



THE REPUBLIC OF UGANDA

MINISTRY OF WATER AND ENVIRONMENT

WATER AND SANITATION DEVELOPMENT FACILITY- NORTH

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED
CONSTRUCTION OF BARR RURAL GROWTH CENTRE PIPED WATER SUPPLY
SYSTEM IN BARR SUB COUNTY, LIRA DISTRICT IN NORTHERN REGION OF
UGANDA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT



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ACRONYMS

ACAO	Assistant Chief Administrative Officer
AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
CAO	Chief Administrative Officer
CDO	Community Development Officer
DEO	District Environment Officer
DNRO	District Natural Resources Officer
DWO	District Water Officer
EHS	Environment, Health and Safety
EIA	Environment Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FGDs	Focus Group Discussions
GoU	Government of Uganda
GRM	Grievance Redress Mechanism
HH	Household
HIV	Human Immuno deficiency Virus
IDP	Internally Displaced Persons
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
JTR	Joint Technical Review
JWSSSPS	Joint Water Supply and Sanitation System Programme Support
FC	Financial Cooperation
Km	Kilometre
LC	Local Council
LDLG	Lira District Local Government
MoGLSD	Ministry of Gender, Labour and Social Development
MWE	Ministry of Water and Environment
NEA	National Environment Act
NEMA	National Environment Management Authority
NES	National Environment Statute
NGO	Non-Government Organizations
NPHC	National Population Housing Census
NWSC	National Water and Sewerage Corporation
OHS	Occupational Safety and Health
Ops	Operational Procedures
PCDP	Public Consultation and Disclosure plan
PH	Public Health
PPE	Personal Protective Equipment
RGC	Rural Growth Centre
SDG	Sustainable Development Goal
SSIP	Strategic Sector Investment Plan
STDs	Sexually Transmitted Diseases
STs	Small Towns
ToR	Terms of Reference
UBOS	Uganda Bureau of Statistics
UWSS	Urban Water Supply and Sewerage
WHO	World Health Organization
WSDF	Water and Sanitation Development Facility
WSDF-N	Water and Sanitation Development Facility-North
WSS	Water Supply System

ESIA TEAM COMPOSITION

Table 1 presents the composition of the Environmental and Social Impact Assessment (ESIA) team that undertook the ESIA for the proposed Barr RGC piped Water Supply system in Barr Sub County in Lira District in accordance with the provisions of the *National Environmental Act No. 5 of 2019* of the Laws of Uganda, the *Environmental and Social Impact Assessment Regulations (2020)* and the *National Environment (Conduct and Certification of Environmental Practitioners) Regulations (2003)*.

Table 1: Proposed ESIA Team Composition

Name of Key Specialists	Assigned Position	Signature
Mr. Andrew Nkambo, BSc. <i>Certified Environmental Impact Assessor (CC/EIA/273/22) – Team Member</i>	ESIA and Ecologist/Natural Resources Management Specialist/Lead Consultant	
Dr. Denis Byamukama, PhD <i>Certified Environmental Impact Assessor (CC/EIA/073/22) – Team Leader / Member</i>	Team Leader Water Resources Management / Water Quality Specialist	
Mr. Pius Kahangirwe, MSc. <i>Certified Environmental Impact Assessor (CC/EIA/159/22) – Team Leader / Member</i>	ESIA and Environmental / Occupational Health & Safety Specialist	
Contributing Specialists		
Mr. Anthony Begumisa	Sociologist/Socio-Economist	
Jackline Abitegeka	Environmentalist	
Mr. Edison Agumya	Sanitation and Urban Management Specialist	
Mr. James Kintu	Biodiversity Specialist	
Mr. Abdu Magidu Menya	Sociologist	
Mr. Roy Ongeyuru	Health, Safety and Environment	
Ms. Sheillah Akatukunda	Environmentalist	

EXECUTIVE SUMMARY

ES1: Project background

A reliable piped water supply system that conveys adequate water that meets the drinking water standards and a suitable sanitation system are a pre-requisite for public health and socio-economic development of a society. The Government of Uganda, with support from Development Partners thus established the Water and Sanitation Development Facility (WSDF) programme as a service delivery and funding mechanism to focus on provision of water supply and sanitation to small towns and rural growth centres in the country. The purpose of the WSDF is to support the development of water supply and sanitation in Small Towns (STs) and Rural Growth Centers (RGCs) by providing technical and financial support to help districts and Town Councils to develop, rehabilitate and expand water supply services and sanitation facilities.

Barr sub county is among the many small towns and Rural growth centers (RGCs) selected by Ministry of Water and Environment (MWE) through the Water and sanitation Development Facility- North (WSDF-N) to benefit from the funding through the proposed construction of Barr RGC piped water supply system for Barr sub county, Lira District.

WSDF-N therefore, proposed to carry out an Environment and Social Impact Assessment (ESIA) for the proposed construction of the Barr RGC Piped Water Supply System for Barr sub county in Lira District in accordance with the requirements of the National Environment Management Authority (NEMA) for approval before implementation.

ES2: Current Water Situation in Barr RGC

Barr like most of the rural areas and upcoming small towns in Uganda accesses water from point water sources like boreholes, protected springs and shallow wells. These point water sources are in many cases characterized by low level of service, poor functionality and poor water quality in addition to diminishing water resources. The project area is currently experiencing intermittent water supply from the existing system besides insufficient water quantity at the source. Barr RGC Piped Water System will address the water crisis and provide adequate safe water which is a pre-requisite for a healthy society beside the many other accruing benefits. Availability of water makes it feasible for the majority of the population to engage in meaningful socio-economic activities that would increase household income and thereby reduce poverty.

ES3: Project components and description

This report presents the findings of an Environmental and Social Impact Assessment (ESIA) that has been undertaken at the proposed project infrastructure sites and surrounding areas. The Two proposed motorized boreholes, **DWD79455 (Lat 2.206158; Long 33.014071)** and **DWD79457 (Lat 2.197317; Long 33.027308)** are located in **Abolet B Village** and **Itek Village** respectively as potential sources of water for the proposed Water Supply System and the Reservoir tank and the office block will be located near the Barr Sub County headquarters.

ES4: Policy, Legal and Institutional Framework

For the project to achieve its intended objectives, it will operate under various policies, legal and administrative frameworks. These include laws and policies of Uganda, as well as international treaties and conventions, environmental laws and guidelines with the aim of promoting the positive impacts of the proposed project while minimizing the negative effects. In particular, this environmental and social impact assessment (ESIA) has been carried out in accordance with National Environmental Act (NO.5 of 2019) as well as in consideration of other policies, legal and institutional frameworks relevant to the proposed project. Various policies and laws have been reviewed in relation to the proposed project activities e.g. construction and operational requirements, environmental quality, land use, public health, occupational safety, labour standards and other legal obligations. A comprehensive stakeholder

engagement was carried out during ESIA specifically with Lira District Local Government Officials, Lamogi sub county leaders and Local Community Representatives and Community Members (both interested and affected stakeholders) among others.

The proposed project has potential to significantly improve quality of life in the Barr sub county and the neighbouring towns both during construction and operation phases. Like in other areas, the long-term socio-environmental benefits of a reliable supply of potable water and access to sanitary facilities include reduced morbidity and increased productivity of households along with increased enrolment of children in educational institutions. In addition, project development and operation in the project area will provide considerable economic opportunity and attraction of other services. However, development of the project can also bring with it negative impacts. The key significant negative impacts will arise from construction phase of the intake and water treatment plant. Reason for the ESIA thus to assess, identify and suggest ways to reduce and / or avoid occurrence of such adverse effects during construction and operation of the system component facilities.

ES5: Summary of the anticipated Impacts

Barr RGC Piped Water System is envisaged to improve water access in Barr sub county and neighbouring community and reduce overreliance on the existing water system. Further still, the project will also address the focal area of access to clean water as stipulated under the Uganda Vision 2040 and the National Development Plan III. The project also contributes towards achieving SDG (*specifically SDG 6 on clean water and sanitation*). Several beneficial impacts envisaged will include: Improved quality of water supplied to communities; Improved and increased access to safe water supply; Provision of employment opportunities during construction and operation phases; Improved health and sanitation due to improved water quality and quantity; Improved local economies and induced development especially sourcing of raw materials for construction activities; An increase in revenue for the Municipality from water project collections. The project will further, initiate the move away from the status quo of women and children’s perpetual carrying of water on their heads from unprotected and distant point water source and allow them to engage in income generating activities and to improve the image of the woman and children.

