

# Initial Environmental Examination

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February 2016

## Philippines: Water District Development Sector Project

WATER SUPPLY SUBPROJECT FOR METRO SAN FERNANDO WATER  
DISTRICT

Prepared by Local Water Utilities Administration for the Asian Development Bank.

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## CURRENCY EQUIVALENTS

(As of 29 February 2016)

Currency Unit Philippines Peso (PHP)

\$1.00 = PHP47.57

## ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
<i>Barangay</i>	Village
CDO	Cease and Desist Order
CEMP	Contractor's Environmental Management Plan
CIA	Cumulative impact assessment
CNC	Certificate of Non-Coverage
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DOH	Department of Health
ECC	Environmental Compliance Certificate
EIA	Environmental impact analysis
EMB	Environmental Management Bureau
EMP	Environmental management plan
FGD	Focus group discussion
GHG	Greenhouse gas
GRM	Grievance redress mechanism
IEE	Initial environmental examination
IRR	Implementing rules and regulations
LGU	Local government unit
LWUA	Local Water Utilities Administration
MC	Memorandum Circular
MOA	Memorandum of agreement
MSFWD	Metro San Fernando (La Union) Water District
NAV	Notice of Alleged Violation
NGO	Non-government organization
NIA	National Irrigation Administration
NRW	Non-revenue water
NSO	National Statistics Office
NWRB	National Water Resources Board
PD	Presidential decree
PEISS	Philippine Environmental Impact Statement System
PIU	Project implementation unit
PMU	Project management unit
PNSDW	Philippine National Standards for Drinking Water
RA	Republic Act
REA	Rapid Environmental Assessment
RO	Regional Office
SPS	Safeguards Policy Statement
TSP	Total suspended particulate
WD	Water district
WDDSP	Water District Development Sector Project
WDgrC	Water district grievance redress committee
WHO	World Health Organization

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## WEIGHTS AND MEASURES

ha	–	Hectare
HP	–	Horsepower
km	–	Kilometer
KVA	–	Kilo volt ampere
lpcd	–	liters per capita per day
lps	–	liter per second
m	–	Meter
m <sup>2</sup>	–	square meter
m <sup>3</sup>	–	cubic meter
mg/L	–	Milligrams per liter
mm	–	Millimeter
ug/Ncm	–	Microgram per normal cubic meter
MPN	–	most probable number
PCU	–	platinum cobalt unit

### NOTE

In this report, "\$" refers to US dollars.

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## Executive Summary

1. *Environmental Safeguard.* An environmental assessment was made for the proposed water supply system of the Metro San Fernando Water District (MSFWD). It is one of the pilot subprojects to be funded by the Asian Development Bank (ADB) under the Water District Development Sector Project (WDDSP) of the Local Water Utilities Administration (LWUA). The MSFWD is located in the province of La Union, Republic of the Philippines. Relative to the significance of impacts and risks, this subproject is deemed Environmental Category B based on ADB's environmental categorization and the type of assessment warranted only the preparation of an Initial Environmental Examination (IEE) report. This IEE was carried out under ADB's TA 7122-PHI and in accordance with ADB's *Safeguard Policy Statement (2009)*.

2. *Legal Framework.* The assessment was also carried out within the policy, legal, and administrative frameworks relevant to the environmental assessment of water supply and sanitation projects in the Republic of the Philippines. These include the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (iii) Republic Act No. 9275 - Philippine Clean Water Act of 2004, and (iv) PD 856 - Code on Sanitation of the Philippines. The overall institutional framework is the LWUA and Water District (WD) setup as defined by PD 198. Under WDDSP, LWUA is the executing agency, while WDs, such as MSFWD, are the implementing agencies.

3. *Subproject Description.* The proposed MSFWD subproject will help improve the living conditions of the urban population in the MSFWD and enhance competitiveness by developing water supply infrastructures. MSFWD's proposed water supply system components shall include the following: (i) development of new source facilities, (ii) construction of new pumping facilities, (iii) provision of new treatment facilities, (iv) installation of new transmission and distribution pipelines, (v) construction of new storage tanks, and (vi) provision of new service connections.

4. *Environmental and Socioeconomic Conditions.* Project implementation does not pose a significant environmental threat as proposed pipeline routes follow existing infrastructure corridors and disturbed and/or developed landscapes, including along the highway from the town of Bauang, through San Fernando City, and to the towns of San Juan and Bacnotan as well as residential, commercial, and agricultural lands. Proposed sites of pumping stations and reservoirs are in disturbed landscapes, including cultivated land in Barangay Banlay of Bauang. Proposed sites of pumping stations and reservoirs are in farmlands such as in Barangay Banlay of Bauang. Most areas immediately adjacent to the road where pipelines are to be laid are already occupied by residential and other structures, while areas beyond the road corridors are basically agricultural land. An important fact to consider is that the sites are not within undisturbed landscapes, but areas touched by human activities over the years resulting to their present residential, institutional, commercial, and agricultural landscapes.

5. Socioeconomic indicators revealed that MSFWD's service area has a growing urban sector. Its 2007 total population was 272,148 representing 37.7% of La Union Province. San Fernando City's population is 42.2% of the subproject area population. Aside from San Fernando City, MSFWD franchise area includes the municipalities of San Juan, Bacnotan, Bauang, and San Gabriel in the province of La Union. However, MSFWD is presently covering only 65 Barangays of the subproject area out of a total 201 Barangays. MSFWD operates a water supply system serving 17% of the total population in its franchise area or an estimated 48, 226 people with a total of 8,185 active connections as of December 2008.

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6. *Impacts and EMP.* Screening for environmental impacts is made through a review of the parameters associated with projects for piped water supply against the components of the proposed MSFWD subproject. An important consideration in analyzing the environmental impacts of the proposed subproject is the fact that these are improvements and expansion of an existing water supply system in an already altered environment. New water treatment facility, water pipelines, pumping stations, and reservoirs are not new incursions to ecologically undisturbed landscapes. In the towns of San Juan, Bacnotan, Bauang, and San Gabriel, pipelines will pass through areas already occupied by people or influenced by long periods of human activities. The issue on impacts and risks to biodiversity conservation is not applicable to this subproject since the subproject's components will not be located in areas that are environmentally sensitive and have precious ecology.

7. During detailed design and pre-construction phase, potential nuisances and problems to the public during construction shall be addressed by inclusion in the tender documents of specific provisions addressing these issues. Although there are no issues related to historical and cultural assets, a precautionary measure shall be taken by inclusion of provisions in tender and construction contract documents requiring the contractor to immediately stop excavation activities and promptly inform the authorities if archaeological and cultural assets are discovered.

8. Inventory of losses and required land for acquisition were made during the planning phase and shall be updated during detailed design phase as soon as the final pipeline alignments and final locations of facilities are available. A separate plan for compensation and other assistance corresponding to the losses of the affected people will be prepared. On resource use, MSFWD will apply for water rights of all the wells from the National Water Resources Board (NWRB) and avoid any water use conflict.

9. Adverse environmental impacts during construction are temporary, less than significant, and can easily be mitigated. There will be no massive construction activities that can damage the environment. Water supply pipelaying is a low impact construction activity since trench excavation is shallow with narrow width. Excavated soil is backfilled to the trench after pipelaying. Required structures are relatively small in size. Typical construction issues are manageable with the implementation of a site management plan for: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) construction camps, and (v) public safety and convenience.

10. Environmental problems due to operation of the proposed water supply system can be avoided by incorporating the necessary measures in the design and use of appropriate operational procedures. Public health risk due to delivery of poor water quality can be prevented in a broader scale by implementing a water safety plan as advocated by WHO and the 2007 Philippine National Standards for Drinking Water (PNSDW). Chlorinators will be used for controlling microbial contamination and ensure adequate residual disinfection. Liquid chlorine instead of chlorine gas will be used to reduce risk and improve safety of workers. Potential ground subsidence due to excessive groundwater pumping can be avoided by operating each well at a rate lower than its safe yield.

11. An Environmental Management Plan (EMP) is developed to effectively manage the environmental issues. The plan includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) implementation arrangement. Institutional set-up discusses the requirements and responsibilities during pre-construction, construction, and operation phases. The plan includes tabulated information on: (i) required measures for each environmental impact that requires mitigation, (ii) locations where the measures apply, (iii) associated cost, and (iv) responsibility for implementing the measures and monitoring.

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12. *Consultation and Participation.* Project planning and the subsequent IEE preparation for the proposed MSFWD subproject recognized the need for public consultation and participation as central to effective environmental safeguard. Within the context of “meaningful consultation”, MSFWD initiated a process of consultation during project preparation and intends to continue it during the construction phase. MSFWD conducted an initial public consultations and information disclosure last 04 September 2009 with concerned individuals, Barangay officials, non-government organizations (NGOs), and local government unit (LGU) planning officials. Details of the subproject components were presented to the stakeholders and their views on the respective proposals were requested. Stakeholders expressed support to the proposed subproject. Project disclosure activities were also done during the conduct of a socioeconomic survey between April to May 2009. Some 384 households in MSFWD service area were informed about the proposed subproject and interviewed for socioeconomic data. Another public consultation with the stakeholders was held on 26 November 2012 at the Peoples Hall, San Juan, La Union. During detailed design, LWUA and MSFWD will again conduct public consultations and information disclosure. Large group of stakeholders are expected to attend to these proposed consultations since proposed water tariffs will also be discussed. MSFWD shall keep records of environmental and social complaints received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues.

13. *Grievance Redress Mechanism.* Implementation of the proposed MSFWD subproject will be fully compliant to ADB’s safeguards requirement on grievance redress mechanism (GRM). MSFWD shall disclose the proposed mechanism in public consultations during detailed design and in meetings during the construction phase. Complaints about environmental performance of projects during the construction phase can best be handled by an ad-hoc WD Environmental Complaints Committee (WDECC) for expeditious resolutions of the complaints, while complaints during the operation phase can be brought to the attention of Environmental Management Bureau – Region I (EMB-Reg. 1). MSFWD shall address promptly, at no costs to the complainant and without retribution, any complaints and concerns. WDECC shall be chaired by MSFWD and shall have members from the contractor, Barangay government, concerned NGOs, and women’s organizations. Creation of the WDECC and its operation shall be included in appropriate sections of the subproject’s civil works contract. EMB is mandated by PD 1586 to act on complaints about environmental performance of projects issued with environmental compliance certificates.

14. *Climate Vulnerability and Risk:* The proposed subproject is intended to increase climate resilience of the water supply and distribution system. Climate risk screening revealed high risk to climate impacts, including flood, landslide, tropical storm, and sea level rise. Specifically, this could lead to subproject vulnerability to: source water fluctuations (i.e. groundwater levels) and/or ground heave. Mitigation of potential climate impacts can be accomplished through detailed engineering design (DED). The resulting mitigated residual risk significance was found to be moderate to low.

15. *Conclusion and Recommendation.* The proposed subproject will increase MSFWD’s coverage in providing water supply services. Failure to implement the subproject may lead to public health deterioration. By 2015, MSFWD’s proposed water supply system will increase the population to be served to 70,740. Further increases in served population are expected in the years to follow due to the availability of water supply infrastructures implemented under WDDSP.

16. Analysis of potential environmental impacts revealed no significant adverse impacts to people and environment from the proposed water supply subproject. The IEE concludes that adverse environmental impacts arising from the location, design, construction, operation, and maintenance of the proposed subproject can be mitigated to less significant levels and the corresponding mitigation measures are doable. Monitoring can easily be done. The



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project can be implemented in an environmentally acceptable manner. An expanded environmental impact assessment is therefore not warranted, and this IEE shall be finalized as the final environmental assessment document of the MSFWD subproject. Its environmental classification as Category B is deemed appropriate.

17. LWUA and MSFWD shall ensure that EMP requirements for the construction phase will be reflected in the tender documents and civil works contracts and implemented including the contractor's submission of Contractor's Environmental Management Plan (CEMP). LWUA shall monitor MSFWD's compliance to the EMP. In addition, creation of WDECC and its operation, as part of the grievance redress mechanism, shall be included in appropriate sections of the subproject's civil works contracts. Institutional strengthening of MSFWD, including training, is recommended for effective EMP implementation. MSFWD shall continue the process of public consultation and information disclosure during detailed design and construction phases.

## Location Map



## I. INTRODUCTION

1. The Metro San Fernando (La Union) Water District (MSFWD) is an operational water supply utility located in the province of La Union, Republic of the Philippines and one of the selected subprojects under TA 7122-PHI: Water District Development Sector Project (WDDSP) funded by the Asian Development Bank (ADB). The expected impact of the subproject is improved health and living conditions for the communities served by the participating WDs. The expected outcome is increased access to improved water supply and sanitation services. The Local Water Utilities Administration (LWUA) is the executing agency. The participating water districts, in this case, MSFWD, are the implementing agencies for water supply and sanitation subprojects.

2. Preparation of this Initial Environmental Examination (IEE) is part of the Phase 2 activities of the WDDSP. It provides ADB with an assessment of the environmental concerns to be considered regarding the subproject location, design, construction, and maintenance. This report is also intended to assist LWUA and the MSFWD in the preparation of the required environmental document to meet the Department of Environment and Natural Resources (DENR) requirements for an application of the necessary Environmental Compliance Certificate (ECC) before the start of the construction activities.

3. This IEE is prepared for the proposed water supply subproject of MSFWD. Preparation of the IEE involved field visits to the proposed subproject area; review of available information, discussions with MSFWD, LWUA, DENR, and other government agencies, local government officials, and members of the community within the subproject area.

4. The environmental impacts of the proposed water supply system have been identified and assessed as part of the planning and design process, and actions will be taken to reduce negative impacts to acceptable levels. An environmental assessment using ADB's Rapid Environmental Assessment (REA) Checklist for Water Supply (**Appendix 1**) was conducted, and results of the assessment show that the project is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB Safeguard Policy Statement (2009) (SPS) requirements for Environment Category B projects and to meet the following objectives:

- (i) To provide critical facts, significant findings, and recommended actions;
- (ii) To present the national and local legal and institutional framework within which the environmental assessment has been carried out;
- (iii) To provide information on the existing geographic, ecological, social, and temporal contexts, including associated facilities within the project's area of influence;
- (iv) To assess the project's likely positive and negative direct and indirect impacts on physical, biological, socioeconomic, and physical cultural resources in the project's area of influence;
- (v) To identify mitigation measures and any residual negative impacts that cannot be mitigated;
- (vi) To describe the process undertaken during project design to engage stakeholders, the planned information disclosure measures, and the process for carrying out consultation with affected people and facilitating their participation during project implementation;

- (vii) To describe the project's grievance redress mechanism for resolving complaints about environmental performance;
- (viii) To present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts;
- (ix) To describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and
- (x) To identify who is responsible for carrying out the mitigation and monitoring measures.

## II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

### A. ADB Policy

5. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in the SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

6. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

- (i) **Category A.** Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
- (ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in Category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- (iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- (iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

7. **Environmental management plan (EMP).** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

8. **Public disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

- (i) for Environmental Category A projects, a draft EIA report at least 120 days before Board consideration;
- (ii) final or updated EIA and/or IEE upon receipt; and
- (iii) environmental monitoring reports submitted by the project management unit (PMU) during project implementation upon receipt.

## **B. National Laws**

9. The policy, legal, and administrative frameworks relevant to the environmental assessment of water supply and sanitation projects in the Republic of the Philippines have long been established by the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (iii) Republic Act No. 9275 - Philippine Clean Water Act of 2004, and (iv) PD 856 - Code on Sanitation of the Philippines. The frameworks apply to the MSFWD subproject.

10. The overall institutional framework is the LWUA and WD setup as defined by PD 198 otherwise known as the "Provincial Water Utilities Act of 1973". LWUA, as a government corporation, is mandated to promote the development of water districts in the country. It has a clear mandate to "primarily be a specialized lending institution for the promotion, development, and financing of local water utilities." To carry out this mandate LWUA has major subsidiary roles such as: (i) prescribing minimum standards and regulations in order to assure acceptable standards of construction materials and supplies, maintenance, operation, personnel training, accounting, and fiscal practices for local water utilities; and (ii) providing technical assistance and personnel training programs.

11. PD 198 also mandated the formation of local water districts, which were initially formed by resolutions of the LGUs (generally, municipalities) as a single entity or as a combination of LGUs. Once formed, however, a WD becomes legally autonomous of the LGU and has the standing and legal character of an independent government-owned and controlled corporation. It is controlled by a board of directors, appointed by either the mayor or the governor, consisting of five members representing various sectors, who in turn appoint the WD's general manager.

12. Under WDDSP, LWUA is the executing agency, while the WDs, such as MSFWD, are the implementing agencies for their respective subprojects. LWUA has overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. WDDSP can contribute to Philippine efforts in achieving relevant targets in the Millennium Development Goals (MDGs). Most relevant to WDDSP is Goal 7 (Ensure environmental sustainability) with its "Target 7C" for 2015 calling to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation. Achieving the MDG 2015 target on accessibility to safe drinking water necessitates an assurance that indeed the water is safe. WDs must have raw water sources with sustainable quantities and acceptable quality. They should be able to maintain acceptable water quality levels in the distribution systems to ensure delivery of potable water. The 7C Philippine target is 86.8% of Filipinos will have access to safe water by 2015 and 83.8% will have access to a sanitary toilet facility.

13. The environmental assessment requirement is covered by PD 1586 (establishing the Philippine Environmental Impact Statement System [PEISS]) with its implementing rules and regulations issued under Department of Environment and Natural Resources (DENR) Administrative Order No. 30 series of 2003 (DAO 03-30). The PEISS requires the project proponent to obtain an Environmental Compliance Certificate (ECC) from the Environmental

Management Bureau (EMB) before an infrastructure project can be implemented. The Philippine environmental assessment system conforms with ADB's environmental assessment requirements as revealed by ADB's *Special Evaluation Study on Environmental Safeguards (2006)*.

14. In addition to complying with the requirements of the Philippine National Standards for Drinking Water (PNSDW) or DOH Administrative Order No. 2007-0012, water systems are also covered by Republic Act No. 9275 (The Philippine Clean Water Act of 2004). It's implementing rules and regulations are issued under DENR Administrative Order No.10 series of 2005 (DAO 05-10). Standards for the discharge of all industrial and municipal wastewaters are defined in DENR Administrative Order No. 35 series of 1990 (The Revised Effluent Regulations of 1990) which is based on the Philippine Pollution Control Decree of 1976 issued as PD 984. Sanitation and septic tanks are also covered by PD 856 (Code on Sanitation of the Philippines). The project proponent must secure a discharge permit from the EMB-RO, to confirm the facility's compliance with the prescribed effluent standards. A Permit to Cut will also need to be secured for the EMB regional office, if trees have to be cut.

15. **Table 1** presents the summary of environmental regulations and mandatory requirements for the proposed subproject.

**Table 1: Summary of Applicable Environmental Regulations**

<b>Laws, Rules and Regulations</b>	<b>Description/Salient Features</b>	<b>Permit/Clearance</b>	<b>Required for the Project</b>
PD 1586 and its implementing rules and regulations	Requires project proponents to secure ECC from the DENR before an infrastructure project is constructed. DAO 03-30 provides the implementing rules and regulations for PD 1586 and the Revised Procedural Manual of DAO 03-30 integrates DENR policies to promote EIA as a planning and decision-making tool. DENR MC No. 2011-005 further streamlined the PEISS.	ECC for proposed projects under the EIS system or Certificate of Non-Coverage (CNC) for proposed projects not covered by the system.	An IEE Checklist Report is required for water supply systems with six or less wells and other systems in order to secure an ECC.
Philippine Clean Water Act of 2004 (RA 9275) and its implementing rules and regulations	Provides the policy and regulations for the prevention, control and abatement of pollution in the country's water resources for sustainable development.	Requires Wastewater Discharge Permit for facilities that discharge regulated effluents	Not applicable
DENR Administrative Order No. 35, series of 1990	Known as the Revised Effluent Regulations of 1990, the order sets the effluent standards for discharge into the receiving water bodies.	Compliance with the effluent standards is the primary basis for issuance of Wastewater Discharge Permit	Not applicable
Water Code of the Philippines (PD 1067) and its amended implementing rules and regulations	Establishes the principles for appropriation, control and conservation of water resources in the country and defines the rights and obligations of water users.	Water Permit and Permit to Drill from the National Water Resources Board (NWRB).	Application for permit to drill shall be filed with the NWRB prior to drilling and then water permit after completion of the drilling.
Permit to Cut Trees	Required by the DENR before cutting any tree in both public and private properties.	Permit to Cut is secured from the EMB-RO where the tree/s to be cut are located	To be secured if trees would be cut in the well site or along the transmission line.

