</sub>   | 50                                         | 50      | 0.1                                          | 4500 NO <sub>3</sub> -N, APHA, 21 <sup>ST</sup> EDITION |
| Nitrite                                  | mg/L as NO <sub>2</sub>   | 3                                          | -       | <0.02                                        | 4500 NO <sub>2</sub> -N, APHA, 21 <sup>ST</sup> EDITION |
| Fluoride                                 | mg/L as F <sup>-</sup>    | 2.0                                        | 2.0     | <0.1                                         | 4500 F, APHA, 21 <sup>ST</sup> EDITION                  |
| Chloride                                 | mg/L as Cl <sup>-</sup>   | 250                                        | 250     | 2.9                                          | 4500 Cl, APHA, 21 <sup>ST</sup> EDITION                 |
| Cyanide                                  | mg/L as F <sup>-</sup>    | 1.5                                        | 0.5-1.5 | 0.12                                         | 1520 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Sulfate                                  | mg/L as SO <sub>4</sub>   | -                                          | -       | 13.5                                         | 4500 SO <sub>4</sub> -S, APHA, 21 <sup>ST</sup> EDITION |
| Total Sulfate                            | mg/L as SO <sub>4</sub>   | 300                                        | 300     | 286.0                                        | 2500 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Monochlorine Residual                    | mg/L as Cl <sub>2</sub>   | -                                          | -       | <2.0                                         | Calculation                                             |
| Total Dissolved Solids                   | mg                        | 1000                                       | -       | 328.0                                        | 2540 C, APHA, 21 <sup>ST</sup> EDITION                  |
| Total Suspended Solids                   | mg                        | -                                          | -       | <0.6                                         | 2540 B, APHA, 21 <sup>ST</sup> EDITION                  |
| <b>BIOLOGICAL</b>                        |                           |                                            |         |                                              |                                                         |
| Total Coliforms                          | CFU/100ml                 | NIL                                        | NIL     | NIL                                          | 9220 B, APHA, 21 <sup>ST</sup> EDITION                  |
| Fecal Coliforms                          | CFU/100ml                 | NIL                                        | NIL     | NIL                                          | 9220 B, APHA, 21 <sup>ST</sup> EDITION                  |

APHA: American Public Health Association, Standard Methods for the Examination of Water & Wastewater. WHO GV: World Health Organization Guideline Value. NDWQS: National Drinking Water Quality Standard. \* These values are shown as lower and upper limits. \*\* Values in the parentheses are acceptable values only when alternatives are not available. \*\*Not Accredited Test Method.

**Comment:** Bacteriologically, satisfactory. The tested chemical parameters indicate the NDWQS range water quality.

Analysed by:

Checked by:

Authorized Signature:

- Note: 1. This report refers only to the parameters tested in the samples provided to our laboratory or collected by us for analysis as specified. Endorsement of the product is neither intended nor implied.  
2. Any expiration of this report can not be used as evidence in the court of law and should not be used in any advertising circle without prior written permission from us.  
3. The total liability of our company for the product is limited to the invoiced amount only.

**Annex - 3: Rapid Environment Assessment  
(REA) Checklist**

## ADB'S REA Checklist

## Rapid Environmental Assessment (REA) Checklist

## WATER SUPPLY

## Instructions:

- ☐ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- ☐ This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- ☐ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) Involuntary resettlement, (ii) Indigenous peoples planning, (iii) Poverty reduction, (iv) Participation and (v) Gender and development.
- ☐ 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:** Bardaghat Small Town Water Supply Rehabilitation Sub-Project, Nawalparasi