.It is anticipated that the establishment of the water scheme is expected to have the following benefits:

Table 2: Summary of the anticipated positive Environment and Social Impacts and their enhancement measures

Ref No.	Anticipated Environment & Social positive Impacts	Enhancement Measures
CP1	Employment opportunities	✓ The contractor should involve local leaders in recruitment process to ensure full and fair participation of local communities.
CP2	Income to material/ equipment suppliers and contractors	✓ Earth materials needed for construction, for example, aggregate (stones and sand) will be obtained from quarry operations
CP3	Acquisition/improvement of skills	✓ The Local leaders will play a vital role in screening and recommending those seeking for employment
CP4	Increased Public Revenue / Taxes	✓ The contractor should pay all the taxes including VAT, PAYE and NSSF of the workers
CP5	Impacts on Local Capacity	✓ Ensure Co-operation between international suppliers of specialized equipment and contractors and local contractors and sub-contractors and companies for transfer of skills
CP6	Boost to the Local Economy	<ul style="list-style-type: none"> ✓ Provide direct employment opportunities to the workforce thus contributing towards alleviation of poverty and income generation for the local community; ✓ Stimulate business activities related to contracting works for local entrepreneurs (sub-contractors); ✓ Provide trading opportunities for local communities and

		<p>other small enterprises in the area;</p> <p>✓ Provide opportunities for provision of basic and other services for the contractors and immediate community. The project will consider employment of locals</p>
CP7	Capacity Building	<p>✓ To maximize capacity building for local communities, programs and technical training courses as well as on-the-job training will be provided in specific skills areas for suitable candidates from local communities to enhance minimum levels of education and the possibility of being employed during operational phase</p>
OP1	Improved health status of households in the project communities	<p>✓ Educate users on the proper use, regular cleaning and effective maintenance of both the household and public facilities</p>
OP2	Educational enrolment and attendance	<p>✓ Make the water tariffs affordable to everyone so that children, especially the girl child to regularly and promptly attend school, while mothers will get more time to prepare their children for school.</p>
OP3	Acquisition of new skills	<p>✓ Where the required skills are available locally, the local people should be given first priority commensurate to their level of training</p>
OP4	Improvement in household economic status	<p>✓ Water supply should be set taking into consideration the different levels of users. The users should also be educated to avoid wasteful use of the resources</p>
OP5	Employment opportunities	<p>✓ Wherever feasible, local qualified people will be considered for job opportunities. Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.</p>
OP6	Promotion of gender equality and empowerment of women and the girl child	<p>✓ Make the water tariffs affordable to everyone so that women and girls are freed of the burden of having to spend a lot of their time collecting and carrying water almost on a daily basis often from sources distant from their houses.</p>
OP7	Combat HIV/AIDS, malaria, and other diseases	<p>✓ Make the water tariffs affordable to everyone so that vector borne diseases related to water sources (such as guinea worms, Onchocerciasis, and schistosomiasis) and diseases related to excreta contaminated water and poor hygiene (cholera, typhoid, and diarrhoeal diseases) are reduced due to the increased provision of safe and clean water</p>

However, the ESIA findings indicate that direct impacts will be mitigated and are limited to the project area where construction of pumpstation, Office block and Reservoir works will be undertaken. Direct negative impacts will include: Soil erosion; Minimal destruction of vegetation and crops; increased noise nuisance by construction workers and equipment; increased sediment loads into the surrounding water sources; improper disposal of wastes; other concerns include occupational safety hazards, and HIV/AIDS risk associated with construction labour.

Mitigation measures have been proposed and the developer should ensure that these are implemented such as Maintaining good house-keeping; Screening unsightly aspects from public view including excavations, construction material storage areas, waste storage areas and ablutions, Erecting fencing around construction site to act as a screen minimizing the effect of wind in generating dust emissions; Re-vegetation of all areas of natural vegetation that have been disturbed as a result of construction activities; Proper waste management and containment of storm water especially during rainy season among others.

Anticipated and or identified negative impacts throughout the project phases are summarized below and discussed in detail under Section 8.3 of this ESIA report and these include:

Table 3: Summary of the anticipated negative Environment and Social Impacts and their mitigation measures

Ref No.	Anticipated Environment & Social negative Impacts	Mitigation Measures
CP1	Land acquisition for infrastructure	<ul style="list-style-type: none"> • The district and local authorities in Otwal Sub County have already been engaged together with the local land lords • No grievances were reported and are envisaged. • Land owners that require compensation (where possible) as project affected persons should be compensated before commencement of the project activities
CP2	Loss of vegetation cover and top soil	<ul style="list-style-type: none"> • After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees. • The water source should be fenced off to reduce on going agricultural activities around the boreholes to avoid pollution entering the boreholes especially when it rains heavily. • Minimize vegetation clearance by clearly demarcating work areas. • Provide environmental awareness training to all employees. • Rehabilitate all disturbed areas
CP3	Loss of fauna	<ul style="list-style-type: none"> • Minimize vegetation clearance. • Protect water resources from pollution. • Protect soils from contamination. • Rehabilitate all disturbed areas.
CP4	Increase susceptibility to Soil Erosion	<ul style="list-style-type: none"> • The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water. • The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. • The Project Contractor should backfill all trenches immediately after laying the pipes for the transmission and distribution networks and compact such areas as to near level prior to excavation
CP5	Effects of Poor Solid Waste Management	<ul style="list-style-type: none"> • Waste collection bins will be provided at strategic positions at the construction sites for temporary waste storage. • The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes. • The contractor will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA/ODLG/Otwal Sub County. • Burning of waste on-site shall not be allowed.
CP6	Noise generation	<ul style="list-style-type: none"> ▪ Contractor will be careful when selecting the working equipment to avoid use of old equipment or damaged equipment with high level of noise emissions that would have a negative impact in the environment. ▪ Contractor will ensure that equipment is properly maintained and fully functional in accordance with the manufacturer's recommendations. ▪ The contractor should ensure that noise levels emanating from machinery, vehicles and noisy excavation and construction activities are kept at a minimum for the safety, health and protection of people in the nearby areas. ▪ Regular maintenance, monitoring and, where necessary, the use of silencing equipment will be employed with the aim of reducing noise

		emissions
CP7	Increased incidences of diseases	<ul style="list-style-type: none"> • The contractor should liaise with the District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled. • The contractor should emphasise equal opportunities for both men and women. • The Contractor should, in conjunction with local health authorities, undertake to educate and sensitise the workforce on communicable diseases such as cholera, STDs and HIV/AIDS. Condoms must be made available to the workforce
CP8	Increased accidents and occupational hazards	<ul style="list-style-type: none"> • All construction workers will be oriented on safe work practices and guidelines and ensure that they adhere to them. • Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency. • Quarterly drills will constantly be undertaken or conducted. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive in the case of incidences. • Signage will be used to warn staff and/ or visitors that are not involved in construction activities of dangerous places. <p>Personnel will only undertake tasks for which they are trained/ qualified. A formal 'permit to work' system will be in place and strict instructions will be given for operators of equipment.</p>
CP9	Social Misdemeanour by Construction Workers	<ul style="list-style-type: none"> ▪ As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution. ▪ A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation. ▪ A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE which will be signed by all workers on the project. ▪ Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled. ▪ All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities
CP10	Loss of Land and displacement of economic activities	<ul style="list-style-type: none"> ▪ Ensure timely and appropriate compensation ▪ Take into consideration local community and household preferences. For instance, the landowner is willing to relocate part of his house and underground tank and he is supported by local leaders. ▪ PAPs should be given financial literacy on how to use their compensation packages. ▪ In-kind compensation can be considered especially for institutional landowners. ▪ LGs should be involved in mobilisation and sensitizing PAPs.
	Conflicts due to influx of immigrant labour	<ul style="list-style-type: none"> ▪ The Contractor should develop guidelines for behavioural conduct, including penalties for its workers. ▪ Workers must be sensitized on proper social behaviour and conduct with regard to community norms prior to starting work. Workers should be sensitized to avoid engaging in sexual relations with

		<p>underage girls and married women</p> <ul style="list-style-type: none"> ▪ Employers at both the construction and operation phase should have a strict employment code of conduct. ▪ At the induction of employees, the employer should emphasise that molestation of children especially the girl child is punishable by taking the culprit to court. ▪ An employer who tries to shield or cover up for the employee caught in the act will equally be prosecuted, according to the penal code. ▪ Monitoring school attendance ▪ Sensitization in schools ▪ Reporting mechanisms in place such as a whistleblowing system
	Risk of violence against children	<ul style="list-style-type: none"> ▪ Employers at both the construction and operation phase should have a strict employment code of conduct. ▪ At the induction of employees, the employer should emphasise that molestation of children especially the girl child is punishable by taking the culprit to court. ▪ An employer who tries to shield or cover up for the employee caught in the act will equally be prosecuted, according to the penal code. ▪ Monitoring school attendance ▪ Sensitization in schools ▪ Reporting mechanisms in place such as a whistleblowing system
	Risk of Child Labour	<ul style="list-style-type: none"> ▪ The project implementation team should put a mechanism in place to identify the presence of all persons under the age of 18 and ensure that they are not employed on the project. ▪ Put notices on work sites (NO CHILD LABOUR) in order to silence agitations ▪ Engage District Community Development Office (DCDO), Gender Officers, Parish Chiefs among others. ▪ Monitoring school attendance ▪ Sensitization in schools ▪ Reporting mechanisms in place such as a whistleblowing system
	Risk of Gender Based Violence	<ul style="list-style-type: none"> ▪ The Contractor should have a sexual harassment policy and mainstream it to ensure strict adherence to established mechanisms to avoid the emergence of these challenges; ▪ MWE should ensure that social safeguards personnel are recruited as part of the project implementation personnel to supervise contractors and to continuously engage communities; ▪ Put GBV reporting mechanisms in place; ▪ Community sensitization among men and women
	Increase in HIV/AIDS and STDs	<ul style="list-style-type: none"> ▪ Sensitize workers on proper social behaviour and conduct with regard to community norms, HIV/AIDS and other sexually transmitted diseases. HIV/AIDS policies should be developed at the workplace; ▪ Establish and implement Contractors' HIV/AIDS Workplace Policy; ▪ Free HIV/AIDS testing, counselling and condom distribution be encouraged for both workers, sex workers and local community; ▪ The pathways for transmission of HIV/AIDS and STIs are well known, foreseeable and can be mitigated. Social bonds are not readily controlled, and the permanence of HIV/AIDS transmission makes this particular impact of social bonding both negative and also positive. Social bonds leading to lasting marriages and children occur in such situations; early pregnancies and sexual exploitation can also occur
OP1	Water quality and pollution	<ul style="list-style-type: none"> • The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure. • The boreholes should have raised concrete aprons around their bases to prevent dirty water seeping back into the hole. • The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around them
OP2	Water quantity and yield	<ul style="list-style-type: none"> • Get involved with catchment management planning that could improve land management and restore groundwater recharge.