DAO=Department Administrative Order, DENR=Department of Environment and Natural Resources, ECC=Environmental Compliance Certificate, EMB-RO=Environmental Management Bureau–Regional Office,

IEE=Initial Environmental Examination, MC=Memorandum Circular, NWRB = National Water Resources Board, PD=Presidential Decree, PEISS=Philippine Environmental Impact Statement System, RA=Republic Act.

### III. DESCRIPTION OF THE PROJECT

#### A. Existing Condition and Need for the Subproject

##### 1. LWUA Program started in 2011

16. Implementation of the LWUA Program of Works started in 2011 funded from an NLIF loan secured from LWUA. Only Php13.5 million however was released by LWUA from out of the original loan in view of which the WD had to secure a Php30 million loan from the Land Bank of the Philippines (LBP) in order to finish the works. The works included pipelines installation towards Poro Point, San Fernando, and a few NRW remedial works such as replacement of the asbestos pipes to polyvinyl chloride (PVC) pipes within San Fernando City proper with corresponding meters and valves, and pipe crossings. The remedial works however are not expected to have any significant impact in the NRW level but the additional connections generated in 2012 can be reasonably attributed to said improvements. The above improvements are separate from those being proposed under WDDSP.

##### 2. Water Demand and Service Connections Projections

17. At present, MSFWD covers four towns/municipalities (San Gabriel, Bacnotan, San Juan and Bauang) and one city (San Fernando) in the central area of La Union province. MSFWD's actual number of service connections based on the Monthly Data Sheet (MDS) is 8,167. The projected number of service connections is shown in **Table 2** while the water demand projections and demand variations are shown in **Table 3**.

**Table 2: Projected Number of Service Connections**

<b>City/Municipality</b>	<b>2016</b>	<b>2018</b>	<b>2020</b>	<b>2025</b>
Bacnotan	153	509	984	1,464
Buang	2,798	4,120	5,338	6,574
San Gabriel	86	238	381	527
San Juan	776	1,160	1,732	2,354
San Fernando	4,682	6,041	8,949	11,832
<b>Total</b>	<b>8,495</b>	<b>12,068</b>	<b>17,384</b>	<b>22,751</b>

\* In February 2012, MDS reported connections was 8,167.

**Table 3: Projected Water Demand Projections/Water Demand Variations**

<b>Year</b>	<b>Total Demand (m<sup>3</sup>)</b>	<b>Non-Revenue Water</b>	<b>Average-Day Demand</b>		<b>Maximum-Day Demand</b>		<b>Peak-Hour Demand (m<sup>3</sup>/hr)</b>
			<b>(m<sup>3</sup>)</b>	<b>(lps)</b>	<b>(m<sup>3</sup>)</b>	<b>(lps)</b>	
2016	6,146	40%	10,243	118	12,804	147	854
2018	8,504	32%	12,507	145	15,633	181	1,042
2020	12,118	30%	17,311	200	21,639	250	1,443
2025	15,017	30%	21,453	248	26,816	310	1,788

### **3. Proposed Development Program for MSFWD**

18. The phasing of the improvements has been considered after consulting with the WD and in consideration of the need to limit the amount of loan and the tariff required by the project. This subproject aims to improve the water supply system of MSFWD in order to meet the projected water demand for the design year 2025 in two construction phases: (i) Phase I will meet the projected water demand for design year 2020, and (ii) Phase II, for design year 2025. Only Phase I is being undertaken under the Project.

19. To supplement the existing water supply facilities, the Phase I Development Program will include the following: the construction of eight wells with pumpsets; treatment facilities for each of the new sources plus for the Lon-oy source to reduce turbidity during the rainy season; 51 km of new transmission pipelines; construction of two new reservoirs, plus rehabilitation of the San Juan reservoir; and measures to reduce NRW. Phase I is planned for implementation during 2017-2018. The proposed improvements shall be undertaken in accordance with the established standards set by LWUA.

### **4. Proposed Water Supply System – Phase I**

20. The following improvements are proposed for Phase I (the schematic diagrams are shown in **Figures 1** and **2**):



Figure 1: Schematic Diagram of Proposed Development Program – A

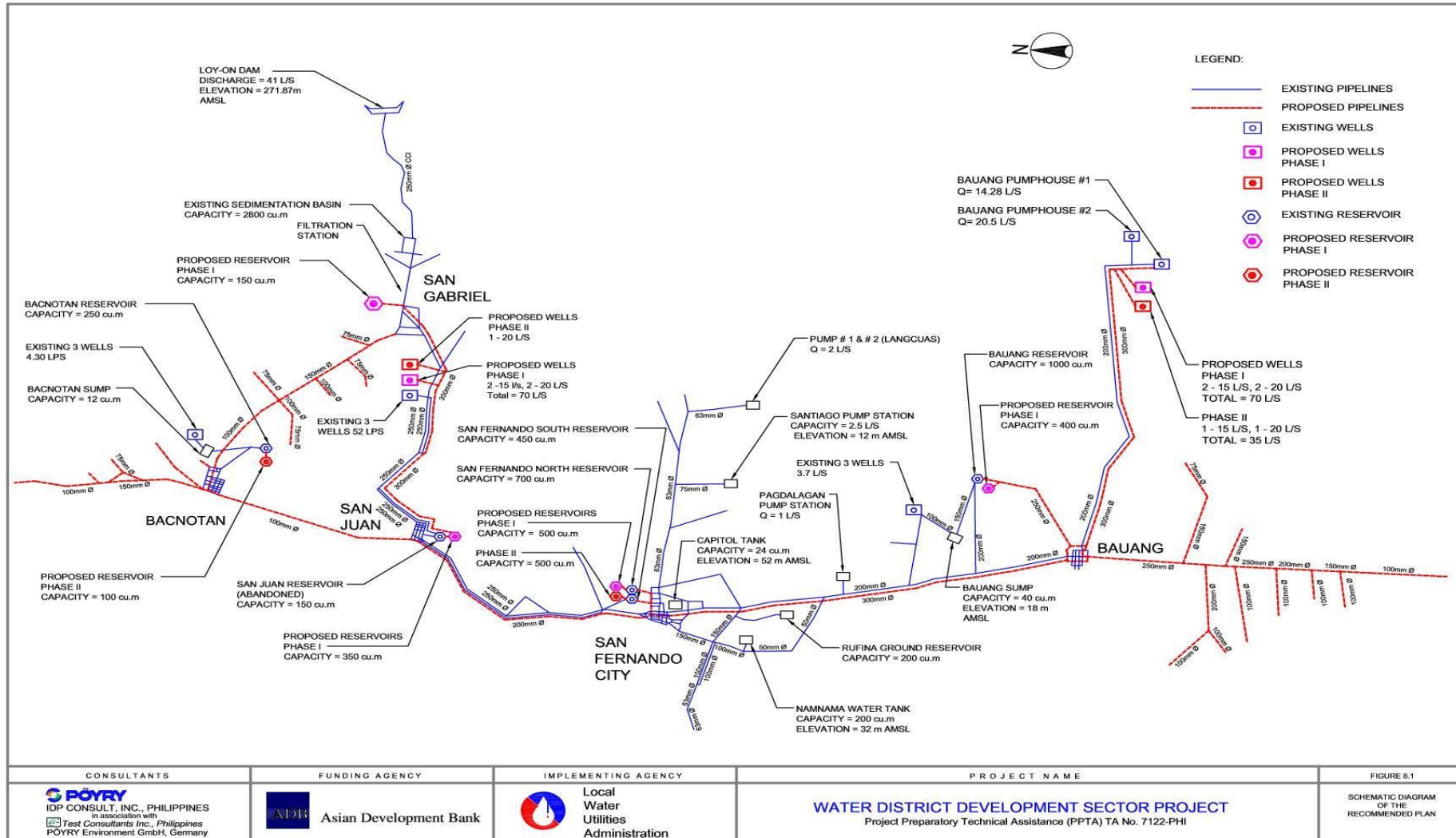
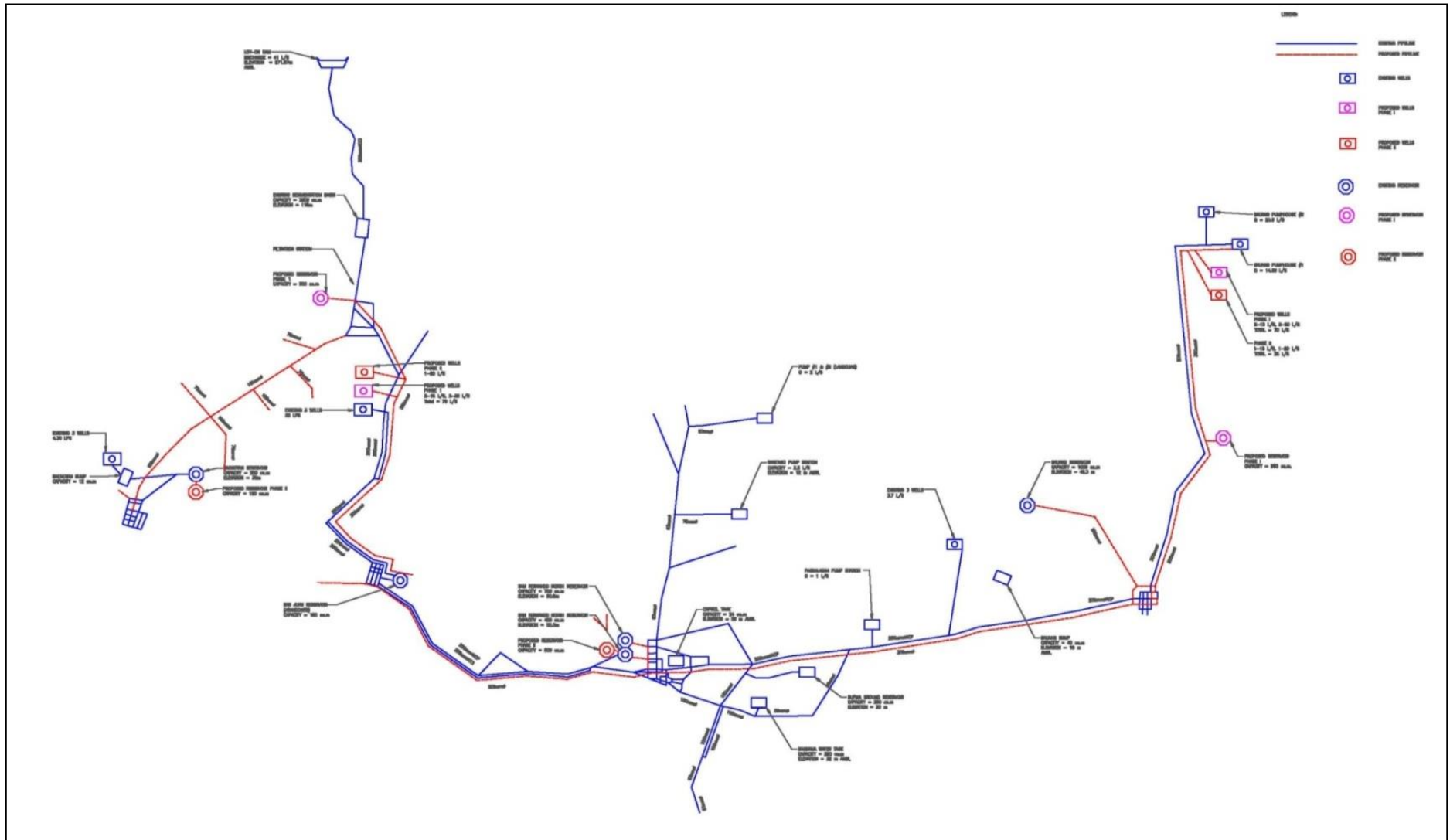


Figure 2: Schematic Diagram of Proposed Development Program – B



## 5. Description of the Proposed Subproject

21. *Source Facilities.* All existing sources will be retained. Water quality test results of WD's wells within the subproject area (Table 4) showed that the raw water quality is within the limits of the 2007 Philippine National Standards for Drinking Water (PNSDW). Hence, expected water quality of the proposed wells will therefore be within the limits of the 2007 PNSDW since raw water quality is already within the limits of the standards. The 2007 PNSDW is the applicable standard for drinking water in this IEE since it is more stringent than the World Health Organization (WHO) *Guidelines for Drinking-Water Quality (2008)*. The value of hydrogen sulfide in Table 2 slightly exceeds the 2007 PNSDW value. However, this is not an issue since the 2007 PNSDW provides a standard value for hydrogen sulfide only for acceptability aspects and not for health significance. Consequently, WHO did not provide a health-based standard for this parameter due to the same reason. Pumping Stations will be constructed in each well. Each pump station will be equipped with a submersible pump and motor capable of producing the expected yields of the new water sources. All pump stations shall be provided with a production meter, hypochlorinator for water disinfection, and stand-by electric generation set. These pumping stations will not cause over pumping of groundwater since the recommendations on the sizes of pump and motor to be installed in the wells will be based on the evaluation of test pumping results and available groundwater drawdowns. Groundwater recharge rates have been factored into the determination of appropriate drawdowns and sustainable well yield. There is therefore no likelihood that the project will cause over pumping of groundwater that could lead to ground subsidence. The sedimentation basin in Barangay Bumbuneg, San Gabriel of the Lon-oy surface water source shall be provided with filter beds to improve its water quality.

**Table 4: Water Quality Data**

Parameters	Test Results Range (mg/l)	2007 PNSDW Limit (mg/l)
Turbidity	0 – 2 NTU	5 NTU
Odor	not objectionable	not objectionable
pH	7 – 7.8	6.5 – 8.5
Calcium	30 - 95	none
Magnesium	12 - 30	none
Chloride	1.35 - 51	250
Boron	0.18 – 0.6	0.5
Fluoride	0.1 – 0.8	1.0
Iron	0 – 0.3	1.0
Manganese	0.003 – 0.01	0.4
Nitrite	0.001 – 0.006	3.0
Aluminum	0.001 – 0.2	0.2
Sulfide	0.001 – 0.09	0.05
Hardness as CaCO <sub>3</sub>	14 - 370	300
Potassium	1.3 – 5.9	none

Source: MSFWD data of one spring and 8 deepwells

22. *New Water Sources.* Based on the initial findings and evaluation of previous water resources investigations, the potential water supply sources for the improvement and expansion of the WD water supply system include Baroro River through dam construction, and additional induced infiltration wells along the Baroro and Bauang Rivers. Construction of additional induced infiltration wells along the Baroro and Bauang Rivers could be made to provide additional supply to the WD. A georesistivity survey consisting of ten (10) vertical electrical sounding (VES) points,

five (5) VES points along the Bauang River and five (5) VES points along the Baroro River, was carried out in May. From the above results, two well drilling sites are proposed upstream of the existing WD wells along the Baroro River and upstream of the existing wells along the Bauang River. Four new wells will be drilled at Brgy. Ballay, Bauang and another four at Brgy. Naguirangan, San Juan. All existing sources will be retained. In year 2011, the average production of all the present sources remains at about 116 lps. The Phase I maximum day demand (MDD) for the year 2020 is 250 lps and will be supplied by the following:

- a) Utilization of all existing sources which could deliver a total capacity of about 116 lps;
- b) Construction of four new wells located at Brgy. Ballay, Bauang and four (4) new wells located at Brgy. Naguirangan, San Juan, which are expected to yield a total of 140 Lps. The expected yields of the wells are shown in **Table 5**.

**Table 5: Expected Yield of Phase I New Water Sources**

New Source Facilities	Year 2020		
	No.	Capacity (lps)	Expected Yield (lps)
New Bauang Deep wells	2	15	30
	2	20	40
New San Juan Deep wells	2	15	30
	2	20	40
<b>Total (lps)</b>			<b>140</b>

23. The proposed additional sources that should be developed to meet this projected demand will come from groundwater through well fields identified in the areas northeast (San Juan) and south (Bauang) of San Fernando City. The combined discharge from the deep wells and shallow wells is 70 – 125 lps and 80 – 120 lps respectively, or a total additional water supply of 150 – 245 lps (12,960 – 21,168 m<sup>3</sup>). To meet the 2025 demand, an additional capacity of about 184 lps from wells at the same locations need to be added during the implementation of the Phase II improvements. The well parameters are summarized in **Table 6**.

**Table 6: Potential Wellfields for Phases I and II**

Water Source	Bauang Well field		San Juan Well field		Combined Well field	
	Deep Well	Shallow Well	Deep Well	Shallow Well	Deep Well	Shallow Well
Well Depth, m	60	12	30-40	12	60; 30-40	12
Well Diameter, mm	200	250	200	250	200	250
Expected Yield/Well, lps	10-20	10-15	10-15	10-15	10-20	10-15
No. of Wells	4	6	3	2	6	8
Total Discharge, lps	40-80	60-90	30-45	20-30	70-125	80-120
				<b>Total</b>		<b>150-245</b>

24. *Storage Facilities.* All existing operational reservoirs will be retained in Phase I. The abandoned San Juan 150 cum concrete ground reservoir will be rehabilitated and 4 new concrete ground reservoirs with a total capacity of 1,400 cum will be constructed to meet the needs of year 2020 for operational and emergency storage. The new storage facilities are shown in **Table 7**.

**Table 7: Phase I - Proposed Water Storage Facilities**

City/Municipality	Existing (m <sup>3</sup> )	Required Additional Storage
Bacnotan	250	-
Bauang	1,000	1-900 m <sup>3</sup>
San Gabriel	0	1-500 m <sup>3</sup>
*San Juan	150	0
San Fernando	1,550	0
<b>Total Capacity</b>	<b>2,950 m<sup>3</sup></b>	<b>1,400 m<sup>3</sup></b>

\*Note: San Juan Ground Concrete Reservoir to be rehabilitated.

25. *Pump sets and Generators.* This includes the construction of four new well pump stations at Brgy. Ballay, Bauang and four new well pump stations located at Brgy. Naguirangan, San Juan. A total of eight new well pump stations will be constructed at the new sources in Bauang and San Juan. Each pump station will be equipped with a submersible pump and motor capable of producing the expected yields of the new water sources. All pump stations shall be provided with a production meter and a stand-by generator.

26. *Treatment/Disinfection Facilities.* This involves the provision of a treatment facility for each pump station and the construction of filter beds after the sedimentation basin for the Lon-oy source. Each of the proposed eight new well pump stations will be provided with a hypochlorinator to disinfect the water being withdrawn from the new sources.

27. *Installation of new transmission and distribution pipelines.* New transmission and distribution lines will be laid in the proposed service expansion while reinforcements will be laid to improve the carrying capacity of the pipes which have become inadequate due to the projected increased flow. This entails the construction of about 94 km of new pipelines ranging from 50 mm Ø to 300 mm Ø. The main transmission pipes of about 57 km and distribution pipes of about 37 km will satisfy the demand for the year 2020 service area. This will likewise include the attendant cost of valves and fittings.

28. *Pipelines and Service Connections.* Provision for some 3,573 connections is included in the project cost.

29. *NRW Reduction Activity.* Non-revenue water (NRW) is the volume of water that goes into the system but does not generate revenue. Included are wastage, leakage and consumptions from illegal connections as well as water used for fire fighting purposes and under-registration of meters. The present system has a high NRW of 52% due to poor conditions of the old pipes and illegal connections. Funds will be provided to purchase operational systems and equipment designed to manage and control NRW.

30. *Water Supply Project – Estimated Capital Cost.* The total capital cost estimate for Phase I, including contingencies and engineering is P416.8 million in mid-2015 prices, as summarized in **Table 8**.