**Sector Division:** Water Supplys

| SCREENING QUESTIONS                                                                                                                    | Yes                                 | No                                  | REMARKS                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>A. Project Siting</b><br>Is the project area...                                                                                     |                                     |                                     |                                                                                                                                                                                                  |
| • Densely populated?                                                                                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Heavy with development activities?                                                                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Adjacent to or within any environmentally sensitive areas?                                                                           |                                     |                                     |                                                                                                                                                                                                  |
| • Cultural heritage site                                                                                                               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | The subproject components are not within locations in or near sensitive and vulnerable ecosystems and protected areas.                                                                           |
| • Protected area                                                                                                                       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Wetland                                                                                                                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Mangrove                                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Estuarine                                                                                                                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Buffer zone of protected area                                                                                                        | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Special area for protecting biodiversity                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| • Bay                                                                                                                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                                                                                                                                                                                  |
| <b>B. Potential Environmental Impacts</b><br>Will the Project cause ...                                                                |                                     |                                     |                                                                                                                                                                                                  |
| • Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff? | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Deep boaring and Spring Water                                                                                                                                                                    |
| • Impairment of historical/cultural monuments/areas and loss/damage to these sites?                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Absence of historical monuments                                                                                                                                                                  |
| • Hazard of land subsidence caused by excessive ground water pumping?                                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <ul style="list-style-type: none"> <li>• Excessive pumping should be controlled</li> <li>• Spring water (ChisaPaniMul I and II)</li> <li>• Reservoir (ThareKhola and Kerabari Stream)</li> </ul> |
| • Social conflicts arising from displacement of communities?                                                                           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not anticipated. The proposed sites of the deep tube well and new overhead tank will not require acquisition of private land. There are no                                                       |

| SCREENING QUESTIONS                                                                                                                                                                                                    | Yes                                 | No                                  | REMARKS                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                        |                                     |                                     | encroachers/squatters or residential/commercial structures at the proposed sites where infrastructure is to be established.                           |
| • Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?                                                                                               | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not anticipated. Water quantity is sufficient.                                                                                                        |
| • Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?                                                                                                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Arsenic problem occurs in the area, a health hazard                                                                                                   |
| • Delivery of unsafe water to distribution system?                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Can be mitigated                                                                                                                                      |
| • Inadequate protection of intake works or wells, leading to pollution of water supply?                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Can be mitigated                                                                                                                                      |
| • Over pumping of ground water, leading to salinization and ground subsidence?                                                                                                                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | High cost involved in pumping will constrain over pumping. EMP recommends monitoring pumping & maintaining record to control pumping to design limit. |
| • Excessive algal growth in storage reservoir?                                                                                                                                                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Treatment will come in existence                                                                                                                      |
| • Increase in production of sewage beyond capabilities of community facilities?                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Can be mitigated                                                                                                                                      |
| • Inadequate disposal of sludge from water treatment plants?                                                                                                                                                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Can be mitigated                                                                                                                                      |
| • Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?                                                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Groundwater pumps are submersible and all other pump equipment in the water treatment plan will be housed in a pump shed.                             |
| • Impairments associated with transmission lines and access roads?                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                                                            |
| • Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.                                                                          | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | To be consider in design stage                                                                                                                        |
| • Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?                                                                                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Training for operator to be provided                                                                                                                  |
| • Dislocation or involuntary resettlement of people                                                                                                                                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not anticipated                                                                                                                                       |
| • Social conflicts between construction workers from other areas and community workers?                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                                                            |
| • Noise and dust from construction activities?                                                                                                                                                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                                                            |
| • Increased road traffic due to interference of construction activities?                                                                                                                                               | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                                                            |
| • Continuing soil erosion/silt runoff from construction operations?                                                                                                                                                    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                                                            |
| • 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? | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Training for operator to be provided                                                                                                                  |
| • Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?                                                                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Concern for corrosion of G.I. pipes caused by the chlorine content in treated water is low. EMP provides mitigation measures.                         |
| • Accidental leakage of chlorine gas?                                                                                                                                                                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Bleaching power is used in Nepal                                                                                                                      |
| • Excessive abstraction of water affecting downstream water users?                                                                                                                                                     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                                                                                                        |
| • Competing uses of water?                                                                                                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                                                                                                        |