		<ul style="list-style-type: none"> • Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer. • Reduce the amount of water being taken – if demand in the area is growing then look at developing new water sources
OP3	Water supply system failure	<ul style="list-style-type: none"> • Payment for water supply services is the only way to keep the service running continuously and therefore tariffs would be designed to ensure financial viability. Cost recovery would be achieved through service fee payments. • Put in place a water user committee to oversee the operations of the water system. • Fence off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like the community tap stands to mitigate trespass and sabotage
OP3	Pollution of water due to cutting of pipes	<ul style="list-style-type: none"> • The developer should hire services of security guards to monitor and guard the water supply system facilities. • Sensitization and awareness about the dangers of vandalising the water supply system facilities should be done especially by the local leaders and the developer (MWE/WSDF-N). • Legal and applicable punitive measures like arrests and prosecution should be taken to those caught vandalising the water system facilities in order to curtail and to serve as an example to those who would want to engage themselves in such acts. • The developer should fence off all the premises of the different project components like the pumping stations, reservoir sites and any other erected structures
OP4	Noise from Generators	<ul style="list-style-type: none"> • Installation of solar system instead of the generator • Regular servicing, maintaining and monitoring of the generators • Switching on the generators for few hours just to boost the pumping of water but to always use the solar systems

ES6: Stakeholder Consultations

An comprehensive stakeholder engagement was carried out during ESIA specifically with Lira District Local Government Officials, Sub-County Officials, Local Community Representatives and Community members among others through community meetings, Ky Informant Interviews (KII) and Focus Group Discussions (FGDs) where about 50 members (30 female and 20 males) were engaged during the two meetings with local community members. The main findings from the stakeholder engagements were largely categorized into two parts i.e., the anticipated impacts (both negative and positive) and general concerns on the project.

An ESMP has been drawn up and presents the actions required to ensure that the mitigation measures proposed in this environmental and social impact study are carried out to a satisfactory conclusion and thus ensure that the environmental risks are reduced to an acceptable level. The EMP provides a delivery mechanism to address potential adverse impacts, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The ESMP covers each stage of the project from construction to operation with the indicative costs for its implementation and monitoring indicators.

An Environment and Social Management and Monitoring Plan (ESMMP) has also been presented in this ESIA report to ensure positive impacts are enhanced while negative impacts are mitigated. Resettlement issues are not anticipated as the proposed project component sites have no standing developments.

Therefore, the proposed project is environmentally and socially feasible for implementation provided the recommended mitigation and monitoring measures are implemented, and the proposed implementation arrangements are upheld.

1 INTRODUCTION

1.1 Background

The Government of Uganda through the Ministry of Water and Environment (MWE) is committed to the provision of safe and clean water and adequate sanitation facilities to its rural and urban population. Additionally, to bring this to fulfilment, the MWE initiated a Water and Sanitation Development Facility – North (WSDF-N) as a mechanism for funding water and sanitation investments in Small Towns (STs) and Rural Growth Centres (RGCs) in northern Uganda.

WSDF-N is the implementing arm of MWE of the Directorate of Water Development, under the Urban Water and Sewerage Service Department (UWSSD). The Project forms part of the nationally identified programs in the national water and environment sector framework that is being implemented under the Joint Water and Sanitation Sector Programme Support (JWSSPS) funded by a joint contribution of Government of Uganda and Development Partners. The WSDF-North activities cover the twenty-nine districts of West Nile, Acholi and Lango sub regions. WSDF-North officially commenced on 1st July 2008 with the actual implementation in 2008/09 FY.

The Urban Water and Sewerage Department (UWSD) of the MWE introduced the Water and Sanitation Development Facility - North (WSDF-N) to support the development of water supply systems and sanitation facilities in STs and RGC through a decentralized and demand driven financing mechanism in Northern Uganda districts. The WSDF-N provides technical and financial support to help districts and town councils to develop, rehabilitate and expand water supply services and sanitation in STs and RGCs, following a demand responsive approach under the framework of Uganda's water and sanitation policies and relevant sector strategies.

As a measure to ensure that environmental integrity and plight of communities where these water supply / sanitation systems are to be implemented are not adversely, an Environmental and Social Management Framework (ESMF) for the Water Supply and Sanitation was developed. This program-wide ESMF was prepared in accordance with NEMA environmental / social assessment procedures, and agreed upon by the relevant stakeholders including MWE and NEMA. The ESMF aims to ensure that implementation of projects / activities under this program are done with little or no harm to the environment and community at large. For operationalization of this ESMF however, site-specific Monitoring Environmental and Social Management Plans (ESMPs) tools will be developed as well to guide the developer (WSDF-N) in undertaking the monitoring.

Accordingly, a consultant has been engaged by WSDF-N to undertake Environment and Social Impact Assessment (ESIA) with site specific ESMP for the proposed Barr Rural growth Centre (RGC) Piped Water Supply System in Barr Sub County, Lira District.

1.2 Water and Sanitation Development Facility- North

The Water and Sanitation Development Facility – North (WSDF-N) officially commenced on 1st July 2008 with approval of the work plans and budgets by Government of Uganda and Development Partners (DPs). The Facility is now in its 14th year of implementation covering twenty-Nine districts across three sub regions of Northern Uganda.

The WSDF-N provides technical and financial support to help districts and Town Councils to develop, rehabilitate and expand water supply services and sanitation in the small towns and rural growth centers, following a demand-based approach under the framework of Uganda's water and sanitation policies and relevant sector strategies. The core activities funded by the WSDF include water supply and sanitation infrastructure development (new investment, rehabilitation, and major extensions), software and sanitation promotion programmes in small towns and rural growth centers.

1.3 Water Supply and Sanitation in Refugee Hosting Communities in Northern Uganda.

The main objective of the Water Supply and Sanitation in Refugee Hosting Communities in Northern Uganda, funded by African Development Bank (AfDB) and Ugandan Government is to provide sufficient, safe and sustainable supply of water and appropriate sanitation in selected refugee hosting communities in Northern Uganda. The investment measures include construction, rehabilitation and expansion of water supply systems, public sanitation facilities (including a Faecal sludge treatment facility) in selected small towns (ST) and rural growth centres (RGC) and neighboring refugee settlements including the procurement of equipment for operation and maintenance (O&M) of the systems. Northern Uganda comprises of a number of districts hosting the refugees from neighboring South Sudan and the Democratic Republic of Congo.

1.4 Justification of the Project

Despite Uganda's favorable refugee policy, the influx of refugees in Uganda comes along with increased demand for the social and infrastructural services like access to health services, safe water, and education among others. The hosting communities are affected too. Based on the UNHCR and Office of the Prime Minister (OPM) report of May 2018, the water consumption for the host community is approximately 7l/c/d. This still falls short of the required minimum supply of 20l/c/d as per the National Water policy 1995. Therefore, the proposed project funded by AfDB aims at improving on the water consumption to the minimum requirement of 20l/c/c as per the National Water policy 1995 for the refugee host communities.

The increasing population in the proposed project area has resulted in the need to increase on the accessibility and provision of safe and clean water for the local communities. In the view of the above, the Ministry of Water and Environment, specifically the Water and Sanitation Development Facility-North (WSDF-N) is implementing a project whose overall objective is to sustainably increase access to safe water supply and improve on sanitation to the communities of Barr RGC in Lira district thereby contributing to Sustainable Development Goals (SDGs) 6 and 12

To ensure that environmental integrity and plight of communities where these water supply / sanitation systems are to be implemented are not adversely impacted upon, an Environmental and Social Management Framework (ESMF) for the Water and Sanitation program will be developed. This program-wide ESMF was prepared in accordance with NEMA Environmental / Social Assessment procedures, and agreed upon by the relevant stakeholders including MWE and NEMA. The ESMF aims to ensure that implementation of projects / activities under this program are done with little or no harm to the environment and community at large. For operationalization of this ESMF however, site-specific Environmental and Social Management Plans (ESMPs) tools will be developed as well to guide developer in implementing the project.