**Table 8: Estimate of Capital Cost - Phase I (for Design year 2020)**

	<b>COST ITEM</b>	<b>UNIT</b>	<b>QTY.</b>	<b>UNIT COST</b>	<b>TOTAL</b>
<b>I.</b>	<b>ENGINEERING BASIC COST ITEMS</b>				
1.0	<b>SOURCE FACILITIES</b>				
	New Bauang Deep wells	no	4	1,000,000	4,000,000
	New San Juan Deep wells	no	4	1,000,000	4,000,000
	<b>TOTAL</b>				<b>8,000,000</b>
2.0	<b>PUMPING STATION</b>				
	<i>a. Bauang</i>				
	Submersible Pump (15 lps)	no	2	400,000	800,000
	Submersible Pump (20 lps)	no	2	540,000	1,080,000
	Electrical Works including Generator sets	lot	4	550,000	2,200,000
	Valves, fittings, and meter	lot	4	105,000	420,000
	Transformer and accessories	set	4	55,000	220,000
	Pump House (18 m <sup>2</sup> )	lot	4	180,000	720,000
	<i>b. San Juan</i>				
	Submersible Pump (15 lps)	no	2	400,000	800,000
	Submersible Pump (20 lps)	no	2	540,000	1,080,000
	Electrical Works including Generator sets	lot	4	550,000	2,200,000
	Valves, fittings, and meter	lot	4	105,000	420,000
	Transformer and accessories	set	4	55,000	220,000
	Pump House (18 m <sup>2</sup> )	lot	4	180,000	720,000
	<b>TOTAL</b>				<b>10,880,000</b>
3.0	<b>WATER TREATMENT FACILITY</b>				<b>B.</b>
	<i>a. Bauang</i>				<b>C.</b>
	Hypochlorinator & Accessories	lot	4	78,000	312,000
	<i>b. San Juan</i>				<b>D.</b>
	Hypochlorinator & Accessories	lot	4	78,000	312,000
	<i>c. San Gabriel</i>				
	Filter Bed & Accessories	lot	1	8,000,000	8,000,000
	<b>TOTAL</b>				<b>8,624,000</b>
4.0	<b>TRANSMISSION FACILITIES</b>				<b>E.</b>
	Pipes (Approx. 57 km New Reinforcement pipes)	lot	1	212,782,130	212,782,130
	Valves and Fittings	lot	1	12,766,928	12,766,928
	<b>TOTAL</b>				<b>225,549,058</b>
5.0	<b>STORAGE FACILITIES</b>				
	<b>New Concrete Ground Reservoir</b>				
	<i>Bauang (1-900)</i>	m <sup>3</sup>	900	21,250	19,125,000
	<i>San Gabriel (1-500 m<sup>3</sup>)</i>	m <sup>3</sup>	500	21,250	10,625,000
	<b>TOTAL</b>				<b>29,750,000</b>
6.0	<b>DISTRIBUTION FACILITIES</b>				
	Pipes (Approx 37 km New Pipelines for expansion area)	ls	1		39,966,650
	Valves and Fittings	ls	1		3,197,332
	<b>TOTAL</b>				<b>43,163,982</b>
7.0	<b>SERVICE CONNECTIONS</b>				<b>5,359,500</b>
7.0	<b>NRW Reduction</b>				<b>F.</b>
	Replacement of pipes, valves and meters	ls	1	12,000,000	12,000,000
	<b>TOTAL</b>				<b>12,000,000</b>
8.0	<b>SUB-TOTAL 1</b>				<b>343,326,540</b>
	PHYSICAL CONTINGENCIES (10% OF SUB-TOTAL 1)				34,332,654
	ENGINEERING STUDIES (6% OF SUB-TOTAL 1+PC)				22,659,552

COST ITEM	UNIT	QTY.	UNIT COST	TOTAL
CONSTRUCTION SUPERVISION (4% OF SUB-TOTAL 1+PC)				15,106,368
<b>TOTAL COST 1</b>				<b>415,425,113</b>
<b>II. NON-ENGINEERING BASIC COST ITEMS</b>				
A. LAND ACQUISITION	m <sup>2</sup>	2,600	500	1,300,000
CONTINGENCIES (5% OF A)				65,000
<b>TOTAL COST 2</b>				<b>1,365,000</b>
<b>TOTAL PROJECT COST</b>				<b>416,790,113</b>

Source: PPTA Consultants

31. *Implementation Schedule.* The implementation schedule of the proposed Phase I improvements is shown in **Figure 3**.

**Figure 3: Phase I – Implementation Schedule**

Item No.	Description	PHASE											
		Year 2016				Year 2017				Year 2018			
		1	2	3	4	1	2	3	4	1	2	3	4
1	Detailed Design and Tendering												
2	Lot Acquisition												
3	Source Facilities (Bauang and San Juan Deep Wells)												
4	Pumping Facilities (Bauang, San Gabriel, San Juan)												
5	Bridge/River Crossings												
6	Treatment Facilities												
7	Transmission & Distribution Facilities												
8	Storage Facilities												
9	NRW Reduction												
10	Installation of Service Connections												

## IV. DESCRIPTION OF THE ENVIRONMENT

### A. Methodology Used for the Baseline Study

32. *Data Collection and Stakeholder Consultations.* Data for this study have been primarily collected through literature review, discussions with the MSFWD officials and staff, stakeholder agencies like the EMB-Region I and LGUs, and field visits to the proposed subproject site.

33. The literature review broadly covered the following:

34. Project details, reports, maps, and other documents on WDDSP available at the MSFWD office;

35. EMB, NWRB and their respective rules and regulations as well as ADB SPS relevant to the proposed subproject.

36. Several visits to the subproject sites were made in November 2012 and January 2013 to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed project. A separate socioeconomic study was conducted to determine the demographic information, and settlements.

37. *Data Analysis and Interpretation.* The data collected were analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the project area. The relevant information is presented in the succeeding paragraphs.

### B. Physical Resources

38. MSFWD covers the provincial capital of La Union province, San Fernando City, and four of the 19 towns in the province, namely: San Juan, Bacnotan, Bauang, and San Gabriel, all located in the Province of La Union. San Fernando City is bounded on the north by the Municipality of San Juan, on the south by the Municipality of Bauang, on the east by the Municipalities of Bagulin and Naguilan, and on the west by the China Sea. The City is between 16° 34' - 24.093" N & 16° 38' - 43.458" N latitude and between 120° 16' - 41.638" E & 120° 25' - 42.305 E longitudes. It is 14 kilometers from Bacnotan, 60 kilometers from Baguio City, 145 kilometers from Tarlac City, Province of Tarlac, and 276 kilometers from Manila. Bauang falls within the longitude 16 ° 20' to 16° 40' and latitude 120° 30" and is about 10 kilometers south of San Fernando City and 50 kilometers west of Baguio City. Bacnotan lies within 16° 42' to 16° 47' north latitude and 120° 20' to 120° 26' east longitude and is 14.27 kilometers north of San Fernando City. The San Gabriel is located between 120° 23' and 120° 30' longitude and between 16° 40' and 16° 45' latitude. It is 282 kilometers north of Manila and 8 kilometers north of San Fernando City. San Juna is located between 120° 19' to 120° 25' longitude and between 16° 39' to 16° 43' latitude and is about 8 km from San Fernando City.

39. *Topography.* San Fernando City is located between the foothills of the Cordillera mountain range to the east and the China Sea to the west. The coastal plain occupies one-fourth of its total land area and the remaining area is characterized by rugged hills and inland valleys which are drained by creeks and streams. The present urban area is situated on the flat areas among seven hills. The highest elevated area is found in the northeast quadrant with an altitude of over



400 meters above sea level. Towards the midwest portion of the city is the Poro Point peninsula that forms the southern enclosure of the San Fernando Bay.

40. The other towns are also in varied topographies. San Juan and Bacnotan are generally flat. San Juan has an average elevation of 107 meters above sea level. The lowest portion is only 6 meters above sea level and the highest portion is at 209 meters above sea level. Bacnotan has an average elevation of 4.65 meters. The plain areas lie in the western portion while the hilly areas lie on the eastern and northern parts. The plains occupy about two-thirds of the municipality and are predominantly used for agriculture and settlement purposes.

41. Bauang western portion is a lowland extending to the shores of the China Sea. Its eastern portion is mountainous with valleys between the mountains. In the urban area, which is located in the central part of the municipality, the elevation is flat and is between 3 to 4 meters above mean sea level. The Bauang River dissects the town from east to west and drains into the China Sea. San Gabriel has an area where only about 10% is relatively flat with elevations of 100 to 200 meters above sea level. This is where the poblacion and two other Barangays are located. The remaining land area is mountainous.

42. *Geology and Soils.* The low-lying coastal areas and narrow river valleys of La Union are covered with recent alluvial deposits. Buried beneath the recent deposits are quaternary to late tertiary clays, sands, and tuffs. At greater depths and exposed in the mountains farther from the shore are older tertiary marine sediments overlying a basement complex of early tertiary to late cretaceous intrusives and metamorphosed volcanics.

43. The low-lying hills of the area is underlain with Quaternary to Tertiary sedimentary formation called the Rosario Formation consists of a sequence of rhythmically interbedded turbidite sandstone, siltstone, shale and minor conglomerate in the lower section and coarse-grained tuffaceous sandstone and conglomerate with minor siltstone, shale, patch-reef limestone and basalt flow in the upper section. The coarse-grained interbeds are moderately permeable while the fine to medium grained are impermeable. This aquifer is classified as poor to moderately good. Recent alluvial deposits occupies the lowlands and consists of recent river deposits. These consists of gravel and sand with some clay and silt and can be observed along major river systems including the Baroro and Baung Rivers. Some deposits are predominantly coarse sand and gravel at shallow depths underlain by sand mixed with clay and silt. These deposits can be good to poor aquifers.

44. *Water Resources.* MSFWD obtains its water supply from one surface source and 18 wells consisting of 10 shallow dug wells and eight deepwells. Groundwater in the general area of La Union is utilized through wells and small capacity springs. Wells are used for domestic, industrial and agricultural purposes. MSFWD utilizes groundwater through shallow dug wells and deepwells. Barangays not served by the existing water supply system obtain their water requirements from springs and small diameter wells drilled to shallow depths while commercial, industrial establishments and some private individuals have their own deepwells.

45. Borehole logs of existing wells indicate that the area is underlain with recent alluvial sediments and the Rosario Formation. The Rosario Formation is generally fine-grained and is considered as poor aquifer. The coralline limestone member in the coastal areas yields saline water to wells. The more productive wells are drilled in the river valleys of the major river systems, which include the Bauang River and

the Baroro River. These river valleys are underlain with sand, gravel, clay and silt. Wells drilled along these river systems produced through induced infiltration and/or leakage through the semi-permeable river deposits. Along the Baroro River, the MSFWD taps the semi-permeable to permeable river deposits through deepwells. Along the Bauang River the MSFWD is also tapping the river's permeable to semi-permeable deposits through three wells.

46. There are two major river systems in La Union; the Baroro River to the north of San Fernando City that traverses the Municipalities of San Juan and San Gabriel and the Bauang River to the south of San Fernando City that traverses the Municipality of Bauang. Smaller creeks pass through the central section of the study area, flowing east to west in a dendritic pattern. Most of these creeks run-dry during prolonged dry periods. The Baroro River originates in the mountains northeast of San Fernando City and flows westerly through the Municipalities of San Gabriel and San Juan before emptying into the South China Sea.

47. The Lon-oy Creek, which is a major MSFWD water source, is one of the perennial tributaries of the Baroro River. The Lon-oy Spring complex, which is one of the headwaters of the creek is located about 12 km east of the San Gabriel Poblacion in Sitio Bakes, Barangay Lon-oy. Lon-oy Creek has a total flow of 635.9 liters per second (lps) or 54,945 cumd measured in May 2009. It is commonly referred to as Lon-oy Spring source but is actually a river intake constructed on the Lon-oy Creek in 1971 to divert part of the flows for the San Fernando Municipal Waterworks System. The intake is located in Barangay Lon-oy, some 10 km east of the San Gabriel town center. The river intake has been the main source of the San Fernando Municipal Waterworks System during the 1970's and is one of the MSFWD's major water supply sources at present.

48. The Bauang River originates in the mountains east of San Fernando City and flows in westerly direction before emptying into the Lingayen Gulf. The Naguillian River, a major tributary joins the Bauang River with its confluence located about one km southwest of the Naguillian Poblacion. The Bauang River has no streamflow record. Its major tributary, the Naguillian River is a perennial river with a maximum monthly discharge of 94,700 lps (8.18 million cumd) and minimum discharge of 1,160 lps (100,224 cumd).

49. *Climate.* The climate of La Union is classified as Type I of the Modified Coronas Classification of the Philippine Climate which is characterized by two pronounced seasons: dry from November to April and wet during the rest of the year. Data from the nearest weather stations revealed a mean rainfall of 2,391.7 mm at Dagupan City and 2,300.9 mm at Vigan City with average number of rainy days of 120 days and 97 days, respectively. Weather stations in Dagupan City and Vigan City were used since these are the nearest stations and have the same climatic characteristics with the towns of La Union. August has the largest rainfalls on both weather stations with a monthly average of 608.6 mm and 646.3 mm, respectively. February is the driest month and an average recorded monthly rainfall of 6.1 mm and 2.8 mm, respectively. The warmest month in Dagupan City is April and that for Vigan City is May with monthly average temperatures of 29.7° C and 29.0° C, respectively. The coolest month is January. The northeast monsoon prevails over the area from November to May where northerly winds blow with an average wind speed of 2 meters per second. Southerly winds blow over the area at an average of 3 meters per second during the rest of the year during the southwest monsoon. An average of 2 tropical cyclones blow over the area annually.

50. PAGASA predicted that the mean temperature in La Union would increase by an average of 0.9°C in 2020 and by an average of 1.86°C in 2050. On the other hand, rainfall would increase by as high as 43.1% during the months of June to August and decrease by about 0.4% from December to February in 2020, increase by as much as 72.5% in June to August and decrease by about 24.6% from March to May in 2050.<sup>1</sup> These predictions point to the need for serious consideration of climate change adaptation in the long-term planning of the WD since higher temperature and higher precipitation levels would have impacts on the availability of both surface water and groundwater.

51. *Air Quality and Noise.* There are no available air quality data specific to the areas where subproject components will be constructed. However, based on the consultant's experience on air quality measurements of similar rural setting in the Philippines, the expected average ground level concentrations of total suspended particulates (TSP) would be close to the indicative value of 65 ug/Ncm. Similarly, there are no actual data on the present noise levels of this area. Again, based on the consultant's experience on noise measurements of similar rural setting in the Philippines, the expected noise levels along the inhabited areas would be between 42 to 48 dB(A) for the daytime, while those in the farm areas would be less than 40 dB(A). In areas where there is higher vehicular traffic volume noise levels could reach as high as 54 dB(A).

### **C. Ecological Resources**

52. *Water Supply System.* Similar to the existing system, MSFWD's proposed water supply system expansion areas will be along existing roads or highways where the proposed pipelines will be laid, while the proposed deepwells and reservoirs will be located near the roads or highways. At this stage of the subproject study, the technical team only identified the general areas for the proposed pipelines, deepwells, and reservoirs. The exact locations will be confirmed during detailed design. The environment specialist visited the proposed locations of the subproject components in order to present appropriate descriptions of the ecological settings.

53. In general, the proposed routes of the pipelines along the highway from the town of Bauang through San Fernando City and to the towns of San Juan and Bacnotan are presently residential, commercial, and agricultural landscapes.

54. Houses, commercial establishments, schools, etc. can be seen in most areas immediately adjacent to the roads and highways. Areas beyond the road corridor are basically residential areas or cultivated strips of land such as rice fields. Devoid of forested areas, the road and highway corridors and immediate environs are unlikely habitats for large wild animals, rare or endangered species. Farm and domesticated animals are therefore the large faunal species such as cows, water buffaloes, goats, pigs, house cats, and dogs.

55. An important fact to consider is that the sites are not within an undisturbed landscape. These are located along major highways and roads that have been functional for a very long time already. Hence, over the years the ecological changes due to human activities in the area resulted to the present residential, commercial, and agricultural landscape.

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<sup>1</sup> *Climate Projections.* kidlat.pagasa.dost.gov.ph. Accessed on May 1, 2013

#### **D. Economic Development of La Union**

56. *City Income and Expenditures.* San Fernando is a third class component city and capital of the province of La Union in the Philippines. According to the latest Philippine census in 2010, it has a population of 114,963 people. Its average annual local government revenue over the period of 6 years from 1995 to 2000 was PHP119,166,954. It budgeted an average annual expenditure, over the same period, of PHP117,118,102 with an average annual surplus of PHP2,048,852. In 2000. The City earned PHP221,191,997 from taxes, operating and miscellaneous revenues, and economic enterprise and budgeted PHP195,262,053 for the same year for a surplus of PHP25,929,944.

57. Bauang is a first class urbanized municipality in the province of La Union. According to the 2010 census, it had a population of 70,735 people, making Bauang the most populated municipality of La Union. with an average 5-year (2001 to 2005) annual income of PHP78,841,050 and expenditures for the same period averaged PHP68,696,784. Its income is derived from real property tax, business taxes and licenses, market receipts, receipts from slaughterhouse and cemetery, fees and other charges. Reported actual income of the municipality in 2005 was PHP85,398,466 and actual expenditure was PHP79,423,743 for a surplus of PHP5,974,722. Bacnotan is another first class municipality with a population of 40,307 people according to the 2010 census. a total revenue in 2005 amounting to PHP62,613,672. Expenditures for the same period was PHP54,102,416.13 and left a surplus of PHP8,545,209.12 or 13.65% for the year. San Gabriel, a 4<sup>th</sup> class municipality in the interior of La Union and considered the largest town in terms of land area, had a population of 16,628 according to the 2010 census. with an annual income in 2008 of PHP31,664,347. San Juan is a 2<sup>nd</sup> class municipality with a population of 35,098 people according to the 2010 census. total revenue in 2005 of PHP67,109,888. Total Expenses amounted to Php40,813,135 in 2005 resulting to a net income of Php26,296,752. Income of these towns is derived from real property tax, business taxes and licenses, market receipts, receipts from slaughterhouse and cemetery, fees and other charges.

58. *Land Use.* San Fernando City has a land area of 10,526 hectares. Agricultural land occupies about 7,030 hectares or about 67% of the total land area. Urban areas occupy about 2,020 hectares, timberland occupies about 636 hectares, residential areas occupy about 455 hectares, and the rest are areas for tourism, fishponds, road rights-of-way, and landfill. Bauang has a land area of 7,160 hectares, of which 91.55 percent or 6,555 hectares are certified alienable and disposable lands. The remaining 605 hectares or 8.4 percent are public forestlands. The protected forest area, those within slopes of 50 percent or over, is estimated to be about 464 hectares. However, most of this protected forest area is classified as grassland or shrub land. Agricultural lands occupy about 4,302 hectares or about 60 percent of the total land area. Agricultural crops include rice, corn, tobacco, fruit trees, and other commercial crops. Built-up areas, open spaces, idle lands, and beaches comprise the remaining 2,253 hectares or 31.6 percent of total land area. The total land area of Bacnotan is 7,654.77 hectares which is 5.1 percent of the total land area of the province. The urban area occupies 613.47 hectares or about 8% of the land area of the municipality. Rural area, composed of 43 Barangays, represents the remaining 92 %. Agricultural lands occupy about 3,904 hectares or about 51% of the total land area.

59. Because of its topography, San Gabriel has a large forest reserve. It has a forest cover of 7,394.68 hectares which is the third largest in the Province of La Union and is 15.26% of the total public forest land of the province. Grasslands and

open spaces comprise 3,570.46 hectares or 20.34 % of the total land area. Built-up areas, both urban and rural Barangays, comprise 127.5 hectares which are less than 1.0% of total land area. San Juan has a land area of 5,966.4 hectares. Agro-forest lands occupy about 1,482 hectares mostly found in the northern and southern portions of the town. Agricultural lands occupy about 3,363 hectares or about 56.36% of the total land area. Built-up areas comprise 589 hectares (9.87%) of total land area. Tourism facilities/spot, fishponds, and a cemetery occupy the remaining areas.