| SCREENING QUESTIONS                                                                                                                                                                                                                                                                                                                                                           | Yes                                 | No                                  | REMARKS                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Increased sewage flow due to increased water supply</li> </ul>                                                                                                                                                                                                                                                                         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Frequency of septage pumping to be increased; regular testing of ground water for microbiological pollution |
| <ul style="list-style-type: none"> <li>Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant</li> </ul>                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Can be mitigated and improved                                                                               |
| <ul style="list-style-type: none"> <li>Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?</li> </ul>                                                                                                                                         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Its small project, so limited number of worker will increase, and can be managed                            |
| <ul style="list-style-type: none"> <li>Social conflicts if workers from other regions or countries are hired?</li> </ul>                                                                                                                                                                                                                                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Priority in employment will be given to local residents.                                                    |
| <ul style="list-style-type: none"> <li>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?</li> </ul>                                                                                                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?</li> </ul> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <b>Sanitation</b>                                                                                                                                                                                                                                                                                                                                                             |                                     |                                     |                                                                                                             |
| <b>C. Potential environmental impacts</b>                                                                                                                                                                                                                                                                                                                                     |                                     |                                     |                                                                                                             |
| Will the project cause...                                                                                                                                                                                                                                                                                                                                                     |                                     |                                     |                                                                                                             |
| <ul style="list-style-type: none"> <li>Impairment of historical/cultural monuments/areas and loss/damage to these sites?</li> </ul>                                                                                                                                                                                                                                           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | No such areas near the subproject sites.                                                                    |
| <ul style="list-style-type: none"> <li>Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?</li> </ul>                                                                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Dislocation or involuntary resettlement of people?</li> </ul>                                                                                                                                                                                                                                                                          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                                                              |
| <ul style="list-style-type: none"> <li>Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?</li> </ul>                                                                                                                                                                                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                                                              |
| <ul style="list-style-type: none"> <li>Impairment of downstream water quality due to inadequate Sewage treatment or release of untreated sewage?</li> </ul>                                                                                                                                                                                                                   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Toilets will be connected to septic tanks that will be designed to achieve maximum retention.               |
| <ul style="list-style-type: none"> <li>Overflows and flooding of neighboring properties with raw sewage?</li> </ul>                                                                                                                                                                                                                                                           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                                                              |
| <ul style="list-style-type: none"> <li>Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?</li> </ul>                                                                                                                                                                                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Noise and vibration due to blasting and other civil works?</li> </ul>                                                                                                                                                                                                                                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?</li> </ul>                                                                                                                                                            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?</li> </ul>                                                                                                                                                                                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |
| <ul style="list-style-type: none"> <li>Inadequate buffer zone around pumping and treatment plants to alleviate noise and other</li> </ul>                                                                                                                                                                                                                                     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                                                  |

| SCREENING QUESTIONS                                                                                                                                                                                                                                                                                                           | Yes                                 | No                                  | REMARKS                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|---------------------------------------------------------------------------|
| possible nuisances, and protect facilities?                                                                                                                                                                                                                                                                                   |                                     |                                     |                                                                           |
| • Road blocking and temporary flooding due to land excavation during the rainy season?                                                                                                                                                                                                                                        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Not applicable as construction work will be done during off rainy seasons |
| • Noise and dust from construction activities?                                                                                                                                                                                                                                                                                | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                |
| • Traffic disturbances due to construction material transport and wastes?                                                                                                                                                                                                                                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Minor and temporary impact                                                |
| • Temporary silt runoff due to construction?                                                                                                                                                                                                                                                                                  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Not applicable                                                            |
| • Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?                                                                                                                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                |
| • Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?                                                                                                                                                                                                             | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                            |
| • Contamination of surface and ground waters due to sludge disposal on land?                                                                                                                                                                                                                                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                            |
| • Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unsterilized sludge?                                                                                                                  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                            |
| • Large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?                                                                                                                                                                      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable                                                            |
| • Social conflicts between construction workers from other areas and community workers?                                                                                                                                                                                                                                       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Priority in employment will be given to local residents.                  |
| • Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?                                                                                                                                    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Not applicable.                                                           |
| • Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Minor and temporary impact                                                |





## **English Translation of Minute of Meeting - Phase II**

Bardghat Small Town Water Supply Sanitation and User's Committee organized a public hearing workshop on 2072/6/6. Participation were made from all concerned stakeholders. After discussion in the public hearing it was observed that there will be no negative impacts on the environment, no necessity of land acquisition and no need of resettlement while implementing the proposed "Enhance Functionality" in Small Town Water Supply and Sanitation Sector Project. As such it was decided to inform this conclusion to the concerned authorities.