1.5 Need for the ESIA

National Environmental Act (NO.5 of 2019) mandates an Environmental Impact Assessment for all projects or policies that may, are likely to or will have significant impacts on the environment so that adverse impacts can be identified, Avoided, reduced, mitigated or compensated for based on the mitigation hierarchy (i.e., Ground water resources including water abstraction). The proposed project falls under Schedule 5 of the National Environment Act which lists projects to be considered for ESIA. The proposed Barr RGC piped water supply system is in the category of projects requiring mandatory Environmental and Social Impact Assessment (ESIA) before implementation.

It is in this regard that in accordance with the National Environment Act (NEA) NO.5 of 2019, the Scoping/Terms of Reference (ToR) were prepared and submitted to NEMA for consideration, which paved way for undertaking a full ESIA for the project. In preparing this report, particular attention was paid to the issues specified in section 10 (1) of the EIA Regulations of 2020 with due reference to Section 13 of the same regulation. This ESIA presents information required for the protection of the environment during the design, construction and operation stages of the proposed project. This will enable NEMA and other lead agencies take a decision on whether to approve the progress of the project in light of the identified environmental and social impacts or not. Specific attention was paid to the Environmental Impact Assessment Guidelines and the specific EIA guidelines for water sector for Uganda.

1.6 Objectives of the ESIA

The main objective of the ESIA was to carry out a comprehensive (full) environmental and social impact assessment for the proposed construction of Barr RGC Piped Water Supply System and propose measures to mitigate the adverse impacts while enhancing the positive ones.

The major tasks of the ESIA were:

- A description of the project areas environmental and social baseline conditions of the surrounding, study and assess how these conditions will be affected by the proposed development.
- Identification, assessment and determination of the likely potential impacts (positive and negative) of the proposed project construction, operation phases and recommend feasible measures to avoid, minimize or mitigate the negative impacts.
- To develop an environmental and Social Management Plan/Mitigation plan (ESMP) for the identified negative impacts and an Environmental Monitoring Plan (EMP) for project implementation; and consultation with major stakeholders.
- To compile an Environmental and Social Impact Statement for submission to NEMA for consideration and approval.
- Assessment of national and international legislative, institutional and policy frameworks and guidelines relevant to the project;

1.7 Project Area

The Two proposed motorized boreholes are located in Itek village and Abolet B villages in Itek parish. The locations of the RGC that will constitute the project area lie in Barr Sub-county though due to recent administrative changes, the sub county is now Itek in Lira District. The Sub- County is situated about 17Km to the east of Lira City and is one of the nine sub-counties that make up Lira district and its about 389 km from Kampala City along the Lira-Kotido Road east of the country. It is bordered by Alebtong district to the north and east, Lira city to the west, Amach subcounty to the south. The sub-county is composed of nine parishes with a total of 74 villages. The coordinates of project area are, 504407.54m E, 248566.50 N.

Barr sub-county came into existence way back in the 1930s and was recognized as an administrative unit where by all policy matters and decisions concerning the sub-county and the district were taken from the central government. However, with the decentralization policy of the NRM government in the 1990s, the sub-county started operating autonomously as an administrative unit. It is categorized as a sub-county according to the urban administrative classification in Uganda and accommodates the headquarters of the sub-county administration. The overall administration is in the office of the Senior Assistant Secretary while the Local Council III office in the sub-county provides the political back-up support with the highest political authority. The LCIII Chairperson is responsible for policy formulation with input from the 7 ward/parish councillors. There are 7 wards (Parishes) Ayam, Alebere, Onywako, Olilo, Ayira and Ober in the sub-county comprising of seventy-four LCI (Villages). The sub-county has six core technical departments namely; administration, finance and planning, public health, and environment, works and engineering, audit, community-based services. The chief administrative officer provides an oversight supervision based on the Local government Act 1997 and Finance and Accounting regulations 2007.

1.8 Key Project Components

1.8.1 Water Source Intake and pump station

The pumps for the production wells and size of the pumping main were designed using Hazen-Williams Formula and a spread sheet was used to design the main requirements in the design year 2046. The Two proposed motorized boreholes, **DWD79455 (Lat 2.206158; Long 33.014071)** and **DWD79457**

(**Lat 2.197317; Long 33.027308**) are located in **Abolet B Village** and **Itek Village** respectively as potential sources of water for the proposed Water Supply System. These production wells will be configured as follows;

- a) Flow of 4.6m³/h at 187m head for newly drilled well DWD79455; borehole riser pipe of OD50 HDPE PN20, 87m long; and pumping main of OD50 HDPE PN10, 3300m long up to a sump to be located at the DWD 79457 well site.
- b) Flow of 4.0m³/h at 113m head for newly drilled well DWD79457; borehole riser pipe of OD50 HDPE PN16, 100m long; and pumping main of OD50 HDPE PN10, 20m long up to a sump located within the well site.

The borehole pump house will be the standard 3.5m X 3.0m floor area pump house with a semi-detached office/store room giving a total floor area of 7.2m X 3.0m. The pump house will contain the associated pipework, fittings and electrical switch gear. The pump houses should have the following characteristics

- The pump houses are to be made in block work.
- The pump houses and all necessary auxiliary facilities are envisaged to fit on a size of land of about 81m².
- Fencing in chain link of about 60m with 1No. double leaf access gate

1.8.2 Sump and Pump House

The sump and pump station will be located at the DWD79457 BH site in Abolet LC. A 30m³ sump capable of storing 3.5hrs of water will be constructed as a single unit with the pump house housing the high-lift pumps and electrical switch gear. Two pumps will be installed, to operate on a duty/standby schedule.

1.8.3 Energy and Power Provision Costs

Since 16hrs pumping is required to meet the demand in the intermediate year (2031), Hydro Electric Power has been considered into the design in order to meet necessary power requirements. This has been done due to the limitation of solar working hours considered at 6hrs maximum per day for design purposes. The energy cost has been optimised by taking into the account the power requirements to meet the demand at the intermediate year (2036) and at the ultimate year. (2046). As for the intermediate year, the HEP shall be used for 10hrs which takes the total pumping hours to 16hrs and then between the intermediate year to the ultimate year, the system runs on HEP for the extra pumping regime adopted. Through this, the energy cost for running the system is optimised without compromising pumping delivery to the tank.

1.8.4 Distribution System

The downstream of the distribution systems reservoir has been modelled using EPANET 2.0. A peak hour factor of 2.0 was used. Due to the topography being flat, in some pipe sections the flow velocities lower than 0.6m/s have been considered to achieve the recommended residual pressures.

The network was designed for those areas with defined access roads but the possibility of extending it was catered for as the project area is expected to expand. Consequently, the smallest size of pipe chosen is OD 50 HDPE. Pipes smaller than OD50, will be laid as Network Intensification lines.

1.8.5 Water Tanks/Reservoirs

The required storage capacity has been computed as 30% of the maximum day demand. The required storage capacities for the system is 61m³. However, the consultant has adopted an 83m³ tank due to the fact that a 61m³ tank does not exist in the market. It is recommended to place the pressed steel tanks on a 10m high steel tower due to the topography of the project area and the low pressures experienced in the far reaches of the distribution network.

1.9 Details of Developer and Investment Cost

The project is being implemented by Ministry of Water and Environment under the Water and Sanitation Development facility- North (WSDf-N). The estimate of the combined project investment cost for Barr

system is **2,477,629,002 (Two Billion Four Hundred Seventy-Seven Million Six Hundred Twenty-Nine Thousand Two shillings only)**. The address/contact person of the Developer is presented below:

Ms. Agwai Angwec
 Branch Manager
 Water and Sanitation Development Facility-North
 Plot 14/16 Maruzi Road,
 P.O. Box 381 Lira, Uganda
 Telephone: (256) 392-705946/782-584814
 Email: [wsdf-n@mwe.go.ug](mailto:w sdf-n@mwe.go.ug)

1.10 Response to NEMA Approval of Terms of Reference Conditions

SN.	REQUIREMENTS	COMMENTS
I	Identify and map all utilities and public infrastructure within the project area that may be impacted on by the project activities and study the area physical plans. Clearly describe the measures that will be implemented to minimize the potential impacts on the public infrastructures and ensure the project is aligned to the physical plans of the area	Though, there are no prepared Physical Development Plans in Otwal Sub County, Consultations were made with the different technical officers to guide on the upcoming projects and plans to be implemented in the area
II	Provide information on the alternatives considered for the project location, design, technology among others and justification for the selection of the preferred options	Addressed under Chapter 6 of this Report
III	Include in the ESIA, a hydrological investigation report in regard to the potential impacts of the piped water supply system on underground water resources within the project area, incorporate in the EIS mitigation actions to address such impacts.	Addressed under Chapter 8, section 8.5 and Table 25 of this Report; Annex VII
IV	Provide in the report accurate set of geographic Coordinates (UTM) for the different project infrastructures	Addressed under Chapter 1; section 1.8.1, sub section 1.8.5 and chapter 3 of this report
V	Provide information on the land ownership and land acquisition processes that will be implemented to ensure that land required for the project is acquired in accordance with government laws on land acquisition and append details on the ESIA report	The Otwal Sub County authorities have committed to provide land (Sub County Land) and secure for the other project components as indicated in Annex III of this Report
VI	Indicate the actual investment cost of the project in line with regulation 18(1) and schedule 5(3f) of the National Environment (Environment and Social Assessment) Regulations 2020	Addressed under section 1.9 and with the attached Valuation Certificate as indicated with the certified Bill of Quantities (BoQs) as shown in Annex VIII
VII	Provide evidence of payments of the thirty percent ESIA fees as required under regulation 49(2) of the National Environment (Environmental and Social Assessment) regulations, 2020.	Attached as the First page of this Report and Annex IX of this report