60. *Commerce and Trade.* San Fernando City had 4,776 registered business/commercial establishments in 2006. There were 30 hotels/inns/taverns, 6 movie houses, 26 restaurants and fast food establishments, 16 resorts and beach cottages, and 2 malls. There were also 33 banks (commercial, savings, and rural) in the City making it the financial center of the entire region. Small commercial establishments and light industrial activities dominate the business landscape of Bauang. These are concentrated in Barangays Central East and Central West. To date, the commercial district now occupies 22.32 hectares. The increase in commercial and industrial activity is primarily a result of the decision of investors to locate in Bauang due to the shortage of space in the City of San Fernando. The hub of trade in the municipality is the Bauang Commercial Center with its 6,642 square meters. The Rural Bank of Bauang is only one bank in Bauang.

61. Bacnotan had 636 commercial establishments in 2005, broken down into 28 classifications. Sari-sari stores comprise 60% of total commercial establishments. It has a public market with 240 stalls in a 1-hectare lot, 3 Rural Banks, 2 Financing Institutions, 26 Cooperatives, 3 Pawnshops, 6 Real Estate Dealers, and 1 Subdivision Developer. Major Industrial activities include the HOLCIM Phils (a cement manufacturing plant), the DMMMSU Pig Extension and Research Farm (DPERF), a tobacco redrying plant, and a manufacturer of pyrotechnics.

62. Small commercial establishments dominate the business landscape of San Gabriel and San Juan. In 2004, 52 establishments were registered with the town of San Gabriel. About half are sari-sari stores and 5 are rice mills. The rest are service establishments and supply/trading stores. It also has a public market but there are no reported banks or other types of financial institutions. In San Juan, there were 339 establishments, 271 of which were sari-sari stores, 23 apartments for residential purposes, 2 animal feeds manufacturers, 2 warehouses, 2 construction firms, 1 hotel & restaurant, 1 resort club & restaurant, 7 beach resorts, and 25 registered rice mills.

63. *Agriculture.* Agricultural land accounted for about 66.8% (7,031.4 hectares) of the total land area of San Fernando City in 2000. Agriculture was, and still is, a major source of livelihood in the city. Major crops included rice to which 3,895 hectares or 52.3% of the agricultural land was planted. Other major crops included tobacco, fruit and leafy vegetables, fruit trees, peanuts, and legumes. In Bauang, agricultural lands account for about 60%. Major crops include rice planted in 1,652 hectares and mostly in rainfed areas. Only about 250 hectares are irrigated rice. About 305 hectares are planted to green and yellow corn and some 240 hectares are planted to mango trees. Native and Virginia tobacco are planted in 508 hectares and coconut trees abound along the coastal areas. Some guapple and grapes are planted but are mostly backyard crops or planted in small areas. Tilapia and bangus are also raised in fresh and brackish waters of the Bauang River in both fishponds and fishpens.

64. In Bacnotan, agricultural land accounts for about 51% or 3,904 hectares of the total land area. Major crops include rice, corn, peanuts, mungbean, fruit and leafy

vegetables, and rootcrops. The most promising high value cash crop is mango with a total of 1,200 fruit-bearing trees planted. Other fruit trees have been planted as cash crops in order to increase income of the farming households. The biggest crop is rice wherein 1,883 hectares are planted. About 880 hectares are irrigated, 980 hectares are rain-fed, and the remaining 23 hectares are for upland rice. Livestock raising is another major agricultural activity with most are raised in backyards. Basi, a local wine, and vinegar are also produced in large quantities and are sold in markets and national trade fairs.

65. In San Gabriel, agricultural lands occupy about 6,322.36 hectares or about 36.0% of the total land area. Agricultural crops include rice, green and yellow corn, peanuts, tobacco, vegetables, rootcrops, and coconut and mango trees. Tiger grass is also cultivated commercially in 150 hectares of land to support its broom-making industry. San Gabriel has 12 irrigation systems. However, upland rice and rainfed rice are still cultivated in areas not reached by these irrigation systems. In San Juan, agricultural land accounts for about 3,363 hectares or about 56.36% of the total land area. Major crops include rice, corn, tobacco, vegetables, root crops, fruits, and fishery products. About half the riceland is rain-fed and the other half is irrigated.

66. *Tourism.* San Fernando City has its share of cultural and historic spots, scenic areas, recreational areas, and excellent tourism facilities. Cultural and historic spots include the Provincial Capitol, which overlooks the City and Poro Point; the La Union Museum; the St. William's Cathedral which was initially built from 1773 to 1786 and rebuilt twice since then; the Pindangan Ruins which is the ruins of a Catholic Church built in 1759 and destroyed in 1786; the Lighthouse at Poro Point; and the Watchtower at Carlatan, which was a look-out point against marauding Muslim pirates called "Tirongs". There is also the Bacsil Ridge which was a battle site between the Japanese and the joint Philippine-American forces in January of 1945; the on-going archeological diggings in Barangay Cadaclan which shows evidence of Pre-Hispanic settlements and the existence of trade with other countries; the Monument for the Unknown Soldiers; and the Executive Memorial Park. Three kilometers north of the city are the Carlatan and Lingsat Coral Reefs which are good places to fish and view marine life. There is a 10-hectare Botanical Garden. There are splendid beaches along the shores of the City supported by reasonably-priced resorts, hotels, lodging houses, inns, etc.

67. In Bauang, the most significant tourist attraction is the grayish sand beach along the coastline. There are 16 accommodation facilities but only 6 are accredited by the Department of Tourism. Other tourism-related establishments such as entertainment and disco clubs, apartels, restaurants, and the like continue to increase in number. Most of these are concentrated in Barangay Paringao. In Bacnotan, the major tourist spot is the Bacnotan Park, a public plaza located in the poblacion fronting the municipal hall. It is the place where cultural activities during fiestas and celebrations are held. The park is well-lighted and has a perimeter fence. Other tourism attractions include Guinabang Falls, the Centennial Tree located at Barangay Carcarmay, and, of course, there are the beaches.

68. San Juan is considered the surfing capital of the Philippines. Local and foreign tourists flock to San Juan during the months of October and November when the waves generated by the tail-end of the rainy season are sufficiently strong to make surfing an exciting recreational activity. There are a few resort/hotels located along the beaches which cater to the high-income and middle-income levels. The Watch Tower Ruins in Barangay Ili Norte which was built in 1815 to serve as a look-out point against Muslim pirates called the "Tirongs". The San Juan Convent Ruins is

located beside the Catholic Church in the Poblacion. This convent is made of bricks and stone and was one of the biggest convents in Northern Luzon.

68. In San Gabriel, potential tourism spots have not been developed. There are numerous unspoiled natural springs situated in three Barangays, namely: Amontoc, Bayabas, and Lon-oy. The Katebbegan Falls is located between Barangays Lipay Sur and Lipay Proper and is presently accessible only by foot. The bottom of the falls is rich with marine life and is a good fishing spot. The Tangadan Falls is found between Barangay Amontoc of San Gabriel and Barangay Dagup of the Municipality of Bagulin, La Union. It consists of several waterfalls of varying sizes at the bottoms of which are natural swimming pools.

69. *Existing Water Supply System.* MSFWD has two water supply systems. "System I" serves San Fernando City, Bauang, San Juan, and San Gabriel, while "System II" serves only Bacnotan. Water is supplied to MSFWD from a combination of surface water source, deep wells, and shallow wells. The average production for 2008 was 134 lps or 458 m<sup>3</sup>/hr. System I is utilizing Lon-oy River as a surface water source with intake weir constructed 12 km east of the San Gabriel Poblacion at an elevation of 272 m. Water is conveyed down to 115 m via gravity to the 2,800 cum. sedimentation basin in Barangay Bumbuneg at the rate of 26 - 41 lps. In addition, System 1 has eight deepwells, nine shallow wells, four concrete ground reservoirs, one elevated steel tank, and four sump tanks. Eight of the shallow wells are in San Fernando City. The distribution network of San Fernando City and the municipalities are interconnected to each other.

70. System II has two shallow wells located in Barangay Nagsaraboan about 2 km east of the Bacnotan Poblacion. Each of these wells has a depth of 6 meters. Water from these wells is pumped into a sump tank then sent to the service area by gravity. It has 1.1 km of ACP transmission line. Pipe types used in both systems consists of PVC, ACP, CCI and GI pipes with diameters ranging from 25mm to 200mm. The total length of the distribution pipelines of the two systems is about 100 km.

71. *Existing Water Supply Service.* MSFWD operates a water supply system serving 17% of the total population in its franchise area or an estimated 48,226 people with a total of 8,185 active connections as of December 2008 in San Fernando City and the towns of San Juan, Bacnotan, Bauang, and San Gabriel. Data on present water service situation in MSFWD's franchise area were generated by a WDDSP household survey using stratified random sampling with three hundred eighty four (384) respondents. Survey was conducted on groups with pipe water connection and those without. About 11.9% of survey respondents had piped water with MSFWD but in certain areas, the water supply was intermittent. The survey indicated an average consumption of 28.8 cubic meters. Of those interviewed 22% provided water to neighbors or relatives; sharing often occurred where there were multiple families in a household; 28.6% catered to 2-3 families. Issues on sufficiency and perceived quality of water were indicated for certain areas; additional sources were cited as shallow wells for other domestic uses (using the average volume of 206.8); purified water refilling stations were the source of drinking water for 1.7% with an average cost of over P15.33 per day; 4.9% used pump to increase water pressure. Overall, 82.9% assessed that water received from piped connection was sufficient for their needs.

72. On the other hand, there was a demand for improved water services. Water pressure was considered poor (7.3%) or very poor (4.9%) by 41 WD-connected respondents, although an improvement in water availability was noted during the rainy season; over 92% cited that water was available everyday during the rainy

period. Performance rating on continuity of water supply was rated poor (12.2%) or very poor, by 7.3%; reliability of water was considered poor by 14.6%, regularity of billing and collection was poor by 7.3%; and, response to customer complaints was assessed to be poor by 17.1% and very poor by 4.9%. Aspects of water quality that were at issue were taste (12.5%), color (12.2%) and smell (12.2%). Boiling of drinking water was the only treatment (7.3%) reported by connected households. There was some dissatisfaction with overall water service with 37% reporting some level of dissatisfaction with water rates as against perceived adequacy of service.

73. Eighty-nine percent of the respondents did not have water connection with the WD. On the other hand, 44% of non-connected interviewees got water from water vendors and peddlers; in addition, 5.3% reported paying for supply of piped water from another's connection. The next most common source was private shallow wells at 45.7%; less common were private deep wells at 3.5%; and public faucets at 0.9%, while 0.3% got water from open dug wells. Female-headed households relied on water vendors at a higher rate of 24.2% compared to 15% by their counterparts. Shallow wells were main sources for bathing (82.2%) and for gardening (83.4%) but only 45.7% used water from these wells for drinking.

74. Close to 82% of non-connected households assessed overall quality of water from their current source as extremely or moderately satisfactory all year round; only 12.9% said source/s were not sufficient during the rainy season. Collecting water took up time. about 97.5% spent 0.5 – 1 hour and 1.3% spent 1.1 to 2 hours collecting water daily by using a pail (86.1%). Water was usually fetched by male household members (42.5%). Bathing had the highest water use per household at an average of 32.19 gallons per day, followed by gardening (7.25), cleaning (6.95), cooking (4.92) and drinking(2.76). Adult female household members (33.5%) and children (11.1%) or anyone available (12.9%) also fetched water.

75. *Transportation and Communication.* San Fernando City can be reached by road, sea, and air. It is 270 kms. to Manila by the Manila North Road and only 60 kms. to Baguio City, the summer capital of the Philippines, all through an all-weather highway. Its seaport at Poro Point can handle international as well as inter-island shipping. The airport is also at Poro Point and handles flights on a regular basis. PLDT and Digitel are the telephone companies with a total subscriber volume of 12,472 (as of 2006). Subscriptions to all major cell phone companies are available all over the city including internet and cable service. Bauang can easily be reached by land transportation since it is traversed by 2 major national highways. The Manila North Road runs through the town from north to south, while the Bauang to Baguio Road runs from east to west. It has neither an airport nor a seaport but it is in the influence area of the San Fernando City airport and seaport.

76. Bacnotan can be reached by primarily by land although it is also accessible by sea, since it is a coastal town. Manila North Road (Rosario-Laoag Road) and the secondary national road of Bacnotan-Luna-Bangar Road traverse the town. Communications service in the municipality is handled by cellular phones, telephones, telegraph through the Bureau of Telecommunications, postal services, and wireless communications. San Juan can be reached by the Manila-North Highway. It has no airports or ports and must rely on 75 kilometers of roads for the transport needs of citizens. Available communication facilities include telephones, cell phones, telegraph, television, cable, and postal services. San Gabriel is completely land-locked and has no airport. Jeeps and tricycles are the most common means of transportation. PLDT and Digitel are the telephone companies. Cellular phones are also common especially with the installation of cell sites at the Poblacion and at Barangay Lacong.



77. *Power Supply.* The subproject area has access to 2 electric utilities, namely the La Union Electric Cooperative (LUELCO) and the privately-owned La Union Electric Company (LUECO). Both derive their power from the Northern Luzon grid of the National Power Corporation. San Fernando City, Bauang, San Gabriel, and San Juan have access to both LUELCO and LUECO. Bacnotan is served only by LUELCO. Electricity is available to all Barangays.

**E. Socio and Cultural Resources**

78. *Population and MSFWD Service Area.* Based on the latest government census in 2010, the subproject area had a total population of 277,731 representing 37.4% of La Union Province.

**Table 9: Population and Growth Rates**

City/ Town	% of Province (2010)	Population			Growth Rate (%)
		2000	2007	2010 (1)	2000-2010
Bacnotan	5.43%	35,419	38,743	40,307	1.30%
Bauang	9.53%	63,373	69,837	70,735	1.11%
San Gabriel	2.24%	14,909	15,803	16,628	1.10%
San Juan	4.73%	30,393	32,952	35,098	1.45%
San Fernando	15.50%	102,082	114,813	114,963	1.20%
<b>Total of 5 LGUs</b>	<b>37.43%</b>	<b>246,176</b>	<b>272,148</b>	<b>277,731</b>	<b>1.21%</b>
<b>La Union Province</b>	<b>100.00%</b>	<b>657,945</b>	<b>720,972</b>	<b>741,906</b>	<b>1.21%</b>

(1) Latest census of the Philippine Statistics Authority.

79. MSFWD’s present franchise area served by MSFWD includes one city and four municipalities in La Union. Two of the five LGUs represent 66% of the total population in MSFWD’s franchise area: San Fernando City (41% of the total population) and Bauang (25%).

**Table 10: 2010 Population of the Five LGUs Served by MSFWD**

City/ Town	% of Total of 5 LGUs (2010)	Population
		2010 (1)
Bacnotan	14.51%	40,307
Bauang	25.47%	70,735
San Gabriel	5.99%	16,628
San Juan	12.64%	35,098
San Fernando	41.39%	114,963
<b>Total of 5 LGUs</b>	<b>100.00%</b>	<b>277,731</b>

(1) Latest census of the Philippine Statistics Authority.

80. *Public Health and Sanitation.* San Fernando City has four tertiary hospitals and one primary-special hospital, 22 Barangay health stations, and six lying-in clinics. There are no hospitals in Bacnotan, Bauang, San Gabriel, and San Juan. Health services are provide by each towns rural health units and Barangay health stations. Basic health services offered by the health centers include basic medical care, immunization of infants and children, monitoring of nutritional status, and family planning. Diarrhea, a disease that may be associated with poor sanitation, is ranked 4<sup>th</sup> in Bacnotan and 5<sup>th</sup> in Bauang of the ten leading causes of morbidity. The NSO 2000 sanitation data revealed that only 51.9% of total households had septic tanks. San Fernando City and the towns do not have sanitary sewer systems.

81. *Education.* San Fernando City offers elementary, secondary, tertiary and graduate studies. Schools for tertiary education include one state university, one state college and 12 private colleges. Graduate studies can be accessed from the government state university and four private institutions. Vocational/Technical courses are available from 10 public vocational schools and nine private vocational schools. In Bauang tertiary level education, as well as vocational education, is provided by one private school. Bauang's close proximity to educational centers of San Fernando City and Baguio City allows the students to access quality tertiary education and graduate studies. Bacnotan has one state university providing tertiary level education, while San Gabriel and San Juan have none. Schools for elementary and secondary education are normally available in these towns.

82. *Socioeconomic Survey.* WDDSP conducted a household survey to get a good insight into the socioeconomic situation specific to the project area. Using stratified random sampling, three hundred eighty four (384) respondents were interviewed for a 95% level of confidence and standard deviation of 0.1. Based on this survey, average household size was 5.11 with 34.6% having 3-4 or 3-5 members. A significant percentage of 28.9% were women-headed households. Highest grade of household head was college level for 42.9% of WD connected households and 23.7% for non-connected households and high school level for 33.3% for WD connected and 42.9% for non-connected households. Respondents were distributed under a wide occupational range including farming, business, street vending, and government and private and employment; 23.8% of WD connected households interviewed were unemployed. Majority (81%) of households belonged to the Ilocano ethno linguistic group. Inter-marriage and migration patterns may be reflected in the 19% of households that were headed by non-Ilocano; 12 other ethno linguistic groups were represented in the survey. Sole occupancy of dwelling was most common at 82.8% with 41% owning the house they occupied.

83. The survey posted an average monthly income of P12,591, though 20.7% had incomes of less than P5,000 and another 32.4% had an income range of P5,000 – P9,999. Estimated household poverty threshold was P6,739 for the survey sample's average household size of 5.11 members. This was computed from the official annual per capita poverty threshold for La Union for 2007 which was pegged at P15,826 for all areas. About 28.6% spent less than P5,000 per month while most (38.6%) spent about P5,000 – P9,999. Over 70% were unable to save while most of those who could (11.9%) had less than P1,000 in savings per month. Television (86.2%), cellular phones (81%) and refrigerators (58.9%) were the most common valuable items of the household.

84. Out of 383 cases in La Union, 79.6% of households had water-sealed toilets (flush or pour flush) connected to septic tanks. The next most common type of toilet system among 8.1% of the households was water-sealed (flush or pour flush) connected to a pit; 9.9% shared toilets; 1% had no toilet (wrap and throw, arinola, bush, etc.), no one reported using water-sealed flush or pour flush connected to a drainage. Most households (91.6%) reported satisfaction with their current toilet system; the main reason for dissatisfaction was due to backflow (43.8%); less than a quarter of households (23.2%) of MSFWD wanted to improve their septage system; for those who did, 45.6% prioritized installation of a septic tank.

85. There was high awareness on hand washing except for other critical activities involving children. All survey respondents reported washing hands before cooking, before eating, after using the toilet, before feeding children, and after washing the children after toilet; but only 57.7% washed hands before breastfeeding. Non-

connected households transported water from source using open (86.1%) and closed containers (3.1%); pipe or water hose was also connected to a neighbor according to 8% of 323 cases; 4.1% of 342 non-connected cases had at least one member who suffered from a water-related disease during the past year; 1.5% of households had at least one child who suffered diarrhea; 17.9% of households treated drinking water; on the other hand, 9.8% of households with WD connection had at least one member who had suffered a water related disease in the past year with 7.3% of these households boiling faucet water for drinking.

86. Respondents sought medical services primarily from public facilities such as medical centers (45.3%), government hospitals (24%), private hospitals (16.7%) and private clinics (8.3%). There were 97.6% of survey respondents who were satisfied with available health services in their locality, with women slightly more satisfied than men; 70.3% of both female and male-headed households had access to Philhealth or had assistance on health expenses while 2.6% relied on self-medication. Significantly more female-headed households (4.5%) relied on self-medication than male-headed (1.8%) households.