# Phase 1

[illegible][illegible]

विशेष कल्याणकारी कार्यगत माह मा  
आयोजना क्षेत्र मा गर्नु आयोजना मा देख्ने  
पेक्का आयोजनाको योजना देख्ने कार्यहरू  
को अध्ययन गरि रिपोर्ट जेठा मन्त्रालय  
मा बर्दस्तर खाट पेठा मन्त्रालय कति  
आवश्यकता कार्यहरू मा प्राथमिकता  
को आधार मा दुई भाग मा बाँडि  
सुन गरी २०२२ र २०३० को Design  
गरी रिपोर्ट तयार गरिइएको पाइयो। जे  
समस्याहरू हुनु रहेका आयोजनाको  
अपना हेर्ने। तयारी निर्माण सुचारु

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

①  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$   $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$   $\frac{1}{16} \times \frac{1}{16} = \frac{1}{256}$   $\frac{1}{256} \times \frac{1}{256} = \frac{1}{65536}$

(७) उद्योग सुख साधन का विचार साधन  
प्रसार का विचार साधन विचार  
साधन का विचार साधन विचार  
साधन का विचार साधन विचार

24/12/2020

[illegible]

Management Prob.

(1) Billing Software का मालिक  
Full Account Software का  
मालिक।

2500 पैसे का मालिक का पैसा है।

(2) बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।

(3) बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।

(4) बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
बिलिंग सॉफ्टवेयर का मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।  
मालिक का पैसा है। मालिक का पैसा है।

# **Phase 2**

आज दिनांक २००७२१६।६ को वरदघाट शाना शहरी कार्यवाही तथा व्यवसाय  
उपस्थित शहरीकरण आयोगका समन्वयक/सहायक उपस्थित एवं मन्त्रालय कार्यालय गएको । यो बैठकमा  
प्रत्यक्ष रूपमा रहेर आएको हुने कारणले शहरीकरण शाना शहरीकरण कार्यवाही (Enhanced Functionality in Small  
Town Water Supply and Sanitation Sector Project) कार्यवाहीमा यो कडायासमा हुने प्रत्यक्ष प्रसार गएको,  
जसमा शहरीकरण रने गएको । पूर्ववर्ती कार्यवाही समेत गरीएको शहरीकरण शाना शहरीकरण कार्यवाहीमा  
समन्वयक/सहायक जसको गरीएको छ ।

उपस्थित:

| क्र.सं. | नाम, थर                   | संस्था                | हस्ताक्षर  |
|---------|---------------------------|-----------------------|------------|
| १-      | श्री कुमार सिंह थापा      | आयुक्त वरदघाट शहरीकरण | श्री.सिंह  |
| २-      | श्री राम कुमार कुँवर      | उपस्थित               | रामकुमार   |
| ३-      | श्री इन्द्र कुमार शाना    | मन्त्रिण              | इन्द्र     |
| ४-      | श्री दिल कुमार कुँवर      | उपस्थित               | दिल        |
| ५-      | श्री कमल थापा             | उपस्थित               | कमल        |
| ६-      | श्री ललिता शर्मा          | "                     | ललिता      |
| ७-      | श्री हिरा कुमार चौधरी     | "                     | हिरा       |
| ८-      | श्री राजेन्द्र शुनार      | "                     | राजेन्द्र  |
| ९-      | श्री जोग ब. थापा          | "                     | जोग        |
| १०-     | श्री रामजी लोडारी         | लेखा/उपस्थित          | रामजी      |
| ११-     | श्री जुन कुमार शर्मा      | उपस्थित               | जुन        |
| १२-     | श्री शकुन्तला चौधरी       | "                     | शकुन्तला   |
| १३-     | श्री धीरज शर्मा           | उपस्थित               | धीरज       |
| १४-     | श्री रुद्र प्रकाश उपस्थित | "                     | रुद्र      |
| १५-     | श्री शेष बाल पाठे         | प्राविष्ट/उपस्थित     | शेष        |
| १६-     | श्री हरि प्रसाद बाल       | ITECO Nepal           | हरि        |
| १७-     | श्री (18/06/01) K/का      | "                     | (18/06/01) |