1.11 Structure of the report

This Environmental and Social Impact Assessment report is concise and limited to the significant environmental issues. It focuses on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting the data. The report contains, but not limited to the following major contents:

- 1) Cover Page (Title of the proposed project, Location, Name, Address and information of the developer)
- 2) Table of content
- 3) Declaration by ESIA team and their details
- 4) List of acronyms
- 5) Executive Summary
- 6) Introduction
- 7) Policy, Legal and Administrative/Institutional Framework.
- 8) Description of the Proposed Project.
- 9) Description of methodology and techniques used in the assessment and analyses of project impacts,
- 10) Baseline conditions of the physical, biological and socio-economic environment of the project area, including results of relevant studies and other geophysical and geotechnical studies.
- 11) Description/Assessment of the Environment and social impacts of project activities.
- 12) Analysis of Alternatives.
- 13) Environmental and Social Impacts and Mitigation Measures.
- 14) Chance finds procedure to facilitate the handling of any unknown or known Physical Cultural Resource(s).
- 15) Grievance Redress Mechanism to facilitate the handling of any complaints that may arise during project implementation.
- 16) Environmental and Social Management Plan (ESMP) matrices detailing measures for addressing potential negative environmental and social impacts of the project. In addition, the ESMP should clearly identify institutional arrangement, roles, responsibilities, implementation schedules and costs in addressing the mitigation measures proposed in this ESIA, including capacity building requirements; and
- 17) Propose an E&S Monitoring Plan with clear monitoring indicators and institutional roles to be used in tracking the implementation and compliance of the proposed mitigation measures;
- 18) Inter-Agency and Public/NGO Consultation.
- 19) List of References.
- 20) Appendices:
 - The Environmental and Social Impact Assessment team.
 - Approved Scoping Report/Terms of Reference
 - Land title/agreements
 - Records of Stakeholder meetings
 - Data and Unpublished Reference Documents.
 - Map, drawing and pictorial complement, especially to convey information on the project affected area and proposed project activities
 - Chance Finds Procedure
 - Grievance Redress Mechanism
 - Monitoring check-lists

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

Key legislation governing an ESIA study in Uganda includes the National Environmental Act NO.5 of 2019 of the laws of Uganda and the Environmental Impact Assessment Regulations (2020). The National Environmental Act established NEMA and entrusts it with the responsibility to ensure compliance with ESIA process and procedures in planning and execution of development projects. The procedures require that a project proponent prepares an ESIA report with a clear assessment of relevant potential impacts, based on Terms of Reference (ToRs) developed from a scoping exercise. This requires that the ESIA addresses potential direct and indirect socio-environmental impacts during the pre-construction, construction, operation and decommissioning phases and an environmental and social management plan (ESMP) has also to be prepared.

Policies, legal and institutional framework considered relevant to this proposed project are discussed in this section. Various laws here reviewed relate to minimum acceptable construction, operational requirements, environmental quality, land use, public health, occupational safety, labour standards and international legal obligations.

2.2 Policies relevant to the Proposed Project

Table 2 below presents the Policy framework related to the project

Table 4: Policy framework related to the Project

Policy	Goal	Relevancy
National Environment Management Policy, 2014	The overall policy goal is sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation. The Policy provides a system of Environmental Impact Assessment (EIA) and environmental monitoring so that adverse environmental impacts can be foreseen, eliminated or mitigated.	Environment and development are interrelated, and this policy requires that environmental aspects are considered in all development projects such as the construction activities. Therefore, this ESIA study has been conducted to take into consideration any adverse social and environmental impacts of the construction activities of the proposed Barr RGC piped Water Supply System.
The National Water Policy, 1999	To manage and develop the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs of the present and future generations with the full participation of all stakeholders.	Water abstraction permits should be obtained from DWRM before operation phase. Water source protection measures have been proposed under the ESMP and full WSPP will also be prepared as part of the assignment and should be implemented to ensure safe water quality and quantity.
The National Gender Policy, 2007	Provides a framework and mandate for all stakeholders to address and implement the gender imbalances within their respective sectors.	This policy would especially apply in the recruitment process of labour, both during construction and operation phase. Men and women should have equal opportunities for available jobs. This policy also requires provision of a work environment that is safe and conducive to women, as it is for men, considering gender-disaggregated differences and vulnerabilities.

The Environmental Health Policy 2005	The policy provides a framework for the development of services and programs at National and Local Government levels that establish the environmental Health priorities.	Analysis of water quality was done at the design stage and during the pump testing where the water quality analysis report was prepared. The results of the analysis have been used and are presented under the Section on Water Quality as part of the baseline information.
The National Wetlands Policy, 1995	To promote the protection of Uganda's wetlands in order to sustain their ecological and socioeconomic functions. Wetlands should not be drained and converted without NEMA's approval.	No sourcing of materials e.g. sand and stones for construction activities is permitted without undertaking an environmental impact assessment for NEMA's consideration.
The National Land Policy, 2013	The goal of this Policy is: "to ensure an efficient, equitable and optimal utilization and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development". One of its objectives is to ensure sustainable utilization, protection and management of environmental, natural and cultural resources on land for national socio-economic development.	By undertaking an ESIA for the proposed project, the developer is ensuring planned and environmentally friendly infrastructure development. Enhancement and mitigation measures should be implemented by the developer and the contractor(s) to ensure that all land use practices conform to land use plans and the principles of sound environmental management such as biodiversity preservation, soil and water protection, conservation and sustainable land management.
The National Health Policy, 2010	To reduce mortality, morbidity and fertility, and the disparities therein.	Contribute to the reduction of water borne diseases thereby improving on the health of communities, especially the girl child and mothers who are mainly involved in collection of water.
Uganda National Climate Change Policy, 2015	The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy including integration of climate change issues into planning, decision making and investments in all sectors.	ESIA promotes the wise use of water resources to minimize harmful effects to the environment and water resource monitoring. It promotes and strengthen the conservation and protection against degradation of watersheds, water catchment areas, river banks and water sources in order to increase their resilience to climate change impacts.
The HIV/ AIDS Policy, 1992	To ensure HIV/AIDS is addressed in the workplace, the policy encourages employee awareness and education on HIV/AIDS. To protect the infected and affected persons from discrimination, employers are required to keep personal medical records confidential. Employees living with, or affected by, HIV and AIDS, and those who have any related concerns, are encouraged to contact any confidant within the organization to discuss their concerns and obtain information.	This policy is relevant to the project if implementation of proposed construction activities leads to influx into the project area by people seeking construction jobs and indulging in prostitution or irresponsible sexual fraternization associated with HIV/AIDS risk. The provisions of this policy are expected to be fulfilled by the construction contractors or their subcontractors, especially in regard to having an in-house HIV Policy, worker sensitization and provision of free condoms.
National Orphans and other vulnerable	The goal of the Policy is full development and realization of rights of orphans and other vulnerable children. The policy provides support to vulnerable children and families such that their	The project Developer (MWE/WSDF-N) and the contractor(s) including their sub-contractor(s) will ensure that the project activities do not compromise or in any way

children's Policy, 2004	capacity to sustain themselves is strengthened; and provides residential care for orphans and other vulnerable children as a last resort	affect the lives and livelihood of all the vulnerable groups like the orphans and children in general during the project implementation
National Orphans and other vulnerable children's Policy, 2004	The goal of the Policy is full development and realization of rights of orphans and other vulnerable children. The policy provides support to vulnerable children and families such that their capacity to sustain themselves is strengthened; and provides residential care for orphans and other vulnerable children as a last resort	The project Developer (MWE/WSDF-N) and the contractor(s) including their sub-contractor(s) will ensure that the project activities do not compromise or in any way affect the lives and livelihood of all the vulnerable groups like the orphans and children in general during the project implementation
National Equal Opportunities Policy, 2006	The National Equal Opportunities Policy provides a framework for re-dressing imbalances, which exist against marginalized groups while promoting equality and fairness for all. With a goal of: providing avenues where individuals and groups' potentials are put to maximum use by availing equal opportunities and affirmative action.	The Water supply projects come along with a lot of opportunities including service delivery, trainings and employment. The project will avail equal opportunities and affirmative action.
The National Child Labour Policy 2006	The policy provides an enabling environment for the prevention, protection and elimination of child labor. It is intended to establish guiding principles in Uganda's effort to eliminate child labor and priorities for government and stakeholder action. This policy is based on recognition that all human beings, adults and children, have rights. Children by virtue of their age and needs are entitled to specific rights, including education, health, survival development, protection and participation	The project management including all the contractors will ensure that all employees are above 18years and not school going students or pupils.
The National Policy for Older Persons 2009	The policy seeks to achieve equal treatment, social inclusion and empowerment of older persons. The values of the policy are: <ul style="list-style-type: none"> i. Equity; Fairness, fair play, impartiality and justice in the distribution of benefits and responsibilities in society. ii. Respect; Views, opinions and rights of older persons will be upheld while they are also expected to exhibit high sense of self- respect. Commitment; The willingness to work hard and give all the energy and time to meet the vision. iii. Accountability; All stakeholders are expected to fulfill their obligations towards one another iv. Equality; All older persons will be accorded same opportunity and rights as other individuals. 	Persons above 65 years old are categorized as old. These should be incorporated in the compensation process where necessary and will be treated with Equity and respect; all their views will be considered regarding the execution of the project.
The National Policy for the Conservation and	The goal of this Policy is to curtail the rampant loss of wetland resources and ensure that benefits from wetlands are sustainable and equitably distributed. Wetlands acting as sources of	The proposed project is aimed at Conservation and Management of Wetland Resources within the catchment area. The designs will adhere to the principles of sustainability