## V. ANTICIPATED IMPACTS AND MITIGATION MEASURES

87. The present report assesses the impacts of the proposed activities on various environmental attributes of the subproject site.

88. *Methodology.* Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed project; (iii) site visit and professional assessment by the environment specialist; and (iv) evaluation of proposed design and potential impacts based on the environment specialist's past experiences. Categorization of the project and formulation of mitigation measures have been guided by ADB's REA Checklist for Water Supply (**Appendix 1**) and SPS.

89. A comprehensive screening for environmental impacts is made through a review of the parameters associated with water supply projects against the components of the proposed MSFWD subproject and the environment where the facilities will be located. A screening checklist was developed from various sources such as DENR checklists, ADB's "Rapid Environmental Assessment (REA) Checklist, and WB Environmental Source Book. Some items of the checklist may not be applicable to this particular subproject. However, they are included in the discussions to indicate that their applicability was reviewed in the environmental impact screening process. This will help identify which topics do not require further attention.

90. *Assessment of the Impacts.* The assessment is made on the following phases of the subproject: (i) Pre-construction, (ii) Construction, and (iii) Operation and Maintenance. Results of the environmental impacts screening are summarized in **Table 11**. It shows the impact types and magnitudes for both positive and negative impacts without the mitigating measures and the resulting situations when mitigating measures will be implemented. Discussions of each issue are presented in the succeeding sections. For ease of identification, a summary of the environmental impacts that should be carried to the section for Environmental Management Plan (EMP) is presented at the end of this section as **Table 12**.

91. Environmental impacts arising from decommissioning of the proposed MSFWD facilities were also reviewed but are no longer further discussed due to the following: (i) decommissioning of facilities is a remote possibility since these will serve growing urban areas and such facilities are critical for sustaining those areas, (ii) residual waste cleanup is not a major concern since the facilities are not industrial manufacturing plants with potential problems for toxic and hazardous wastes, and (iii) solid wastes from decommissioning is also not a major concern since the structures are mostly made of reinforced concrete and the solid wastes are mostly recyclable materials such as broken concrete materials, reinforcing steel bars used in the structures, structural steel, roofing materials, electrical wires, etc.

**Table 11: Summary of Environmental Impact Screening**

Environmental Impacts and Risks	Without Mitigation	With Mitigation
<b>PRE-CONSTRUCTION PHASE</b>		
Encroachment to environmentally sensitive areas	na	na
Impacts and risks to biodiversity conservation	na	na
Encroachment to historical areas and cultural areas	Δ -	Δ
Potential competing use of water resource	Δ -	Δ
Potential nuisance and problems to the public	● -	Δ
Loss of assets (IR concerns)	● -	Δ
<b>CONSTRUCTION PHASE</b>		
Modification of construction site topography	Δ -	Δ
Removal of Trees	Δ -	Δ
Displacement of Rare or Endangered Species	na	na
Soil erosion and sediments of construction sites	● -	Δ
Nuisance/ public inconvenience in pipelaying	● -	Δ
Noise from construction equipment	● -	Δ
Local air pollution due to construction activities	● -	Δ
Oil and other hazardous materials releases	Δ -	Δ
Vehicular traffic congestion and public access	● -	Δ
Hazards to public due to construction activities	● -	Δ
Pollution and health risk due to workers camp	● -	Δ
Increase employment opportunity in work sites	● +	● +
Improper closure of construction sites	● -	Δ
<b>OPERATION AND MAINTENANCE PHASE</b>		
Health hazard due to delivery of poor water quality	● -	Δ
Pollution from increased generation of sewage and sullage	● -	Δ
Noise and air pollution of pumping stations	Δ -	Δ
Ground subsidence due to over-pumping	● -	Δ
Noise and air pollution from water treatment plant	Δ -	Δ
Waste generation of filter beds (backwash)	Δ -	Δ
Pumping stations operational risk and safety	● -	Δ
Water treatment facility operational risk and safety	● -	Δ
Increase employment opportunities	Δ +	Δ

Legend: n.a. = not applicable; Δ = insignificant; ● = significant; + = positive; - = negative

## **A. Design/Pre-Construction Phase Considerations**

92. *Encroachments.* MSFWD subproject's components will not be located in areas that are environmentally sensitive and areas with historical and cultural importance. As described in the environmental baseline, the proposed sites are residential, institutional, and agricultural landscapes. The proposed routes of the pipelines along the highway from the town of Bauang through San Fernando City and to the towns of San Juan and Bacnotan are presently residential, commercial, and agricultural landscapes, while proposed sites of pumping stations and reservoirs are in farmlands such as in Barangay Banlay, Bauang. Proposed pipelines routes in interior areas are also in mainly residential areas such as in the town of San Gabriel. There are no known archaeological and cultural assets in these proposed sites. Nevertheless, precautions will be taken to avoid potential damage to any archaeological and cultural assets by inclusion of provisions in tender and construction documents requiring the contractors to immediately stop excavation activities and promptly inform the authorities if archaeological and cultural assets are discovered. Under the Cultural Properties Preservation Act (Presidential Decree No. 374) when excavators shall strike upon any buried cultural property, the excavation shall be suspended and the matter reported immediately to the Director of the National Museum who shall take the appropriate steps to have the discovery investigated and to ensure the proper and safe removal thereof, with the knowledge and consent of the owner

93. *Impacts and Risks to Biodiversity Conservation.* The issue on impacts and risks to biodiversity conservation is not applicable since the MSFWD subproject's components will not be located in areas that are environmentally sensitive. The sites are not in undisturbed landscapes and over the years the ecological changes due to human activities in the area have resulted to the present residential, commercial, institutional, and agricultural landscapes.

94. *Competing Use of Water Resource.* Problems on competing use of groundwater resources are not expected since MSFWD shall apply for water rights of all the wells from the National Water Resources Board (NWRB) and avoid any water use conflict. In the issuance of water rights, NWRB will ensure that groundwater resources are appropriately allocated.

95. *Nuisance and Problems to the Public.* Potential nuisances and problems to the public during construction can best be avoided if proactively addressed during detailed design and pre-construction phase. Consultation and information dissemination to potentially affected people shall be done during detailed design. Tender documents shall include provisions addressing potential nuisances and problems to the public during construction. These include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) construction camps, and (v) public safety and convenience. In addition, prior to site works, the contractor shall coordinate with the appropriate agencies in the procurement of required clearances with regard to electricity, telephone lines and other utilities/structures that may be affected by construction activities. These shall all be reflected in the construction contracts.

96. *Loss of Assets.* Inventory of losses and required land for acquisition were made during the planning phase and shall be updated during detailed design phase as soon as the final pipeline alignments and final locations of facilities are available.

A plan for compensation and other assistance corresponding to the losses of the affected people will be prepared. All payments to affected parties shall be made by MSFWD before the start of construction activities.

97. *Climate Change Resilience.* While the Project is intended to improve climate change resilience by upgrading and/or expansion of the existing current water system, the system itself may be vulnerable to the effects of climate change. In particular, sources of raw water (i.e., groundwater) may be depleted and/or ground heave (and other phenomena) may affect structural integrity of the distribution system. This can be mitigated with the conduct of appropriate study to ascertain availability (or abundance) of raw water especially under extremely dry conditions/weather. Likewise, the detailed engineering design (DED) should ensure the selection of appropriate materials for piping distribution to mitigate potential effects of ground heave (and other similar phenomena).

98. Likewise, relevant engineering standards shall be applied to account for other natural hazards (e.g., flood, earthquake). All civil works will take into consideration construction criteria applicable to the observed level of risk. Disaster risk mitigation measures will include, among others, sufficient elevation for structural foundation to account for projected or estimated flood depths; avoiding areas of known seismic risks (e.g., fault lines) as component locations; and ensuring structural design are in accordance with applicable standards/codes. These measures will be considered in detail during the DED stage.

99. Using the AWARE climate sensitivity software and the scenario of “without-mitigation“, the project has been rated as “HIGH” risk with flood, landslide, tropical storm and sea level rise as major risk contributors. With all the identified mitigation and adaptation measures for both climate change and natural hazards, the resulting residual risk significance may be considered as “MODERATE to LOW”.

## **B. Construction Phase Environmental Impacts**

100. *Site Preparation.* Construction of the water filter beds (Barangay Bumbuneg, San Gabriel), pumping stations, pipelines, and reservoirs will not involve modification of the construction site topography. Water supply pipelines will follow as much as possible the existing site contour. This issue is therefore considered not significant. Removal of trees will not be an issue due to the following: (i) pipelines will mostly be laid in trenches along the right-of-way of existing roads, and (ii) areas required for pumping stations and reservoirs are relatively small. The issue on displacement of rare or endangered species is not applicable to this subproject since there are no known rare or endangered species within the proposed sites of San Fernando City, Bacnotan, Bauang, San Gabriel, and San Juan.

101. *Soil Erosion and Sediment of Construction Sites.* During rainy periods, exposed soil at the construction site can easily be washed away by runoff and carried to the natural drainage system. Hence, soil erosion of the construction sites could occur if preventive measures are not instituted.

102. Mitigation. Control of the surface runoff is necessary in preventing erosion. The contractor shall be required to use structural erosion prevention and sediment control practices which will divert the storm water flows away from the exposed areas, prevent sediments from moving offsite, and reduce the erosive forces of runoff waters. These may include the following: (i) interceptor dikes, (ii) pipe slope drains, (iii) straw bale barriers, (iv) sediment traps, and (v) temporary sediment basins. Whenever possible, total exposed area shall be minimized.

103. *Nuisance/Public Inconvenience in Pipelaying.* Public inconvenience could arise in pipelaying works due to prolonged period of water supply service interruptions. Dumping of construction materials and solid wastes in watercourses will also cause nuisance to the public aside from affecting water quality and the flow regime.

104. Mitigation. The construction contractor shall be required: (i) to do installation or replacement of pipes within the shortest time possible to minimize water supply cut-off periods and/or use of night time schedules, as well as announcement of water supply interruptions two to three days prior to actual cut-off; and (ii) not to dump earth, stones, and solid wastes in watercourses to avoid adverse impact on water quality and flow regime.

105. *Construction Noise.* Potential sources of noise are the construction equipment, such as trucks and other equipment, which can generate noise of 80 dB(A) from a distance of 30 meters. Loud noise sources such as blasting are not expected in the construction activities of the MSFWD subproject. This issue is important since the proposed pipelines routes, along the highway from the town of Bauang through San Fernando City and to the towns of San Juan and Bacnotan, have numerous residential and commercial areas. In San Gabriel, proposed pipelines routes are mainly in residential areas.

106. Mitigation. Nuisance from equipment noise can be mitigated with the use of sound suppression devices for the equipment. In areas near any house or noise-sensitive sites, noisy equipment shall not be operated during nighttime to early morning (22:00H – 06:00H). Noise levels due to construction activities should not exceed 50 dB(A) near schools such as the San Gabriel Vocational High School and San Felipe Elementary School in San Gabriel, 55 dB(A) in other areas, and 45 dBA during nighttime. Workers using noisy equipment shall be provided with earplugs.

107. *Local Air Pollution Due to Construction Activities.* Dust generation from trenching, earthworks, and soil preparation activities during dry periods will be an air pollution problem. Intermittent episodes of air pollution from smoke belching equipment may also occur. This issue is considered significant during dry periods. Another potential source of air pollution are large stockpiles of construction materials such as soil and aggregates. Without any mitigating measures, dust generation could be significant during dry periods.

108. Mitigation. The contractor should be required to perform regular water spraying of the sites during dusty periods in order to reduce the generation of dusts. He will also be required to use equipment that are properly maintained and are not smoke belchers. Covers for stockpiles that will be left idle for a long time shall be required. Covers will prevent dust generation due to wind action. Trucks transporting loose construction materials such as sand, gravel, spoils, and the like shall be provided with tarpaulin cover.

109. *Oil and other hazardous materials releases.* Heavy equipment and vehicles will be used in the various construction activities for the MSFWD subproject. Aside from fuel, oil, and grease, the activities may also involve the use of paints and solvents. Although there is potential for accidental releases of these materials, the issue is not considered significant since expected quantities will be relatively small. However, as part of good construction practice, the contractors will be required to implement an awareness program for all workers regarding the prevention and management of spills and proper disposal of used containers. Fuel and oil shall be

stored in a designated secured area provided with an impermeable liner to prevent the accidental spills from seeping into the ground.

110. *Vehicular Traffic Congestion and Public Access.* Construction activities, such as pipelaying, may cause traffic congestion in heavily traveled highways and narrow streets. It may hinder public access. In the MSFWD subproject, transmission line pipelaying along the highway from Bauang through San Fernando City and to the towns of San Juan and Bacnotan are expected to cause traffic congestion since there are lots of vehicles using the highway and pipeline alignment might be in the road shoulders or within the pavement. Installation of secondary pipes crossing the highway to the other side may cause the temporary closure of half the road and will lead to traffic congestion. This issue is therefore considered significant.

111. Mitigation. Contractors shall be required to: (i) prepare a traffic plan; (ii) closely coordinate with local authorities for the closure of roads or rerouting of vehicular traffic; (iii) consider the schedules of local activities with heavy presence of people such as festivities, processions, parades, etc. in the timing of construction activities; (iv) do proper stockpiling and immediate disposal of spoils to avoid nuisance and traffic/access obstruction; and (v) do immediate restoration of roads and other areas affected by pipe laying, construction activities and vehicles.

112. *Hazards to Public Due to Construction Activities.* Construction activities, such as pipelaying, along the roads may result to hazardous driving conditions since vehicles would still be using the road while construction activities are ongoing. The movement of construction vehicles and excavations would pose some hazards to the driving public. There is also risk of people falling down in open trenches since pipelaying trenches are normally left uncovered until pipeline testing is completed.

113. Mitigation. The contractor shall be required to implement a road safety plan incorporated in his construction schedule. Safety measures shall be implemented including: (i) warning signs to alert people of hazards around the construction sites, (ii) barricades, and (iii) night lamps for open trenches.

114. *Pollution and Health Risk due to Workers Camp.* The contractor is expected to erect temporary workers' camps during construction of the MSFWD subproject. Improperly managed silt runoff and sanitary wastes from these camps may reach nearby areas. Poor sanitation and lack of proper solid waste management at the worker's camp will provide the conditions for vermin and other disease vectors to easily multiply and infect the workers. This may lead to the transmission of diseases from the workers camp to other areas. These conditions will increase public health risk.

115. Mitigation. The construction contractor shall be required to: (i) install proper sanitary facilities to prevent the indiscriminate discharge of sanitary wastes at the camps surroundings, (ii) implement proper solid waste management, and (iii) prevent surface runoffs from flowing into the workers camps to avoid carrying away any contaminants. The contractor shall be required to use temporary diversion drains, catch drains, and silt-traps at these camps.

116. *Improper Closure of Construction Sites.* Construction activities will generate construction solid wastes after completion of work. This may include used wood materials, steel works cuttings, paint and solvents containers, used oil from equipment, unused aggregates, etc. If not remove from the sites after completion of the construction activities, these solid wastes will cause aesthetic problems and some will be potential sources of contaminants for surface runoffs. This is important



in the reservoir sites of San Fernando City and the towns of San Juan, Bacnotan, Bauang, and San Gabriel.

117. Mitigation. After completion of work activities, the contractor shall be required to remove the construction wastes from the sites before finally leaving. The entire site must be free of any construction solid wastes. Implement the required surface restoration.

118. *Increase Employment Opportunities at Work Sites*. Various construction activities for the pumping stations, filter beds, reservoirs, and pipelines will definitely require a considerable number of workers. The impact would be beneficial and significant since employment opportunities in the area will increase.

119. Enhancement. Whenever possible, the contractor shall be encouraged to use the available local labor for these construction activities. The recruitment of workers shall be coordinated with the local officials.

### **C. Operation Phase Environmental Impacts**

120. *Health Hazard Due to Delivery of Poor Water Quality*. Delivery of poor water quality will increase the health risk to water consumers. Threats to water quality are always present in all components of a water supply system, from the raw water sources up to the service connections. Threats of contamination in water sources may be due to the presence of bacteria, viruses, protozoa, or chemicals. This raises the need to provide a secure barrier to post-treatment contamination as the water is transported to the consumer. MSFWD should therefore manage the environmental risk to its water supply system. Failure to implement the appropriate management measures may result to adverse consequences threatening public health such as the case of a microbial outbreak.

121. Mitigation. Delivery to customers of poor water quality from (i) the deepwells and pumping stations of San Juan and Bauang, (ii) the water treatment facility at San Gabriel, and (iii) the entire water supply network can be prevented in a broader scale by implementing a water safety plan as advocated by WHO. The 2007 Philippine Standards for Drinking Water (PSDW) also advocates preparation of a water safety plan.

122. A water safety plan shall enable MSFWD to (i) prevent contamination of its water sources, (ii) treat the water to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water. It is an approach that will clearly show the desire of the MSFWD in applying best practices in ensuring delivery of potable water to its consumers.

123. For controlling microbial contamination, a hypochlorinator will be installed at each pumping stations and the water treatment facility at San Gabriel to ensure that water will be chlorinated and adequate residual disinfection will be maintained. This device uses a feed pump to inject controlled amount of chlorine solution into the water leaving the pumping stations. This is safer than using chlorine gas. The standards for chlorine residual of the 2007 PSDW are: (i) 0.3 mg/l minimum for detection at the farthest point of the distribution system and (ii) 1.5 mg/l maximum for detection at the farthest point of the distribution system.

124. *Pollution from Increased Generation of Sewage and Sullage*. Increasing the water supply to the service area will also increase the generation of sewage and

sullage since most of the water used by consumers will become wastewater from the toilets, kitchens, and laundry areas. This wastewater will contribute to pollution of the surrounding areas. Without a mitigating measure, this impact would be significant.

125. Mitigation. Wastewater from the toilets, kitchens, and laundry areas will normally be handled by the individual septic tanks system of the water consumers. The septic tank system will: (i) treat the wastewater and reduce the pollution potential and (ii) reduce the people's exposure to untreated domestic wastewater. This will help in interrupting disease transmission.

126. *Noise and Air Pollution of Pumping Stations*. Noise of pumping stations is not an issue for the MSFWD subproject since there will be no significant sources of mechanical noise within the stations. Potential sources of noise, such as pumps and electric motors will be housed in buildings that provide noise attenuation. Local air pollution levels will not be affected by equipment use during normal operations since the pumping station will run on electricity to be supplied by the local power companies (La Union Electric Cooperative and La Union Electric Company). Hence, there will be no air pollution associated with fuel combustion during normal electricity supply. However, a diesel-fueled electricity generator set will be used during the occasional brownout events. This generator set will surely comply with the air pollution regulations since a permit will be secured for its use. There will be no operational activities that will cause dust generation. Mitigating measures are therefore not necessary for noise and air pollution.

127. *Ground Subsidence Due to Over-pumping*. Pumping groundwater should not be done without a defining a limit to how much water can be extracted. Excessive groundwater pumping will result to continuous reduction in the groundwater level in the aquifer. This will lead to a situation where the aquifer at some point will not be able to supply water in an economical or even physical sense. This will also cause an environmental effect known as ground subsidence. It is the result of soil compression when the drop in the water level will change the soil structure. Ground subsidence can result in significant damage to properties and structures. This issue is important to MSFWD since its water sources are mainly groundwater.

128. Mitigation. To avoid over pumping the aquifers, each well shall be operated below its safe yield. This refers to the long-term balance between the water that is naturally and artificially recharged to an aquifer and the groundwater that is pumped out. When more water is removed than is recharged, the aquifer is described as being out of safe yield. When the water level in the aquifer then drops, mining of groundwater is happening. At any rate, the recommendations on the sizes of pump and motor to be installed on the wells will be based on the evaluation of test pumping results and available groundwater drawdowns. MSFWD should monitor the groundwater level of each well to determine if continuous reduction in the groundwater level in the aquifer is occurring. WD staff are quite capable of doing this simple task since it will only use a wire to be attached to an ordinary electrical tester and lowered into the well, a common practice in the Philippine water industry. The water level below ground surface will be measured from the distance where the electrical tester indicated contact with the water level.