आयुक्त वरदघाट शहरीकरण  
कार्यालय



| क्र.सं | नाम धर                  | ठेगाना           | हस्ताक्षर       |
|--------|-------------------------|------------------|-----------------|
| १८-    | श्री मैत्र शंकर जिरी    | वर्दघाट-४ उपमंडल | मजबूत           |
| १९-    | श्री मैत्र न. के.सी.    | वर्दघाट-४ "      | मैत्र न. के.सी. |
| २०-    | श्री शम्भा देवि चौधरी   | वर्दघाट-४ "      | माधा            |
| २१-    | श्री उमाकला पराजुली     | वर्दघाट-४ "      | उमा कला         |
| २२-    | श्री विजु रणोड          | वर्दघाट-४ "      | विजु रणोड       |
| २३-    | श्री बुद्धि लाल धिमिरे  | वर्दघाट-४ "      |                 |
| २४-    | श्री श्रीभारत आधिकारी   | वर्दघाट-४ "      | श्रीभारत        |
| २५-    | श्री कमला चुंदली        | वर्दघाट-४ "      | कमला            |
| २६-    | श्री रम प्रसाद युपिदी   | वर्दघाट-४ "      | रम प्रसाद       |
| २७-    | श्री जयि कलदुर पापा     | वर्दघाट-४ "      | जयि कल          |
| २८-    | श्री कृष्ण मगर          | वर्दघाट-४ "      |                 |
| २९-    | श्री उमाकला पंगेरी      | वर्दघाट-४ "      | उमा             |
| ३०-    | श्री राम बलदुर शता      | वर्दघाट-४ "      |                 |
| ३१-    | श्री पविता शर्मा धिमिरे | वर्दघाट-४ "      | पविता शर्मा     |
| ३२-    | श्री बाबु राम धिमिरे    | वर्दघाट-४ उपमंडल |                 |
| ३३-    | श्री प्रकाश शर्मा       | " "              |                 |
| ३४-    | श्री तुलसी शिवाली       | " "              |                 |
| ३५-    | श्री गिता शर्मा         | " "              | गिता शर्मा      |
| ३६-    | श्री राज कुमार चौधरी    | वर्दघाट-४ "      |                 |
| ३७-    | श्री कल्पना लुवरे       | वर्दघाट-४ "      |                 |
| ३८-    | श्री विवेक कुमार मुनि   | आर्यालप डंगलसाम  |                 |



म. ग. क. २७  
कमला सिंह शापा  
अध्यक्ष



|     |                         |        |                 |
|-----|-------------------------|--------|-----------------|
| 83. | શ્રી મોહન વ. ગુરજર      | વર્ષ-૪ | Hand            |
| 80. | શ્રી નેત્ર ગણપતી કલ્યાણ | "      | <del>Hand</del> |
| 89. | શ્રી પ્રમોદ અમીન        | "      | <del>Hand</del> |
| 82. | શ્રી પ્રભુ વ. શાહ       | "      | Hand            |



ગુજરાત સાહિત્ય અકાદમી

# **Project Photographs**

## Photos on Public Gathering Meeting on Environmental and Social Issues

### BARDGHAT



*Photo No. 1*



*Photo No. 2*





*Photo No. 3*



*Photo No. 4*



*Photo No. 5*



*Photo No. 6*