Management of Wetland Resources, 1995.	wastewater treatment should be fully protected. This policy outlines guidelines for wetland resource developers.	such that areas within wetlands are left intact, as much as possible.
Uganda Vision 2040	Water Development is stated as one of the opportunities that can foster the socio-economic transformation of Uganda from a peasant to a modern and prosperous country.	The project will increase access to safe potable water thus contribute to improved health, sanitation and hygiene.
National Development Plan III	The plan focuses on increasing access to safe water, sanitation and hygiene levels, functionality of water supply systems and promoting catchment based integrated water resources management during the planning process in order to achieve the middle income status by 2025.	The project focuses on providing access to safe and clean water, increasing the functionality of the water supply systems within the Rural Growth Centre and the Sub-County.
Sustainable Development Goals (SDG)	The 2030 agenda for Sustainable Development envisions a world where we reaffirm commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene.	The project will specifically support SDG 6 on ensuring clean water and sanitation is attained. This focuses on ensuring availability and sustainable management of water and sanitation for all.

2.3 Laws relevant to the Proposed Project

Table 3 below presents the Legal framework related to the project

Table 5: Legal framework related to the project

Legal Framework	Relevancy	Requirement
The Constitution of the Republic of Uganda; 1995; amended as at 15 th February 2006, Government of Uganda.	The State shall promote sustainable development and public awareness of the need to manage land, air and water resources in a balanced and sustainable manner for the present and future generations. The Constitution is the cardinal law in Uganda upon which all environmental laws and regulations are founded.	All environmental impact actions of the project are therefore meant to conform to the broader objectives of the Constitution which requires a healthy environment for all citizenry. ESIA report has been prepared for NEMA's consideration before implementation of the project. Therefore, this Project will be implemented in a manner that will incorporate the appropriate safeguards for environmental and social issues, especially land take. Any land required for the implementation of the construction activities will be obtained within the confines of the law, after a Resettlement Action Plan (RAP) has been conducted where possible.
The National Environment Act No. 5 of 2019	This act provides for various strategies and tools for environment management, which also includes the ESIA for projects likely to have significant environmental impacts. The Third Schedule of the National Environment Act, No. 5 of 2019 lists projects to be considered for environmental impact assessment. Under that	The Act governs and guides environmental management in Uganda. This ESIA is prepared to conform to the Act's requirement that projects likely to have significant environmental impact undertake an ESIA before they are

	categorization, most water resources related projects fall under two ground and surface water resources.	implemented. ESIA report has been prepared for NEMA's consideration before implementation of the project.
The Water Act, Cap 152 and The Water Resources Regulations, 1998	Management of water resources Regulation and issuing of water use, abstraction and wastewater discharge permits; Prevention of water pollution. Managing and monitoring and regulation of water resources	Water abstraction permits should be obtained from DWRM before operation phase. Water analysis was done during the design stage and pump testing where a water quality analysis report was prepared and these results have been used during this ESIA and results compared to those of national standards for portable water.
The Land Act, Cap 227	Section 74 (i) states that where it is necessary to execute public works on any land, an authorized undertaker shall enter into mutual agreement with occupier or owner of the land in accordance with Act.	These tenure systems will be important during resettlement planning. The extent of works designed to ensure the construction of the Barr RGC WSS will necessitate land take in the Project Area. Any land required for the implementation of this Project will be acquired in accordance with the provisions of this Act. 60m X60m will be required for the pump stations, 30mX30m for each of the Reservoir tanks and the office block. The RoW along the road reserves was permitted by the District authorities and Uganda National Roads Authority, Lira for the transmission and distribution networks.
The Occupational Safety and Health Act, 2006	Provision of Occupation Health and Safety of workers and Inspection of places of works. This Act requires that employers provide and maintain safe working conditions and take measures to protect workers and the public from risks and dangers of their works, at his or her own cost (Section 13). Employers with more than 20 workers should prepare and often revise a written policy with respect to safety and health of workers (Section 14). The contractor therefore is obliged to provide employers with washing facilities, First Aid, facilities for meals and safe access to workplaces	An ESMP has been prepared and the Contractor will ensure the workplace is registered under the Ministry of Gender, Labour and Social Development (MoGLSD) under the Department of OHS. The construction activities will require workers during the construction, and operation and maintenance phases. Therefore, the Act requires that MWE and all contractors must ensure that workers have a safe working environment at all times and that their health is not at risk as a result of the working environment.
The Workers' Compensation Act, 2000	This requires compensation to be paid to a worker injured or acquired an occupational disease or has been harmed in any way in the course of his/her work.	This Project will require workers during construction, operation and maintenance phases. Any injury or illness resulting from Project related activities will be subject to conditions of the Workers' Compensation Act. Lira District Labour officers will also be involved in ensuring compliance of the Contractor's' with labour laws. The developer shall ensure that all contractors and sub-contractors provide personal protective equipment (PPE)

		to employees to minimize accidents and injuries and ensure workers safety onsite.
The Physical Planning Act, 2010	Section 37 requires an EIA permit for developments before they are implemented. It states: "Where a development application related to matters that require an environmental impact assessment, the approving authority may grant preliminary approval subject to the applicant obtaining an EIA certificate in accordance with the National Environment Act".	MWE shall use established guidelines to acquire land and compensate where possible for acquired lands, as well as safeguarding the natural environment, in line with the provisions of this Act. Where necessary RAP will be prepared for the Water transmission lines in fulfilment of the above provisions before construction activities are implemented. 60m X60m will be required for the pump stations, 30mX30m for each of the Reservoir tanks and the office block. The RoW along the road reserves was permitted by the District authorities and Uganda National Roads Authority, Lira for the transmission and distribution networks
The Public Health Act, Cap 281	The Public Health Act aims at avoiding pollution of environmental resources that support health and livelihoods of communities. It gives local authorities powers (Section 103) to prevent pollution of watercourses.	The disposal of waste from the proposed project will have to be appropriately managed so as to prevent risk to public health, in line with the provisions of this Act.
The Local Governments Act, Cap 243	Provides for the system of local governments based on the decentralization of district for the enforcement of environmental law.	The developer will work closely with the District Water Officer (DWO), District Natural Resources Officer (DNRO) and Sub-County Community Development Officer in carrying out monitoring activities to ensure no damage onto the environment and social amenities.
Investment Code Act, Cap 92	Section 18(2) (d) of the Act requires an investor to take necessary steps to ensure that development and operation of an investment project do not cause adverse ecological and socio-economic impacts.	MWE is the implementing agency for the project that received funding from the AfDB. This ESIA is in partial fulfilment of the requirements of this Act, since adverse ecological and socio-economic impacts as a result of the project implementation have been identified and mitigation measures developed.
Employment Act, 2006	This Act is the principal legislation that seeks to harmonize relationships between employees and employers, protect worker's interests and welfare and safeguard their occupational health and safety through: i) Prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV). ii) Providing for labour inspection by the relevant ministry (Part III). iii) Stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI). iv) Continuity of employment (continuous service, seasonal	The Act will govern labour arrangements and conditions under which persons hired by the project work. It prohibits Child labour (a condition the contractor must comply with) as well as providing guidance on work rights during the post-construction phase.