129. *Waste Generation of Filter Beds*. A water filtration facility will generate wastewater in the form of filter backwash water. The process of continually renew the efficiency of the filter units will require repeated backwashing operation to unclog the filter beds. This activity will generate filter backwash water that contains the solids removed by the filter beds. In addition, sludge at the

sedimentation basins has to be removed regularly in order to maintain the capacity of the basins. However, this issue is considered not significant since the proposed filter beds at Barangay Bumbuneg in San Gabriel will be small and will simply augment the existing sedimentation basin and the expected clean water output is small at only 27 lps. Nevertheless, the filter backwash water will be sent to the sedimentation basin. Settled sludge of the sedimentation basin shall be sent to large sludge ponds where the long detention time allows safe discharge of clear water.

130. *Pumping Stations Operational Risk and Safety.* The proposed MSFWD pumping stations will not inherently pose risks to the environment and people. These facilities will not use flammable materials during normal operations. Conditions of extreme conditions of temperature and pressure are not to be expected. Use of diesel-powered generators as stand-by power source is considered safe since these are equipped with safety devices and leak detection for fuel tanks. The potential source of risky situation will be the used of chlorine gas as disinfectant. Accidents may occur with chlorine gas handling.

131. Mitigation. In older water facilities, the significant source of hazardous situations is the use of chlorine gas as disinfectant. This shall be avoided in the proposed MSFWD pumping stations by using sodium hypochlorite (NaOCl), the liquid form of chlorine. NaOCl is inherently a safer disinfectant. Its character can simply be put as household bleach or swimming pool chlorine.

132. *Water Treatment Facility Operational Risk and Safety.* The proposed MSFWD water filtration facility (filter beds) is a type of facility that will not inherently pose any significant risk to the environment and people. It will not use flammable materials during normal operations. Conditions of extreme conditions of temperature and pressure are not to be expected. Use of diesel-powered generators as stand-by power source is considered safe since these are equipped with safety devices and leak detection for fuel tanks. The potential source of risky situation will be the used of chlorine gas as disinfectant.

133. Mitigation. In older water treatment plants, the significant source of hazardous situations is the use of chlorine gas as disinfectant. This shall be avoided in the proposed MLUDWD water filtration facility (filter beds) by using sodium hypochlorite (NaOCl), the liquid form of chlorine. NaOCl is inherently a safer disinfectant. Its character can simply be put as household bleach or swimming pool chlorine.

134. *Increase Employment Opportunities.* Operation and maintenance of the pumping stations, reservoir, and pipelines will definitely require a number of workers. The impact would be beneficial since employment opportunities in the area will increase. However, the expected number of additional workers will be small since the additional water supply facilities are not labor intensive. This impact is therefore considered less significant.

135. *Lower Precipitation and Higher Temperature due to Climate Change.* PAGASA predicts that seasonal mean rainfall in the province of La Union in 2020 would be lower by 9.7mm during the summer months of March, April, and May compared to the observed baseline (1971-2000), and increase in seasonal mean temperature by 2.1°C during the same period. This means that there would be less precipitation to recharge the aquifer and higher rate of evapotranspiration during the summer months.

136. Mitigation. To conserve groundwater source, water abstraction in each well will be done below the permitted rate in its Water Permit issued by NWRB. Moreover, effective pump capacity to be installed will be smaller than the allowed rate.

137. MSFWD will monitor the groundwater level of each well to determine if continuous reduction in the groundwater level in the aquifer is occurring using an electrical tester. As part of the climate change adaptation, MSFWD will develop other water sources, such as surface water, and promote rainwater harvesting.

138. *Potential Conflict on Water Uses.* As population increases, water demand will also increase and different water uses will emerge that may create conflict in the future.

139. Mitigation. Integrated water resources management within the watershed to improve the allocation and management of scarce water resources in the context of climate change will be initiated by MSFWD. An agreement with DENR and the city government for the assignment of a watershed area to the WD will be worked out. The agreement will include the active participation of the city and watershed Barangays. Meanwhile, the WD will continue to implement its tree planting program in coordination with the city Barangays.

140. This proposed subproject of MSFWD will have an overall beneficial net effect on the water supply system of the WD because it will improve the water resiliency in the province of La Union.

141. After impacts and risk screening, **Table 12** lists the environmental impacts and risks that requires mitigation and shall be carried to the EMP Section.

**Table 12: Environmental Impacts and Risks for Inclusion in EMP**

Environmental Impacts and Risks	Without Mitigation	With Mitigation
<b>PRE-CONSTRUCTION PHASE</b>		
Potential nuisance and problems to the public	● -	△
Loss of assets (IR concerns)	● -	△
<b>CONSTRUCTION PHASE</b>		
Soil erosion and sediments of construction sites	● -	△
Nuisance/ public inconvenience in pipelaying	● -	△
Noise from construction equipment	● -	△
Local air pollution due to construction activities	● -	△
Vehicular traffic congestion and public access	● -	△
Hazards to public due to construction activities	● -	△
Pollution and health risk due to workers camp	● -	△
Increase employment opportunity in work sites	● +	● +
Improper closure of construction sites	● -	△
<b>OPERATION AND MAINTENANCE PHASE</b>		
Health hazard due to delivery of poor water quality	● -	△
Pollution from increased generation of sewage and sullage	● -	△
Ground subsidence due to over-pumping	● -	△
Future scarcity of water and conflict in water uses due	● -	△

to climate change		
Water treatment facility operational risk and safety	● -	Δ
Pumping stations operational risk and safety	● -	Δ

Legend: n.a. = not applicable; Δ = insignificant; ● = significant; + = positive; - = negative

142. The subproject is unlikely to cause significant adverse impacts. However, there are no impacts that are significant or complex in nature, or that needs an in-depth study to assess the impact. The potential adverse impacts that are associated with design, construction, and O&M can be mitigated to acceptable levels with the recommended mitigation measures.

**D. Cumulative Impact Assessment**

143. The cumulative impact assessment (CIA) examined the interaction between the project’s residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project’s potential cumulative effects were considered with respect to valued components (VCs) in environmental and socioeconomic categories, in four areas:

- (i) of any potential residual project effects that may occur incrementally over time;
- (ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
- (iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed project; and
- (iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.

144. The project has identified the VCs as water quality, noise, traffic management, socioeconomic and socio-community components, and human health. There are no foreseeable projects that will overlap with the project. The spatial boundary of the project is the area along the pipe alignment, existing right of ways, and pump sites. The temporal boundary can be considered as the Municipalities of Bacnotan, Bauang, San Gabriel, and San Juan, and San Fernando City.

145. Given that the water supply requirements of the four municipalities and one city will be met and the sources considered adequate, there are no significant cumulative impacts expected on the future water supply.

146. Air quality effects will occur during construction. Consequently, although emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites, this impact will be short-term and localized to the immediate vicinity of the alignment. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, landfilling of residual wastes). Given the project’s relatively minor contribution to common air contaminants and GHG

emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

147. Noise levels during construction in the immediate proximity of most work sites are expected to increase. The duration of this exposure will be relatively brief. This exposure represents a temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the project O&M will be largely imperceptible, as the pump is submersible and located in relatively small sites within the Barangay.

148. Land use/traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented to address temporary disruptions to land use and access, traffic delays and detours, and increased volumes of construction-related traffic. Traffic movement along the alignment will be improved once construction is completed. Since only relatively small land area will be occupied by the eight new wells and four concrete reservoirs, plus the pipelines that will also be buried, it will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance the project area. This can be considered a long-term cumulative benefit of the subproject.

149. Upon completion of the subproject, the socio-community will benefit from improved water supply system. This is considered a long-term cumulative benefit.

150. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and common air pollutants will occur in proximity to project work sites during construction, due to their short-term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

151. The subproject will benefit the general public by contributing to the long-term improvement of water supply system and community livability in all five LGUs to be served by the subproject.

## **VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION**

149. MSFWD has undertaken various activities concerning information disclosure, public consultation, and public participation for the proposed MSFWD's water supply subproject. These were done to achieve a meaningful stakeholders' consultation and ensure subproject success.

150. During the planning phase, information regarding the proposed water supply subproject were disclosed to the public such as in the conduct of a socioeconomic survey between April to May 2009. Some 384 households in MSFWD's area were informed about the proposed subproject and interviewed for socioeconomic data. Survey respondent also included those households without water service connection with MSFWD.

151. Key informant interviews and focus group discussions (FGDs) with *Barangay* and city officials were conducted to get their cooperation and gather information relative to poverty incidence and concentration, and identify needs and recommendations on water a. Participants in the key informant and FGDs included the following: (i) WD staff and management, (ii) local health officials, (iii) gender focal persons of LGU, (iv) city and *Barangay* officials, (v) LGU planning offices, (vi) local environment offices, and (vii) urban poor NGOs.

152. *Public Consultation.* On 04 September 2009, MSFWD conducted an initial public consultation and formally discussed the proposed water supply subproject with the stakeholders and requested their views. A total of 13 stakeholders' representatives participated. Stakeholders were encouraged to raise their social and environmental issues. Participants included: (i) concerned individuals, (ii) *Barangay* officials, (iii) NGOs, (iv) LGU planning officials, (v) Liga ng mga *Barangay*, and (vi) WD staff and management. Stakeholders expressed support to the MSFWD subproject. Summary of the consultation outcomes is presented in **Table 13**, while the documentation is presented at the annexes. Septage management was part of the consultation topics since it was a subproject component during the initial stage of the study. MSFWD decided later in March 2010 to exclude the sanitation component from the subproject. Attached in **Annex 4** is a record of attendance of said meeting.

153. A public consultation was again held on 26 November 2012 (the attendance record is attached as **Annex 6**). The overall response to the subproject was favorable inasmuch as improved water supply was widely welcomed. Nevertheless, some concerns were raised. Among them were compensation for trees that might be cut down, perception that water for irrigation might somehow be affected, the lack of water during the dry season, the possibility that water sources might be depleted, and flooding and erosion. The policy on compensation of trees and other assets was explained to the participants. In response to the concern about the possible effect on water sources and the availability of water for irrigation, The WD explained that the National Water Regulatory Board (NWRB) gives the allocation on the amount of water that may be extracted from the ground and the WD keeps within the limits set by the NWRB in its water permits. It also explained that the present rate of water abstraction by the WD is minimal and that engineering studies are conducted before any project is implemented. On the concern about flooding and erosion, the WD maintained that it will continuously coordinate with the provincial government on the issue. A summary of the issues raised and the corresponding responses are shown in **Annex 7**.

154. *Future Disclosure and Consultations.* During detailed design, LWUA and MSFWD will again conduct public consultations and information disclosure. Large group of stakeholders are expected to attend these proposed consultations since proposed water tariffs will also be discussed. Views of the stakeholders will be considered in the overall design process. Stakeholders' consultations shall be continued throughout the duration of the construction phase. MSFWD shall keep records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues.

**Table 13: Summary of Consultation Outcomes (04 September 2009)**

Group Represented	Issues/ Concerns Raised	Project's Response
Senior Citizen(NGO); 1 attendee	Will participants of the septage management program be only those near the sites of water	Initially, it shall be those who have water connections with MSFWD

	sources	
Bauang Association of Barangay Captains; 4 attendees	will the old pipelines be replaced	existing pipelines are still good and will be retained. San Fernando City will have increase water pressure due to the additional parallel pipelines to be installed
City Planning Office; 1 attendee	heavy traffic that pipelaying activities may cause in the city particularly during big events such as fiesta and school openings	civil works contracts will include provisions requiring the contractors to implement a traffic management program in close coordination will local authorities
La Union Vibrant Women Incorporated (Bauang NGO); 1 attendee	will new pipelines be installed	MSFWD will install new parallel pipelines
LGU Bauang; 2 attendees	how the project will handle the existing septic tanks since most of them have unlined bottoms	the project has a revolving fund for old septic tanks repair, while new septic tanks have lined bottoms in compliance to the building code
San Gabriel Municipal Planning Office; 1 attendee	laxity of security at the San Gabriel sedimentation basin since students were able to bath at the basins	MSFWD will look into the matter since the facility is supposed to be guarded at all times
La Union Vibrant Women Incorporated (San Juan NGO); 1 attendee	how a Barangay may be connected to the new water supply system	a Barangay resolution requesting MSFWD is needed and MSFWD will then conduct a concessionaire survey

## VII. GRIEVANCE REDRESS MECHANISM

155. Local grievance redress mechanism is important in the implementation of the proposed MSFWD subproject since any complaint and concern of the affected people must be addressed promptly at no costs to the complainant and without retribution. This mechanism shall be disclosed in public consultations during detailed design and in meetings during the construction phase. Complaints about environmental performance of projects during the construction phase can best be handled by an ad-hoc Water District Environmental Complaints Committee (WDECC) for expeditious resolutions to the complaints. Complaints during the operation phase can be brought to the attention of the MSFWD or EMB-Reg. I.

156. *MSFWD Environmental Complaints Committee.* MSFWD shall form the WDECC to be chaired by the Water District-Project Implementation Unit (WD-PIU) head. Members shall include the following: (i) contractor's highest official at the site such as Construction Manager or Construction Superintendent, (ii) Barangay officials, (iii) concerned NGOs, and (iv) women's organizations. Creation of the WDECC and its operation shall be included in appropriate sections of the civil works contract. Expeditious resolution of complaints during construction is important since activities are sometimes continuous and can easily change the landscapes within a



week. For the quick filing of complaints, the WDECC shall prepare a form to be used for the filing of grievances/complaints. The use of form will also facilitate the filing of complaints by illiterate persons. A sample grievance registration form is appended as **Appendix 2**.

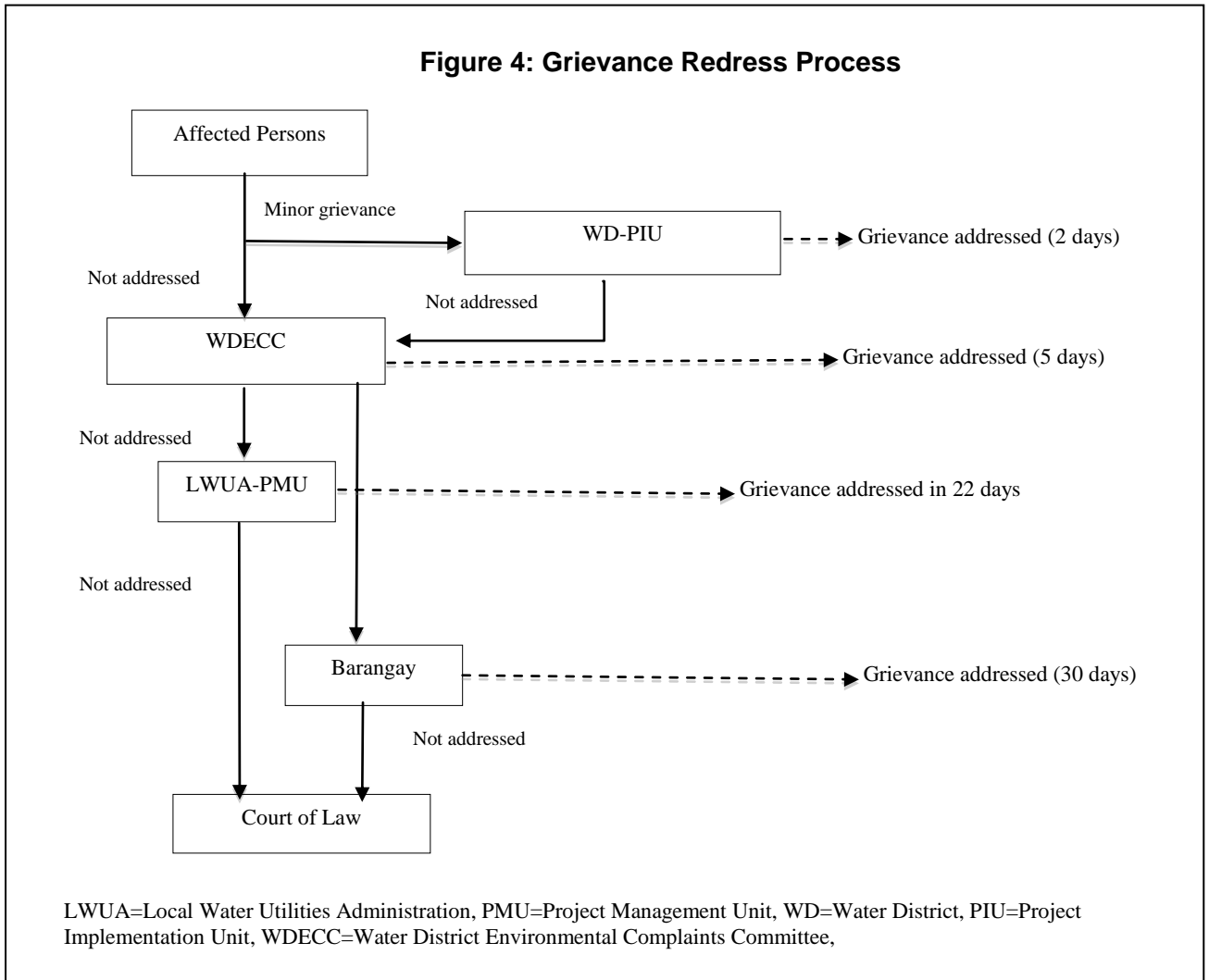
157. The steps to be followed in filing complaints and the procedures for redress are the following: (i) complainant shall provide the background and file the complaint verbally or in writing to WDECC. The WDECC secretary shall assist the complainant in filling-up the complaint form; (ii) within 2 working days, the WD-PIU head, contractor's representative, and complainant shall discuss if the complaint can be resolved without calling for a WDECC meeting; (iii) if the complaint cannot be resolved by the WD-PIU head and contractor's representative, a WDECC meeting shall be called with the complainant to resolve the complaint within 5 working days; (iv) if the complaint cannot be resolved, the complainant shall raise the issue to the Barangay officials where Barangay rules and regulations are followed for the amicable settlement of disputes at the Barangay level without judicial recourse; and (v) if the complaint cannot be resolve at the Barangay level, the complainant shall seek recourse with the courts. If the complaints are based on violations of the ECC terms and conditions, the complainant has an option to also bring the issue to DENR. **Figure 4** shows the grievance redress process.

158. *Recordkeeping.* Records will be kept by the MSFWD-PIU of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome.

159. *Costs.* All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borned by MSFWD.

160. *Complaints to DENR.* Complaints about environmental performance of projects issued an ECC can also be brought to the attention of DENR-EMB. The process of handling such complaints is described in the *Revised Procedural Manual (2007)* for the IRR of PD 1586. The steps that DENR-EMB may follow in handling complaints are: (i) DENR-EMB shall verify if the complaint is actionable under P.D. 1586, (ii) within 72 hours from receipt of a complaint DENR-EMB will send the proponent a Notice of Alleged Violation (NAV) and requests for an official reply as to why the proponent should not be penalized, (iii) DENR-EMB may conduct field validation, site inspection and verification or other activities to assess or validate the complaint. The proponent is allowed to respond within 7 days. Proponent's failure to respond to the NAV and further notices will force DENR-EMB to take legal actions. DENR may issue a Cease and Desist Order (CDO) to project proponents which shall be effective immediately based on: (i) violations under the Philippine EIS System, and (ii) situations that present grave or irreparable damage to the environment. PD 1586 also allows DENR to suspend or cancel the proponent's ECC if the terms and conditions have been violated.

**Figure 4: Grievance Redress Process**



**VIII. ENVIRONMENTAL MANAGEMENT PLAN**

161. This section addresses the need for mitigation and management measures for the MSFWD subproject. Information includes: (i) mitigating measures to be implemented, (ii) required monitoring associated with the mitigating measures, and (iii) implementation arrangement. Institutional set-up is presented in the implementation arrangement and discusses the roles during implementation and the required monitoring. It also outlines the requirements and responsibilities during pre-construction, construction, and operation phases.