	employment, etc. (Part VIII). This Act is relevant to both construction & operation phases.	
The Mining Act, Cap. 148	Stone quarry sites and gravel borrow pits will be necessary for materials needed to construct the concrete works of the project components. Therefore, applicable licenses shall be obtained from the Commissioner of the Geological Survey and Mines. The Mining Act of 2003 regulates mining developments including set up of new quarries and/or sandpits. Relevant environmental studies required for this license application are described in Part XI.	This Act will apply to the project's contractor(s) who will be required to obtain license for extraction of stone/aggregate and murram materials required for construction. The extraction of stone/aggregate and murram materials will be undertaken in line with the provisions of this Act. Issues of restoration of the sites after extraction of murram will be of key importance after construction of the proposed project.
The Children's Act, Cap 59	This is an Act to reform and consolidate the law relating to children; to provide for the care, protection and maintenance of children; to make provision for children charged with offences and for other connected purposes. Part II of the second schedule of this Act defines a child as a person below the age of eighteen (18) years. In the same schedule under Section 8 of this Act provides that no child shall be employed or engaged in any activity that may be harmful to his or her health, education or mental, physical or moral development.	This Project will require workers during construction, operation and maintenance phases. No child should be employed under project work force requirement however, any employment or engagement of children will be done in line with the restrictions of this Act and the Employment Act to ensure that risks to children are either eliminated, or reduced to as low as reasonably practicable. In addition, the contractor will confirm age of potential labourers prior to hiring through National Identity card, birth certificate or confirming with LC and community elders. Lira District Probation Officers will provide guidance to Contractors and their employees' areas of compliance.
The Historical Monuments Act, 1967	Sub-section 12(1) requires that any portable object discovered in the course of an excavation shall be surrendered to the Minister who shall deposit it in the Museum. The Act adds that, notwithstanding provisions of the subsection, where any object is discovered in a protected site, place, or monument, the owner of the protected site, place, or monument shall be entitled to reasonable compensation.	This Act requires that any chance finds encountered during project construction shall be preserved by the Department of Monuments and Museum in the Ministry of Tourism, Wildlife and Heritage. Any chance find objects, material or infrastructure that may be identified as falling under the category of 'archaeological pale-ontological ethnographical and traditional interests' during the Project implementation will therefore, be reported to the Department of Museums and Monuments for advice and where necessary undergo a forensic assessment
Environmental and Social Assessment Regulations, S.I No. 143 of 2020	According to sections 15 of the Regulations, the developer of any project that has or is likely to have a significant impact on the environment is required to undertake an ESIA process after approval of the ToRs.	ESIA report has been prepared for NEMA's consideration after the approval of the Terms of References before implementation of the proposed project.

The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	In Regulation 17 (1), every landowner, occupier or user who is adjacent or contiguous with a wetland shall have a duty to prevent the degradation or destruction of the wetland and shall maintain the ecological and other functions of the wetland. The tool used under these Regulations to ensure compliance is the permit.	Prior to any works at the discharge of effluent back into the environment or any wetland, MWE will seek permission from NEMA, as provided for in these Regulations. Water source protection measures and an independent WSPP have been proposed to protect any wetland resources within the catchment area for the BWSS.
The National Environment (Waste Management) Regulations, 2020	Regulation 5 (1) stipulates that a person who generates waste, a waste handler or product steward has a duty of care and shall take measures to ensure that waste is managed in a manner that does not cause harm to human health or the environment among other provisions.	These regulations apply to both construction and operation-phase waste which should be managed in a way such as to avoid environmental and public health impact. Therefore, all the generated various types and volume of waste should be managed and conform to these regulations.
The National Environment (Noise Standards and Control) Regulations, 2000.	Part III Section 8 (1) requires facility operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible noise levels. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite hearing protection.	All construction activities should be carried out between 7am – 6pm by the Contractor as working hours. No construction activities to be carried out at Night. Noise levels should also be monitored and not to exceed 85dB as per Regulation.
The Water Resources Regulations, 1998	With regard to water abstraction, Part II: Section 3 Sub-section (1) of these regulations requires application for Water Permits by anyone who: (a) Occupies or intends to occupy any land; (b) Wishes to construct, own, occupy or control any works on or adjacent to the land referred to in regulation 10; may apply to the Director for a water permit.	Water abstraction permit will be obtained by the developer from the Directorate of Water Resources Management (DWRM) before operation phase.
The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 2020	Section 5 details that a person shall not discharge effluent into water or land except in accordance with the Act, the Water Act, the National Environment (Waste Management) Regulations, 2020, the Petroleum (Waste Management) Regulations, 2019, the Water (Waste Discharge) Regulations, these Regulations and environmental standards. For this project, this standard is applicable to liquid waste/ sewage treatment plant and public toilets.	Effluent/liquid waste (such as human waste, food scraps, oils, soaps and chemicals) should not be discharged into any wetland or in the River water resources and should be managed in a manner that does not cause harm to human health or the environment.
Draft National Air Quality Standards, 2006	The draft national air quality standards provide Uganda’s regulatory air quality standards.	These standards will apply particularly during construction of the pumpstation and reservoirs.

	Pollutant	Averaging time for ambient air	Standard for ambient air
	Carbon dioxide (CO ₂)	8 hour	9.0 ppm
	Carbon monoxide (CO)	8 hour	9.0 ppm
	Hydrocarbons	24 hour	5 mg m ⁻³
	Nitrogen oxides (NO _x)	24 hour	0.10 ppm
		1 year arithmetic mean	
	Smoke	Not to exceed 5 minutes in any one hour	Ringlemann scale No.2 or 40% observed at 6m or more
	Soot	24 hour	500 µg Nm ⁻³
	Sulphur dioxide (SO ₂)	24 hour	0.15 ppm
	Sulphur trioxide (SO ₃)	24 hour	200 µg Nm ⁻³
	<i>Note: ppm = parts per million; "N" in µg/Nm-3 connotes normal atmospheric conditions of pressure and temperature (25oC and 1 atmosphere).</i>		
The National Environment Regulations, 2020 (Audit)	Part III on Environmental Compliance Audit, Section 12, Sub-section (1) requires the developer of a project or activity listed in Schedule 3 to these Regulations to carry out an environmental compliance audit.		The project will involve construction and operation of water supply and sanitation facilities that have a potential to impact negatively of the environment. Therefore, MWE should conduct Environmental Audits to assess if there are impacts, to what extent and mitigate them.

2.4 Framework and Guidelines for Water Source Protection, 2013

Volume 1 presents the Framework for Water Source Protection Guidelines; this is then applied in four further volumes that give specific guidance for the different types of water infrastructure. This project is guided by Volume 2 on Piped water supplies including: surface water abstraction from rivers and reservoirs, gravity flow piped schemes from springs. The four volumes (2-5) of specific guidance are intended for water infrastructure managers and relevant government officials at the national and district levels and are intentionally concise to encourage their uptake and use. However, some users may want, or need, a deeper insight into the water source protection process. Hence, the purpose of this Framework volume is to present a systematic guide to producing a Water Source Protection Plan for any type of water source.

Water treatment systems are designed to handle incoming water quality within defined parameters. If there is a trend of water quality decline then this can reduce the lifetime of infrastructure or increase the need for further capital expenditure on more intensive water treatment, such as micro-filtration. The Joint Technical Review in 2010 and subsequent Water Sector Working Group agreed that 3% of infrastructure budgets should be allocated to catchment and source protection. These guidelines were developed to enable these projects to implement this decision.

2.5 Institutional Framework

Table 4 below presents the institutional framework.

Table 6: Institutional framework related to the project

Institution	Mandate
National Water and Sewerage Corporation (NWSC)	The National Water and Sewerage Corporation Statute establishes the NWSC with a mandate to operate and provide water and sewerage services in areas entrusted to it on a sound commercial and viable basis. NWSC operates in cities, municipalities and larger towns as well as decentralization and private sector participation in small towns. NWSC is considered a key stakeholder in the proposed project
Ministry of Water and Environment (MWE)	MWE is responsible for policy formulation, setting standards, strategic planning, coordination, quality assurance, provision of technical assistance, and capacity building. The ministry also monitors and evaluates sector development programmes to keep track of their performance, efficiency and effectiveness in service delivery.
Developer / WSDF-N	WSDF-N will be responsible for: <ul style="list-style-type: none"> ▪ Applying for the Groundwater Abstraction Permits from DWRM. ▪ Compensating local Project Affected Persons (PAP) where possible for any loss or negative effect of the project before implementing the project. ▪ Implementing mitigation measures and actions to protect the environment and monitor implementation of proposed measures in the specific site-ESMPs.
National Environmental Management Authority (NEMA)	The National Environmental Act, No5 of 2019 recognizes NEMA as the principal agency responsible for coordination, monitoring and supervision of environmental conservation activities. NEMA is under the Ministry of Water and Environment (MWE) but has a cross-sectoral mandate to oversee the conduct of EIAs through issuance of guidelines, regulations and registration of practitioners. It reviews and approves environmental impact statements in consultation with any relevant lead agencies. NEMA works with District Environment Officers and local environment committees at local government levels who also undertake inspection, monitoring and enforce compliance on its behalf. NEMA will therefore review and approve the ESIA report and through the District Environment Officer, undertake environmental monitoring during project implementation.
Directorate of Water Resources Management (DWRM)	DWRM is responsible for issuing of water abstraction and wastewater discharge permits. The primary goal of the directorate is to promote sustainable development of Uganda's water sector. The directorate is into design and implementation of water quality assessments, monitoring ground and surface