**A. Environmental Mitigation**

162. **Table 14** presents the information on: (i) required measures for each environmental impact that requires mitigation, (ii) locations where the measures apply, (iii) associated cost, and (iv) responsibility for implementing the measures. Details of mitigating measures are already discussed in **Section V** where the need for mitigation of each impacts was determined in the screening process.

**Table 14: Environmental Mitigation Plan**

Project Activity	Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Location	Mitigation Cost	Responsibility Implementation/ Supervision
<b>PRE-CONSTRUCTION PHASE</b>					
Excavation requirements	Potential damage to archaeological and cultural assets	Tender documents shall include a provision that will require construction activities to be stopped immediately upon discovery of any archaeological and cultural relics and authorities will be informed promptly	Pipeline trenches, civil works excavations	Part of detailed design cost	Design Consultants / LWUA Project Management Unit (PMU)
Social and community concerns	Potential nuisance and problems to the public	Consultation with the affected communities regarding the expected impacts and proposed mitigation measures of the project; Tender documents shall include provisions addressing the potential nuisances and problems to the public during construction phase	Pipelines routes, reservoir and pumping station	Part of detailed design cost	MSFWD PIU, Design Consultants / LWUA PMU
IR concerns	Loss of assets	Compensation and other assistance for loss assets and land acquisition; Consultation and information dissemination to affected people.	Pipelines routes, reservoir and pumping stations	Part of detailed design cost	MSFWD PIU, Design Consultants / LWUA PMU
Preparation of detailed engineering design	Natural hazards, such as earthquake, flood	Structural integrity of the water supply system shall conform with the requirements of the National Structural Code of the Philippines, 2010 (NSCP) and the latest edition of the American Water Works Association (AWWA) Standards for wells, pipes, valves, and fittings. Likewise, hazard maps shall be consulted.	All structural components	Part of detailed design cost	Design Consultants / LWUA Project Management Unit (PMU)
<b>CONSTRUCTION PHASE</b>					
Pipelaying and other civil works	Soil erosion and sediments of construction sites during rainy periods	Total area exposed shall be minimized; use of structural erosion prevention and sediment control practices which may include: interceptor dikes, pipe slope drains, straw bale barriers, sediment traps, and temporary sediment basins	Pipelines routes, reservoir and pumping station	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying	Nuisance / inconvenience to the public	Minimize water supply cut-off periods and /or use of nighttime schedules, as well as announcement of water supply interruptions two to three days prior to actual cut-off; no dumping of earth, stones, and solid wastes in watercourses	Pipelines routes,	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Nuisance from noise of construction equipment	Consultation with affected areas; not to operate noisy equipment during nighttime (22:00 – 06:00); sound suppression for equipment; ear plugs for workers	Pipelines routes, reservoir and pumping station	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Air pollution due to construction activities	Water spraying for dust control; construction materials with potential for significant dust generation shall be covered; tarpaulin cover for trucks transporting loose construction materials; not smoke belchers equipment	Pipelines routes, reservoir and pumping station	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Traffic congestion and hindrance to access	Close coordination with local authorities in road closure and traffic rerouting; contractor's traffic plan; proper stockpiling of materials and immediate disposal of spoils; immediate restoration of roads and affected areas	Pipelines routes	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Pollution and health risks due to workers camp	Proper camp sanitation; installation of sanitary facilities; solid waste management; surface runoffs control such as temporary diversion drains, catch drains, and silt-traps	Workers camp	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Hazard to public due to construction activities	Implement road safety plan and safety measures including warning signs to alert people of hazards around the construction sites, barricades, and night	Pipelines routes, reservoir and pumping	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants

Project Activity	Potential Environmental Impact	Proposed Mitigation Measure or Enhancement Measure	Location	Mitigation Cost	Responsibility Implementation/ Supervision
		lamps for open trenches in pipelaying	station		
Rehabilitation and closure of construction sites	Improper closure of construction sites	Removal of all construction wastes and implement surface restoration	Pipelines routes, reservoir and pumping station	Incorporated in construction contract	Contractor / MSFWD PIU, Supervision Consultants
Pipelaying and other civil works	Increase employment opportunities	Contractor required to give preference to local labor; workers recruitment to be coordinated with local officials	Pipelines routes, reservoir and pumping station	No cost	Contractor / MSFWD PIU, Supervision Consultants
<b>OPERATION PHASE</b>					
Water production	Health hazard due to delivery of poor water quality	Water disinfection using chlorine; water safety plan implementation	Pipelines, reservoirs, and pumping stations,	Part of operation & maintenance costs	MSFWD / LWUA
Water consumption	Pollution from increased generation of sewage and sullage	Septic tanks system of water consumers	Subproject water supply service area	Cost of water consumers	Water consumer/ LGU
Groundwater pumping	Potential ground subsidence due to excessive pumping	Groundwater pumping at lesser than the safe yield of each well	pumping stations	No cost	MSFWD / LWUA
Water treatment plant operation	water treatment plant operational risk and safety	Use liquid chlorine (sodium hypochlorite) instead of chlorine gas	Water treatment plant	Part of capital, operation & maintenance costs	MSFWD / LWUA
Pumping station operation	Pumping station operational risk and safety	Use liquid chlorine (sodium hypochlorite) instead of chlorine gas	Pumping station	Part of capital, operation & maintenance costs	MSFWD / LWUA
Abstraction of groundwater	Scarcity of water supply and conflict in water uses	Integrated water resopurces management of a watershed will be initiated by MSFWD through a MOA with DENR.	Watershed area of La Union province	Part of operation cost	MSFWD / LWUA

163. Although details of the required mitigating measures are already discussed in the screening for impacts, the following items are discussed further to highlight their importance: (i) tender documents and construction contracts, (ii) contractor's environmental management plan, (iii) construction site management plan, (iv) water safety plan, (v) source protection study and wellhead protection plan, and (vi) unanticipated environmental impacts.

164. *Tender Documents and Construction Contracts.* Environmentally responsible procurement advocates the inclusion in construction contract documents the provisions addressing the management of environmental impacts and risk during construction. This includes the contractor's submittal of a Contractor's Environmental Management Plan (CEMP). Tender documents and construction contracts shall therefore include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) construction camps, and (vii) public safety and convenience.

165. *Contractor's EMP.* During construction, each contractor will be guided by its detailed CEMP. This shall be based on the MSFWD subproject's EMP with details on staff, resources, implementation schedules, and monitoring procedures. The agreed CEMP will be the basis for monitoring by PMU, MSFWD PIU, and other

monitoring parties. Inclusion in construction contract documents the provisions requiring the contractor to submit a CEMP is important since the contractor will be legally required to allocate a budget for mitigation measures implementation. The CEMP will allow MSFWD's construction supervision engineer to focus on what are specific items expected from the contractor regarding environmental safeguards on a day-to-day basis. With the CEMP, MSFWD can easily verify the associated environmental requirements each time the contractor will request approval for work schedules.

166. The CEMP shall be prepared by all contractors before the start of the construction works and shall be approved by MSFWD's PIU. This requirement shall be included in the construction contracts. It shall provide details on specific items related to the environmental aspects during construction. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machineries, safety and traffic management, avoidance of inconveniences to the public, air and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery.

167. *Water Safety Plan.* MSFWD shall manage the environmental risk to its water supply system in a broader scale. As previously pointed out, the role of a water safety plan in addressing the risk cannot be overemphasized. This is an approach advocated by WHO for ensuring the delivery of safe drinking water to the consumers. Its need is also reflected in the 2007 PNSDW. The water safety plan shall enable the MSFWD to (i) prevent contamination of its water sources water, (ii) treat the water to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water. It is an approach that will clearly show the desire of the MSFWD in applying best practices in ensuring delivery of potable water to its consumers.

168. *Source Protection Study and Wellhead Protection Plan.* An input to the preparation of the water safety plan is the source protection study. This includes preparation of a source water assessment and wellhead protection plan. The study will help identify risk to the water supply system. A source water assessment is an evaluation of how susceptible a source may be to potential sources of contamination. Potential contaminant sources that could adversely affect the quality of water supply source are identified. Output of assessments will be used to prepare the wellhead protection plan. Wellhead Protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area with influence to the groundwater supplies to the well. The wellhead protection plan includes designating the protection area or capture zone. A wellhead protection plan is particularly important for MSFWD since its groundwater sources are within or near built-up areas and the risk of contamination to these sources is high.

169. *Unanticipated Environmental Impacts.* Where unanticipated environmental impacts become apparent during project implementation, MSFWD shall prepare a supplementary environmental assessment and EMP to assess the potential impacts and outline mitigation measures and resources to address those impacts.

**B. Environmental Monitoring**

170. **Table 15** presents the information on: (i) aspects or parameter to be monitored, (ii) location where monitoring is applicable, (iii) means of monitoring, (iv) frequency of monitoring, (v) responsibility of compliance monitoring, and (vi) cost of monitoring. The PMU shall prepare quarterly environmental monitoring reports to be submitted to LWUA management detailing the status of mitigating measures implementation.

**Table 15: Environmental Monitoring Plan**

Aspects / Parameters to be monitored	Location	Means of Monitoring	Frequency	Implementation Responsibility	Compliance Monitoring Responsibility	Monitoring Cost
<b>PRE-CONSTRUCTION PHASE</b>						
Specific provision in tender documents on archeological/cultural relics	Pipeline trenches, civil works excavations	Verify draft and final documents	Twice – draft and final documents	Design consultants	LWUA PMU	Part of project management in detailed design (minimal cost)
Consultation meetings; Specific provisions in tender documents on nuisance & problems to public	Pipelines routes, reservoir and pumping station	Verify meetings documentation; Verify draft and final documents	After completion of meetings; Twice – draft and final documents	MSFWD, Design consultants	LWUA PMU	Part of project management in detailed design (minimal cost)
Consultation meetings; payments to affected people	Pipelines routes, reservoir and pumping stations	Verify meetings documentation; Verify plans and IR payments	After completion of meetings; upon completion of payments	MSFWD, Design consultants	LWUA PMU	Part of project management in detailed design (minimal cost)
<b>CONSTRUCTION PHASE</b>						
Total area to be exposed; runoff flowing into disturbed sites	Pipelines routes, reservoir and pumping station	Visual inspection of sites; plans verification	Daily during rainy periods	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Water supply interruptions; materials and solid wastes dumped in watercourses	Pipelines routes	Visual inspection of sites; work schedules verification	Daily	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Noise levels not to exceed 50 dBA near school, 55 dBA in other areas, and 45 dBA during nighttime	Pipelines routes, reservoir and pumping station	Use of sound levels meter	Daily	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Dust, cover of stockpiles, smoke belching	Pipelines routes, reservoir and pumping station	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Road closure and traffic rerouting; materials stockpiles; road restoration	Pipelines routes	traffic plans verification	weekly	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Sanitary toilets, garbage bins,	Workers camps	Visual inspection of	Once before start of	Contractor	Construction supervision	Part of consultant's construction

Aspects / Parameters to be monitored	Location	Means of Monitoring	Frequency	Implementation Responsibility	Compliance Monitoring Responsibility	Monitoring Cost
runoff controls		camps	construction and once monthly		consultants, MSFWD PIU	supervision contract; minimal cost to MSFWD PIU
Road safety plan; sign, barricades and night lamps	Pipelines routes, reservoir and pumping station	Visual inspection of sites	Daily	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Construction wastes	Pipelines routes, reservoir and pumping station	Visual inspection of sites	Once before final stage of demobilization	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Number of local labor employed	Pipelines routes, reservoir and pumping station	Verification of contractor's records	Once a month	Contractor	MSFWD PIU	No cost
<b>OPERATION PHASE</b>						
E. Coli bacteria; PNSDW physical & chemical	Pipelines, reservoirs, and pumping stations,	Water sampling and laboratory test	Monthly for bacteria; annual for physical & chemical	MSFWD	LWUA	Part of MSFWD's operation cost (USD300 /year)
Septic tank of water consumers	Subproject water supply service area	Visual inspection of sites	Once a year	Water consumer	LGU	Minimal cost
Groundwater levels	Wells/ pumping stations	Use of groundwater level meter	Once a month	MSFWD	LWUA	Minimal cost to MSFWD
Liquid chlorine usage	Water treatment plant	Verification of operation records	Once a year	MSFWD	LWUA	Minimal cost
Liquid chlorine usage	Pumping stations	Verification of operation records	Once a year	MSFWD	LWUA	Minimal cost

171. *Project Performance Monitoring.* Project performance monitoring presents the desired outcomes as measurable events by providing parameters or aspects that can be monitored and verified (**Table 16**). Tendering process advocating environmentally responsible procurement is a desired outcome during the pre-construction phase. This can easily be verified by checking if EMP requirements are incorporated in construction contracts. Construction phase desired outcomes include effective management of environmental impacts and reduce risk to public. For the operation phase, MSFWD's water supply system must meet the drinking water standards (2007 PNSDW) for bacteria count (E. coli), color, pH, turbidity, dissolved solids, hardness, alkalinity, manganese, iron, fluoride, chloride, sulfates, magnesium, calcium, carbonates, and bicarbonates.

**Table 16: Project Performance Monitoring**

Desired Outcomes	Aspects / Parameters to be monitored	Means of Monitoring	Frequency	Implementation	Compliance Monitoring	Monitoring Cost
<b>PRE-CONSTRUCTION</b>						
Detailed design is environmentally responsive	EMP requirements incorporated in detailed design	Verify detailed design documents; EMP requirements	Two reviews: (i) draft detailed design documents	MSFWD, Design consultants	LWUA PMU	Minimal cost

		reflected in tender documents	and (ii) prior to approval of final documents			
Tendering process advocates environmentally responsible procurement	EMP requirements incorporated in construction contracts	Verify construction contract documents;	Prior to finalization of construction contract documents	MSFWD PIU	LWUA PMU	Minimal cost
<b>CONSTRUCTION PHASE</b>						
Effective management of environmental impacts during construction	Number of public complaints on construction activities	Verification of contractor's records; MSFWD coordination with local officials	Once a month	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
Reduce risk to public during construction	Number of accidents involving construction activities	Verification of contractor's records; MSFWD coordination with local officials	Once a month	Contractor	Construction supervision consultants, MSFWD PIU	Part of consultant's construction supervision contract; minimal cost to MSFWD PIU
<b>OPERATION PHASE</b>						
Water quality meets drinking water standards	Required drinking water quality parameters	Water sampling and laboratory test	Monthly for bacteria; annual for physical & chemical	MSFWD	LWUA	Part of MSFWD's operation cost (USD300 /year)

### C. Implementation Arrangement

172. This subsection presents the: (i) institutional set-up, (ii) implementation schedule, (iii) required clearances and permits, and (iv) capability building

173. *Institutional Setup.* LWUA is the executing agency, while MSFWD is the implementing agency. LWUA has overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. LWUA will establish a Project Management Unit (PMU) to coordinate implementation at the national level, including procurement of goods, works, and services. A PMU staff shall be designated as the Environment Officer for the project. At the subproject level, MSFWD will be responsible during construction and operation phase of the subproject. During the construction phase, MSFWD shall establish a Project Implementation Unit (PIU) to work closely with LWUA's PMU. A team of consultants will assist LWUA's PMU and MSFWD during pre-construction and construction phases. The role of the WDECC during the construction phase is highlighted since it is an important aspect of the grievance redress mechanism in promptly addressing the public's complaints about environmental performance of the subproject during execution of the construction activities.

174. *Environmental Monitoring Reports.* During the construction period, the construction supervision consultants, together with the PIU, shall prepare monthly environmental monitoring reports to be submitted to MSFWD and the PMU. The contractor shall submit to the PIU a monthly environmental monitoring report. Based on the monthly reports, the PMU shall prepare semi-annual environmental monitoring reports which shall be submitted by LWUA to ADB.



175. *Implementation Schedule.* As presented in the project description, the MSFWD subproject is scheduled to start in the fourth quarter of 2016 and to be completed in December 2018. However, construction of the components is scheduled for 2017 up to 2018. MSFWD shall ensure that construction contract provisions related to the EMP shall be included in the tendering stage in 2016.

176. *Clearances and Permits.* Under present Philippine regulations, MSFWD shall apply for an Environmental Compliance Certificate (ECC) from the EMB-Reg. I for the proposed water supply systems and Water Permit from the NWRB. Permit to Cut trees will be secured by the contractor, if trees have to be cut.

177. *Capability Building.* WDDSP implementation will be supported by consulting services to be sourced in two contract packages: (i) project management advisory services, including detailed engineering designs, preparation of contract documents, support to water districts with construction supervision and quality control, and the preparation of any resettlement plans; and (ii) institutional development and capacity building for LWUA, the project management unit (PMU), and water districts.

178. *Environmental Costs.* The main environmental costs to be borne by MSFWD are the costs for securing the ECC from EMB-Reg. I (PhP5,000) and Water Permit from NWRB (PhP5,130). Both permits will be secured prior to implementation of the subproject. Also, the periodic environmental monitoring during the operation phase is an annual recurring expense of MSFWD.

179. The costs for public consultations and information disclosure, and capacity building are major costs that are covered in the Project.

180. The contractor's cost for site establishment, preliminary activities, construction, defect liability activities, and environmental mitigation measures related to EMP implementation during planning, design, and construction will be incorporated into the contractual agreements and engineers costs, which will be binding on him for implementation. The survey will be conducted by the contractor.

181. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of MSFWD. All monitoring during the O&M phase will be conducted by MSFWD; therefore, there are no additional costs.

182. The activities identified in the EMP mainly include site inspections and informal discussions with workers and local community, and this will be the responsibility of PIU, costs of which are part of project management.

## **IX. CONCLUSIONS AND RECOMMENDATIONS**

183. MSFWD is presently suffering from low water pressure in its distribution system. With the proposed water supply system under WDDSP, its capacity to deliver safe drinking water and adequate water pipeline pressure will significantly improve.

184. The environmental screening process has highlighted the environmental issues and concerns of the proposed MSFWD subproject. An important fact considered in the screening is that the proposed sites are not within undisturbed landscapes since the proposed routes of the pipelines along the highway from the town of Bauang through San Fernando City and to the towns of San Juan and Bacnotan are presently residential, commercial, and agricultural landscapes, while proposed sites of pumping stations and reservoirs are in farmlands or near

residential areas. Hence, the proposed subproject is essentially not a new incursion to an ecologically untouched zone.

185. Based on the screening for environmental impacts and risks, there are no significant negative environmental impacts and risks that cannot be mitigated. Consequently, this assessment concludes that the proposed MSFWD subproject can be implemented in an environmentally acceptable manner. There is no need for further environmental assessment study. A full EIA is not warranted and the subproject's environmental classification as Category B is deemed appropriate. The IEE shall therefore be finalized as the final environmental assessment document of the proposed subproject.

186. The proposed MSFWD subproject is hereby recommended for implementation with emphasis on the following: (i) EMP of MSFWD subproject shall be included in the design process; (ii) Contracts of design consultants shall have provisions requiring the consultants to consider EMP recommendations in the design process; (iii) Tendering process shall advocate environmentally responsible procurement by ensuring the inclusion of EMP provisions in the bidding and construction contract documents; (iv) Contractor's submittal of a CEMP shall be included in the construction contract; (v) Contract provisions on creation and operation of the WDECC shall be included in construction contracts; (vi) LWUA, with its regulatory function, shall ensure that capability building for MSFWD shall be pursued; and (vii) MSFWD shall continue the process of public consultation and information disclosure during detailed design and construction phases.

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**Appendix 1**  
**Rapid Environmental Assessment (REA)**

Screening Questions	Yes	No	Remarks
<b>A. Project Setting</b> Is the project area...			
• Densely populated?		✓	Bgry. Paraiso has a very low population density of 2.4 persons per hectare.
• Heavy with development activities?	✓		
• Adjacent to or within any environmentally sensitive areas?		✓	No water supply project components are within locations in or near sensitive and valuable ecosystems, including protected areas and forests.
• Cultural heritage site		✓	
• Protected area		✓	
• Wetland		✓	
• Mangrove		✓	
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	
<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?		✓	Source of water supply is groundwater. No industrial establishment in the Barangay.
• Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not applicable
• Hazard of land subsidence caused by excessive groundwater pumping?		✓	Rate of water abstraction regulated by the NWRB.
• Social conflicts arising from displacement of communities?		✓	No displacement of communities.
• Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	No conflict with shallow wells.
• Unsatisfactory raw water supply (e.g., excessive pathogens or mineral constituents)?		✓	Regular water quality monitoring will be conducted.
• Delivery of unsafe water to distribution system?		✓	Raw water will be hypochlorinated at source.
• Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Buffer zone will be fenced off.
• Overpumping of groundwater, leading to salinization and ground subsidence?		✓	Rate of water abstraction regulated by the NWRB.
• Excessive algal growth in storage reservoir?		✓	Not anticipated. The storage tank is fully enclosed elevated tank.
• Increase in production of sewage beyond capabilities of community facilities?		✓	Septage management will be undertaken jointly by the city and the water district.
• Inadequate disposal of sludge from water treatment plants?		✓	Not applicable
• Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	Not applicable. Submersible pump will be used.
• Impairments associated with transmission lines and access roads?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP includes measures to mitigate the impacts.

Screening Questions	Yes	No	Remarks
• Health hazards arising from inadequate design of facilities for receiving, storing, and handling chlorine and other hazardous chemicals?		✓	Liquid chlorine, which is less hazardous than gas, will be kept in secure storage area.
• Health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		✓	Personal protective equipment will be provided to workers.
• Dislocation or involuntary resettlement of people?		✓	No displacement of communities.
• Disproportionate impacts on the poor, women and children, indigenous peoples, or other vulnerable groups?		✓	Not applicable.
• Noise and dust from construction activities?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP includes measures to mitigate the impacts.
• Increased road traffic due to interference of construction activities?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. The EMP ensures measures are included to mitigate the impacts. Construction contractors will be required to coordinate with the local traffic police.
• Continuing soil erosion/silt runoff from construction operations?		✓	Not anticipated, as topography of Colombo is plain.
• 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?		✓	Not anticipated.
• Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not anticipated. Water quality is being regularly monitored.
• Accidental leakage of chlorine gas?		✓	Not anticipated.
• Excessive abstraction of water affecting downstream water users?		✓	Not anticipated. Rate of abstraction is regulated by NWRB.
• Competing uses of water?		✓	Not anticipated.
• Increased sewage flow due to increased water supply?	✓		Septage management will be undertaken jointly by the city and the water district.
• Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant?		✓	Septage management will be undertaken jointly by the city and the water district.
• Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not anticipated. Maximum of 50 workers at any given time.
• Social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
• Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel, and other chemicals during operation and construction?		✓	Not applicable. Trenching will be done manually. Construction will not involve use of explosives.
• Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to		✓	Operational area will be clearly demarcated and access will be controlled.

<b>Screening Questions</b>	<b>Yes</b>	<b>No</b>	<b>Remarks</b>
members of the affected community, or where their failure could result in injury to the community throughout project construction, operation, and decommissioning?			
<b>Climate Change and Disaster Risk Questions</b> The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	<b>Yes</b>	<b>No</b>	<b>Remarks</b>
<ul style="list-style-type: none"> <li>Is the project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunamis, volcanic eruptions, and climate changes (see Appendix I)?</li> </ul>	✓		Earthquake and flood are natural risks that can be mitigated by designing civil works consistent with the Philippine Building Code.
<ul style="list-style-type: none"> <li>Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., increased extreme rainfall increases flooding, damaging proposed infrastructure)?</li> </ul>	✓		Climate change adaptation need to be considered in the long-term planning in view of PAGASA predictions in weather pattern in the future.
<ul style="list-style-type: none"> <li>Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?</li> </ul>		✓	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement, etc.
<ul style="list-style-type: none"> <li>Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by paving vulnerable groundwater recharge areas, or using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?</li> </ul>		✓	Not applicable.

## Appendix 2 Sample Grievance Redress Form

The \_\_\_\_\_ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *\*(CONFIDENTIAL)\** above your name. Thank you.

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

### FOR OFFICIAL USE ONLY

<b>Registered by:</b> (Name of Official registering grievance)	
<b>Mode of communication:</b> Note/Letter E-mail Verbal/Telephonic	
<b>Reviewed by:</b> (Names/Positions of Officials Reviewing Grievance)	
<b>Action Taken:</b>	
<b>Whether Action Taken Disclosed:</b>	Yes No
<b>Means of Disclosure:</b>	

## **ANNEXES**

1. Site Photographs
2. Minutes of Consultation Meeting Held on 04 September 2009
3. List of Participants - Consultation Meeting Held on 04 september 2009
4. Attendance Sheet - Consultation Meeting Held on 04 Spetember 2009
5. Invitation to the Consultation Meeting Held on 26 November 2012
6. Attendance Sheet – Consultation Meeting Held on 26 November 2012
7. Summary of Issues Raised During Consultation Meeting Held on 26 November 2012
8. Photographs of Consultation Meeting Held on 04 September 2009
9. Photographs of Consultation Meeting Held on 26 November 2012



Annex 1  
**Proposed Sites of the MSFWD Water Supply System**



Photo No.1 – Farmland as site of proposed wells in Barangay Banlay, Bauang.



Photo No.2 – Typical road in MLUWD areas where water supply pipelines will be laid.

## Annex 2

### **Minutes of the Public Consultation/Meeting held at Midtown Restaurant, San Fernando City, La Union, 04 September 2009**

#### **Opening/ Presentations:**

The public consultation/meeting started at 2:00 P.M. with Metro La Union Water District (MSFWD)'s General Manager (GM), Mr. Felipe Picazo, welcoming the participants and thanked them for positively responding to MSFWD's invitation.

Mr. Arturo Rimando, MSFWD's Engineering Division Manager, presented the detailed aspects of the proposed water supply system and septage management program. He emphasized that San Fernando City should not wait until the coastal waters and groundwater quality will deteriorate further – a septage management program should now be initiated. Mr. Ruel Janolino, WDDSP's Environment Specialist, provided additional details of the proposed septage management program and encouraged the participants to raise any points concerning environmental and social issues. Juliet Villegas, WDDSP's Resettlement Specialist, discussed the advocacy aspects of the proposed septage management program.

#### **Comments, Views, Issues and Concerns**

Mr. Perfecto Sanchez, Senior Citizen NGO, asked if the participants of the septage management program will only be those near the sites of water sources. MSFWD's GM answered that initially it shall be those who have water connections with MSFWD.

Mr. Martin Montanez, President of Bauang Association of Barangay Captains (ABC), asked if the old pipelines will be replaced. MSFWD's GM answered that existing pipelines are still good and will be retained. San Fernando City will have increase water pressure due to the additional parallel pipelines to be installed.

Mr. Ronilo Ducusin, San Fernando – City Planning Office, expressed concern on the heavy traffic that pipelaying activities may cause in the city particularly during big events such as fiesta and school openings. WDDSP's Environmental Specialist explained that civil works contracts will include provisions requiring the contractors to implement a traffic management program in close coordination with local authorities. The Project Management Unit (PMU) shall ensure that this issue will be handled effectively during construction.

Ms. Benilda Policarpio, La Union Vibrant Womes Incorporated (LUVWI)-Bauang, asked if new pipelines will be installed. MSFWD's GM answered that new parallel pipelines will be installed.

Ms. Marlyn dela Cruz, LGU Bauang, asked how the project will handle the existing septic tanks since most of them have unlined bottoms. The environmental consultant explained that the project has a revolving fund for septic tanks repair. Mr. Ronilo Ducusin added that new septic tanks have lined bottoms in compliance to the building code.

Mr. Emmanuel Guillet, San Gabriel Municipal Planning Office, alerted MSFWD on the laxity of security at the San Gabriel sedimentation basin since students were able to bath at the basins and expressed apprehension that somebody might get drowned. MSFWD's GM appreciated the information and will look into the matter since the facility is supposed to be guarded at all times.

Ms. Marlyn Olete, LUVWI San Juan, asked how a Barangay may be connected to the new water supply system. MSFWD's GM explained that a Barangay resolution requesting the WD is needed. The WD will then conduct a concessionaire survey.

WDDSP's Resettlement Specialist asked if the participants have additional issues to raise. After confirming that there were no more issues, GM Picazo closed the meeting by thanking everyone for participating in the public consultation.

Meeting Closed at 3:15 P.M.

Annex 3  
**List of Participants of Metro La Union WD Public Consultation  
and Information Disclosure [04 September 2009]**

**Stakeholders/Participants:**

1. Benilda S. Policarpio – President, LUVWI Bauang (NGO)
2. Perfecto F. Sanchez – President, Senior Citizen NGO
3. Marlyn g. Olete – President, LUVWI San Juan (NGO)
4. Emmanuel G. Guillet – Municipal Planning Office-San Gabriel
5. Romeo Padilla – President – Association of NGOs –San Fernando City
6. Florence Rulloda – Project Development Officer – LGU Bauang
7. Marlin A. Montanez – ABC President, Bauang, La Union
8. Marilou C. Garcia –Liga ng Mga Barangay – San Fernando City
9. Ferdinand C. Versosa – Director, Liga ng Mga Barangay
10. Rudy P. Ducusin – City Planning and Development Office
11. Gavino G. Martinez – Director, Liga ng Mga Barangay
12. Ronilo C. Ducusin –LGU- San Fernando City
13. Marlyn M. edla Cruz –LGU, Bauang

**Metro La Union Water District (MSFWD) and WDDSP Team**

14. Felipe G. Picazo – GM, MSFWD
15. Arturo N. Rimando – Division Manager, MSFWD
16. Genesis M. Sabalboro – Draftsman, MSFWD
17. Lovie A. Sadorneo – Minutes & Agenda Officer
18. Cristina C. Castellano – Executive Assistant, MSFWD
19. Carolyn Gamuan – consultant, POYRY-IDP
20. Jett Villegas – consultant, Poyry-IDP
21. Ruel Janolino – consultant, Poyry-IDP
22. Ramon de la Torre – consultant, Poyry-IDP

Attendance Sheet of Stakeholders Consultation held at Midtown Restaurant, San Fernando City on 04 September 2009

TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT  
 LIST OF PUBLIC CONSULTATION PARTICIPANTS  
 PROPOSED WATER SUPPLY AND SANITATION PROJECT OF METRO LA UNION WATER DISTRICT

CONSULTATION DATE: 04 SEP 2009

No.	Name	Designation	Organization	Signature
1	SEMILDA G. POLICARPIO	PRESIDENT	NGO-LUWU, BAWANG	
2	PERFECTO F. RAUCHER	PRESIDENT	DGO S.C.	
3	MARLYN G. OJEDA	President	NGO-LUWU + BIKO - Sn.Jh	
4	EMMANUEL C. GUNJET	M.P.D.C	LGU-SAN GABRIEL	
5	JUNED PADILLA	Facilitator	ASSO. P. NCO'S. San Fe. City	
6	FLORENCE RULLODA	Proj. Dir. Off.	LGU-Bawang	
7	Marlene A. Manfraz	ABC President	Bawang L. N. (Pamun. B36)	
8	MARILYN C. VARGAS	Representative of MR. Ramon Dataga	Liga ng mga Barangay - STC	
9	FERNANDO C. VERPASA	BOD	UCA	
10	RUDY P. DUCUSIN	CPDO - CSF	LGU	
11	GAVIN V. PRINCE	LGU CHIEF ASSISTANT	UCA	
12	RONILO C. DUCUSIN	LGU	LGU, CSF	
13	MARLYN M. DE LA CRUZ	IT	LGU - BAWANG	
14	FELICE S. PIGAZ	GM. MLUND	MLUND	
15	ARTURO N. RIMANDO	DIN. MANAGER	MLUND	
16	GENESIS H. SALSABORO	DRAFTSMAN	MILUND	
17	LONIE A. JARDOLINO	MAN. of ALBONDA OFFICER	MLUND	
18	Cristina C. Castillano	Exec. Asst.	M. MLUND	
19	CAROLYN GAMARA	Ponying IDP - Sr. Dist	CSGN	
20	JAY RULLODA	Ponying - 1st ADP		
21	RUEL JARDOLINO	SNV	Ponying	
22	Ramon d. de la Torre	Co-organizer	Ponying	

Annex 5  
Invitation to the Consultation Meeting Held on 26 November 2012



Republic of the Philippines  
**METRO SAN FERNANDO WATER DISTRICT (LU)**  
Administration Bldg, Quezon Ave.,  
City of San Fernando, La Union 2500  
Trunkline Nos. (072) 700-35-50 to 53 loc. 308  
Telefax.No. (072)700-3554

November 20, 2012

**SUBJECT:** Invitation to attend the Social Safeguards Consultation

**SIR/MADAM:**

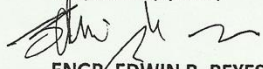
The Metro San Fernando Water District together with Lahmeyer IDP Consult, Inc. will be conducting a Social Safeguards Consultation on November 26, 2012. This is in connection with the future plans of the water district to expand and improve its services to the people of La Union.

A survey which was conducted sometime in 2009-2010 has identified you as one of the households which are likely to be directly or indirectly affected by the project. The objective of this consultation is to inform you and discuss with you the possible impact of the project on your assets.

In this regard, may we invite you or your representative to attend the said consultation session which is scheduled on November 26, 2012, 8:00 AM to 12:00 NN at the People's Hall, San Juan Municipal Hall, San Juan, La Union.

Your participation in the said activity will be highly appreciated. Thank you very much and more power!

Respectfully yours,

  
**ENGR. EDWIN R. REYES**  
\*Interim General Manager

Annex 6

Attendance Sheet of Consultation Meeting Held at the Peoples Hall, San Juan, La Union on 26 November 2012

ADB TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT (EXTENSION)

Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP (Extension)

ATTENDANCE SHEET

Date: 26 November 2012, Venue: PEOPLES HALL, SAN JUAN, L.U.

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
1	GLENDA R. CABAUTAN	MSTWD	09165552007 lcabautan@mfpc.com	
2	CLAUDINE D. ALAMA	MSFWD	0917-5800-253 claudinealama@ylnor.com	
3	ARTURO N. RIMANDO	MSFWD	09156691220 arturo_rimando@yahoo.com	
4	CARLOS D. CADENEG	P. B6Y - <sup>Publication</sup> SAN-GABRIEL	09169143117	
5	ERWIN L. KEYES	MJFWD		
6	Benedict P. Combonil	MSTWD	09192300592 br.combonil@gmail.com	
7	ELVIRA B. ANDRADA	BRGY. BUCAYAB BAUANG, LU	09196157654	
8	LORENZO L. XIBEHES JR.	BUCAYAB BAUANG L.U.	09215616258	
9	JOVEN V. ANDRADA	(PUNAS BOP) Sta. Cruz, Baconatar, La Union	09165393928	
10	Suanito M. Dy	Baconatar, La Union	09268086683	

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBERS & EMAIL ADDRESS	SIGNATURE
11	Leilua Pasera		Binonan, San Juan	
12	Elena Pasera		Binonan, San Juan	
13	R. DHAZAN	MSFWD	0920534881	
14	(ELYRA P. ANDRADA)		09190157654	
15	(RODRIGO L. ARBES JR.)	BAGY. KAWD.	0924618886	
16	REMIATO MARIANO	MSFWD	09175300445	
17	FERRI NI PARCHAMENTO	MSFWD	09276269949	
18	HERNANDO T. PARIS JR	MSFWD		
19	LUZMINDA V. VILLANUEVA	PB-DILI, BAIONG, LU	09219797380	
20	LORENZO Z. MARQUEZ	MSFWD		
21	LITO SANSANO	MSFWD		
22	AVELINO ESPENILVA	MSFWD		
23	ARRIMUNE FERNANDEZ	MSFWD		



	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
24	Feresita P. Durgin	Ili Sur, San Juan	0910-345 979	
25	FIDEL B. DUCSIP	PANICSICAH		
26	ARVIN A. CATEAGAN	PANICSICAH, San Juan		
27	DANIEL M. ARZABAL	BOMBO RAYO	09209682318	
28	MADLON XNOXXX	BBY 1		
29	Miguel Quercu	Plus san Fdo City		
30				
31				
32				
33				
34				
35				
36				

\*

Annex 7  
**Summary of Stakeholder Consultation**  
 People's Hall, San Juan Municipal Building  
 November 26, 2012

Stakeholder Group	Issue/Concern Raised	Response of WD
<b>Barangay Official (Kagawad)</b>	What will happen to the narra trees we planted along the sidewalk? Will it be relocated, uprooted or cut? How deep and how wide will the pipes be installed from San Juan to Bacnotan?)	About those that will be affected by our project, the trees along the sidewalk, actually we have conducted inspection and we found out that these will not be affected at all because we can always re-route or re-align our lines. No private properties will be affected, just driveways and road crossings. Our transmission lines are big so it will be about 1 meter deep and half-meter wide.
<b>Barangay Official (Kagawad)</b>	We are just wondering why the water coming out of our faucets is dirty and brownish in color)	We advise that when collecting water, the first pail of water collected should be disposed or used to water the plants and the like. Because it is possible that pipes will be scoured and dirt will flow with the water especially if it is stored overnight.)
<b>Municipal Government (Mayor of San Juan)</b>	Under the Local Government Code, we are supposed to get a benefit from the water extracted from Brgy. Naguirangan, but up to now, we have not received any incentive. Just like Bacnotan, San Gabriel and Bauang, we are supposed to get a special costing since we are the sources of water.	Regarding your LGU share, we are just waiting for the Sangguniang Panlalawigan to approve/pass resolution regarding this which I think was in the agenda and hopefully was already approved. Once we have that, we will be ready to implement and give you your share. LGU share will be divided among the province (25%), municipality (30%) and Barangay (45%).)
<b>Farmers</b>	The project is nice, but with the construction of deep wells, our farmers might be affected especially during summer	We will be constructing infiltration wells at Naguirangan along Baroro River. We have secured a permit from NWRB and this is what is restricting us on how much we are to abstract. NWRB allocates and sets the limitation. As a matter of fact, we have not yet maximized our permit that is why we are also planning to rehabilitate our lines there. But rest assured we will stick to what is being set in our permit.)
<b>Farmers/crop growers</b>	The farmers/growers experiences problem during dry months. Of course, they get mad because they cannot plant.)	That is why we have the NWRB. The problem today is the supply. We have yet to saturate San Gabriel and San Juan and

Stakeholder Group	Issue/Concern Raised	Response of WD
		hopefully once the project is implemented, there will be more service connections and there will be an improved water supply system
<b>Resident</b>	There are subdivisions near us and surely more connections is expected and thereby water sources where we get our water might be affected	(Okay, we will look into your concern)
<b>Barangay official, lot owner</b>	There is a reservoir in our Barangay and the lot where it was constructed is owned by my family. There had been no resettlement done and no trees were replaced. And about your expansion project, excavated portions should be properly restored so as to prevent exposed pipes	Regarding our reservoir in Dili, the lot owner, a certain Mr. Madayag has already approached me. Thank you for the information. Can I just get your contact number
<b>Barangay official</b>	Restored portions of your projects at Poblacion are subsiding. There are five big pumping stations owned by BPPC at Bucayab and this might affect our sources of water. Can you please inspect the Bauang River because houses are already near the banks	Normally, engineering studies are conducted prior to the implementation of any project. Our abstraction is very minimal and as long as there is water in the river, we can get water from it.
<b>Barangay official</b>	We advise full inspection of the river because our place is being flooded. This is to avoid any problems in the future; your facilities might just be washed out. Though, it will be a great help if we can be provided with water there	Let us coordinate the overflow/riverbanks protection with the provincial government. Hopefully if we have already laid the lines on your Barangay, we will have water connections to serve your area

Annex 8  
**Photographs of the Consultation Meeting Held on 04 September 2009**



Photo No.3 – MLUWD GM clarifying some points at public consultation meeting [04 September 2009]



Photo No.4 – Stakeholders representatives raising points at public consultation meeting [04 September 2009]

Annex 9  
Photographs of Consultation Meeting Held on 26 November 2012



Photo No. 5 – A participant raising a point during the public consultation held on 26 November 2012.



Photo No. 6 – The resettlement specialist clarifying an issue on involuntary resettlement.