	water resources, laboratory and field works and ultimately water pollution control.
Directorate of Water Development (DWD)	Lead agency responsible for policy guidance, coordination and regulation of all water sector activities including provision of oversight and support services to the local governments and other water supply service providers. DWD has the mandate to promote the provision of clean and safe water to all persons, investigate, control, protect and manage water in Uganda for any use in accordance with the provisions of the Water Statue, 1995
Ministry of Gender, Labour & Social Development (MGLSD)	MGLSD sets policy direction and monitoring functions related to labour, gender and general social development. Its OHS Department in the ministry is responsible for inspection and mentoring of occupational safety in workplaces and this could be during project construction and operation of the WTP facilities. The OHS Department in this Ministry is responsible for undertaking inspections of construction sites to ensure safe working conditions.
District Local Administration Structures	The proposed project is within the jurisdiction of Lira District Local Government (ADLG), headed by a Local Council V (LC V) Chairman and Chief Administration Officer (CAO) who are the political head and technical head respectively. Various district offices whose functions would be relevant to the project include offices of Natural Resources/Environment, District Health Inspector, District Planner, Community Development Officer, District Director of Health Services, District Water Officer, Town Council and District Engineer. Equally important are village-level local council administration (LC I and LC III). Leaders at these levels of local administration are closer to residents and therefore important in effective community mobilization, sensitization and dispute resolution given that there is shared infrastructure to serve cross-border communities. Local government structures are important for mobilizing support for the project as well as monitoring its social-environmental impacts both during construction and operation phases.
Directorate of Environment Affairs (DEA)	Coordinate, inspect, supervise and monitor the environment and natural resources. Ensure that environmental policies and laws are respected while implementing water resources related projects.
Contractor	The Contractor(s) must include in their schedule of works, all proposed mitigation measures. The Contractor(s) must have designated personnel (Supervising Consultants) to monitor environmental, safety and health matters during construction works, and report regularly to WSDf-N. It is recommended that the Supervising Consultant Team include an Environment Management Specialist, who must be responsible for the day-to-day guidance of the project activities on environment and social compliance to the requirements of the Contract and legislation.

2.6 International legal and lenders requirements

Uganda is a party to a number of international and regional agreements which requires her to comply with provisions of the agreements when setting up projects like the Barr RGC Piped Water Supply and Sanitation Project.

International financial institutions like the African Development Bank (AfDB) have environmental and social safeguard policies that are designed to avoid, mitigate, or minimize adverse environmental and social impacts of projects supported by them. These are complimented by the Performance Standards (PS) which have been set by the International Finance Corporation (IFC). These safeguard policies and performance standards can be used and adhered to during the project cycle to ensure that the project meets the international standards.

Table 7: The Safeguard policies and Performance Standards relevant to the Project

Operational Safeguard/ Performance Standard	Key Issues	Relevance/Applicability
OS 1: Environmental and social assessment	Mainstream environmental and social considerations, including those related to climate change vulnerability	An environmental and Social Impact Assessment (ESIA) has been conducted for this project (this Report) where potential

		and thereby contribute to sustainable development in the region. It governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements	impacts have been identified and mitigation measures proposed. This will ensure that the project is implemented in a sustainable way.
OS 2: Involuntary resettlement, acquisition, displacement and compensation	Involuntary land population and	Mainstream resettlement considerations in AfDB operations. It consolidates the policy commitments and requirements set out in the Bank's policy on involuntary resettlement, and incorporates a number of refinements designed to improve the operational effectiveness of those requirements	All people whose land is to be affected for example at the proposed water abstraction site, reservoir sites and some areas along the proposed pipeline route will be compensated prior to start of construction works.
OS 3: Biodiversity and ecosystem services		Identify and implement opportunities to conserve and sustainably use biodiversity and natural habitats as well as observe, implement, and respond to requirements for the conservation and sustainable management of priority ecosystem services.	Mitigation measures have been proposed in this Report to minimize probable impacts of this project on biodiversity, including water resources so that their ability to provide ecosystem services to people are not compromised.
OS 4: Pollution prevention and control, hazardous materials and resource efficiency	Pollution	Manage and reduce pollution in AfDB funded projects. It covers a range of key impacts including pollution, waste, and hazardous materials for which there are agreed international conventions, as well as comprehensive industry specific and regional standards, to be followed to safeguard the environment and humans from being polluted as a result of the development activities	The project proponent and contractor will set up a waste management plan to handle liquid and solid wastes, including those of hazardous nature.
OS 5: Labour conditions, health and safety	Labour conditions,	Protection of workers' rights and provision of their basic needs. It establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation of the labourers	The project will abide by the labour laws to protect the interests of workers. This will include for example: providing contracts to all hired workers, providing workers with personal protective equipment, setting up a grievance handling mechanism (Annex VI) to enable workers express their complaints, among others.
Performance Standards			
PS1: Social & environmental assessment and management systems		It establishes the importance of: (i) integrated assessment to identify the	An ESIA has been carried out. Potential impacts of the project have been identified and their mitigation measures proposed.

	environmental and social impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) the client's management of environmental and social performance throughout the life of the project.	Stakeholder involvement was a major component of the ESIA.
PS 2: Labour and working conditions	This performance standard is concerned with management of labour risks such as lack of contracts, insufficient wages, exploitation of minors, discriminatory hiring, unsafe and unhygienic living conditions, internal grievance handling, excessive over-time and handling of casual labourers.	A grievance handling mechanism will be put in place where workers can lodge their complaints. The project will employ workers following the relevant labour laws of Uganda.
PS3: Resource efficiency and pollution prevention	Requires project to efficiently use resources and to minimize or avoid pollution to the environment	The Developer shall ensure that pollution control measures are in place and only the required resources are utilized.
PS4: Community health, safety and security	This performance standard looks at aspects that can expose the public to accidents, excessive noise, traffic congestion, diseases, insecurity, among others	An ESMMP has been put in place detailing the management of impacts related to community health, safety and security.
PS5: Land acquisition and involuntary resettlement	Establishes requirements for efficient and timely compensation and/resettlement of project affected persons	All the required for project activities will be obtained following the laws of Uganda, and all people whose land is affected will be compensated prior to the start of project activities
PS6: Biodiversity conservation and sustainable management of living natural resources.	Requires that projects put up necessary measures to conserve biodiversity and natural habitats	An ESMMP has been put in place with measures to ensure biodiversity is not adversely impacted by the implementation of the project.
PS7: Indigenous peoples	Promotes the protection of indigenous people	No indigenous peoples as defined under this standard are considered to be resident in the project area.
PS8: Cultural heritage	Requires that all resources of cultural importance are identified and protected	No cultural resources were identified during this assessment. However, any cultural resource that may be identified at any stage of project operation will be protected and relocated according to the established laws of Uganda. A chance finds procedure (Annex V) will guide handling and management of any PCRs that may be found during civil/earth works.

3 DESCRIPTION OF PROPOSED PROJECT

3.1 Introduction

The proposed Barr RGC Water Supply System feasibility assessments opted for drilling of boreholes as intake in Abolet B village and Itek villages for supply of water to Barr RGC in Barr Sub County over the design horizon of 22 years with the initial year being 2024 and the ultimate year 2046. The project is envisaged to implement the following main components within the Area:

- i. Raw water intake and pump stations at Abolet B and Itek villages, in Barr RGC, Barr sub county.
- ii. The water supply system will have two transmission systems mainly Pumping from the borehole **DWD79455** to the storage reservoir and Pumping transmission main from **DWD79457** to the storage reservoir.
- iii. The required design storage capacity is therefore 83m³. The reservoir will be elevated on a 10m high stub walls.

3.2 Location of Project Site

The Two proposed motorized boreholes are located in Itek village and Abolet B villages in Itek parish. The locations of the RGC that will constitute the project area lie in Barr Sub- County though due to recent administrative changes, the sub county is now Itek in Lira District. The Sub- County is situated about 17Km to the east of Lira City and is one of the nine sub-counties that make up Lira district and its about 389 km from Kampala City along the Lira-Kotido Road east of the country. It is bordered by Alebtong district to the north and east, Lira city to the west, Amach subcounty to the south. The sub-county is composed of nine parishes with a total of 74 villages. The coordinates of project area are, 504407.54m E, 248566.50 N.

Barr sub-county came into existence way back in the 1930s and was recognized as an administrative unit where by all policy matters and decisions concerning the sub-county and the district were taken from the central government. However, with the decentralization policy of the NRM government in the 1990s, the sub-county started operating autonomously as an administrative unit. It is categorized as a sub-county according to the urban administrative classification in Uganda and accommodates the headquarters of the sub-county administration. The overall administration is in the office of the Senior Assistant Secretary while the Local Council III office in the sub-county provides the political back-up support with the highest political authority. The LCIII Chairperson is responsible for policy formulation with input from the 7 ward/parish councillors. There are 7 wards (Parishes) Ayam, Alebere, Onywako, Olilo, Ayira and Ober in the sub-county comprising of seventy four LCI (Villages). The sub-county has six core technical departments namely; administration, finance and planning, public health, and environment, works and engineering, audit, community based services. The chief administrative officer provides an oversight supervision based on the Local government Act 1997 and Finance and Accounting regulations 2007.

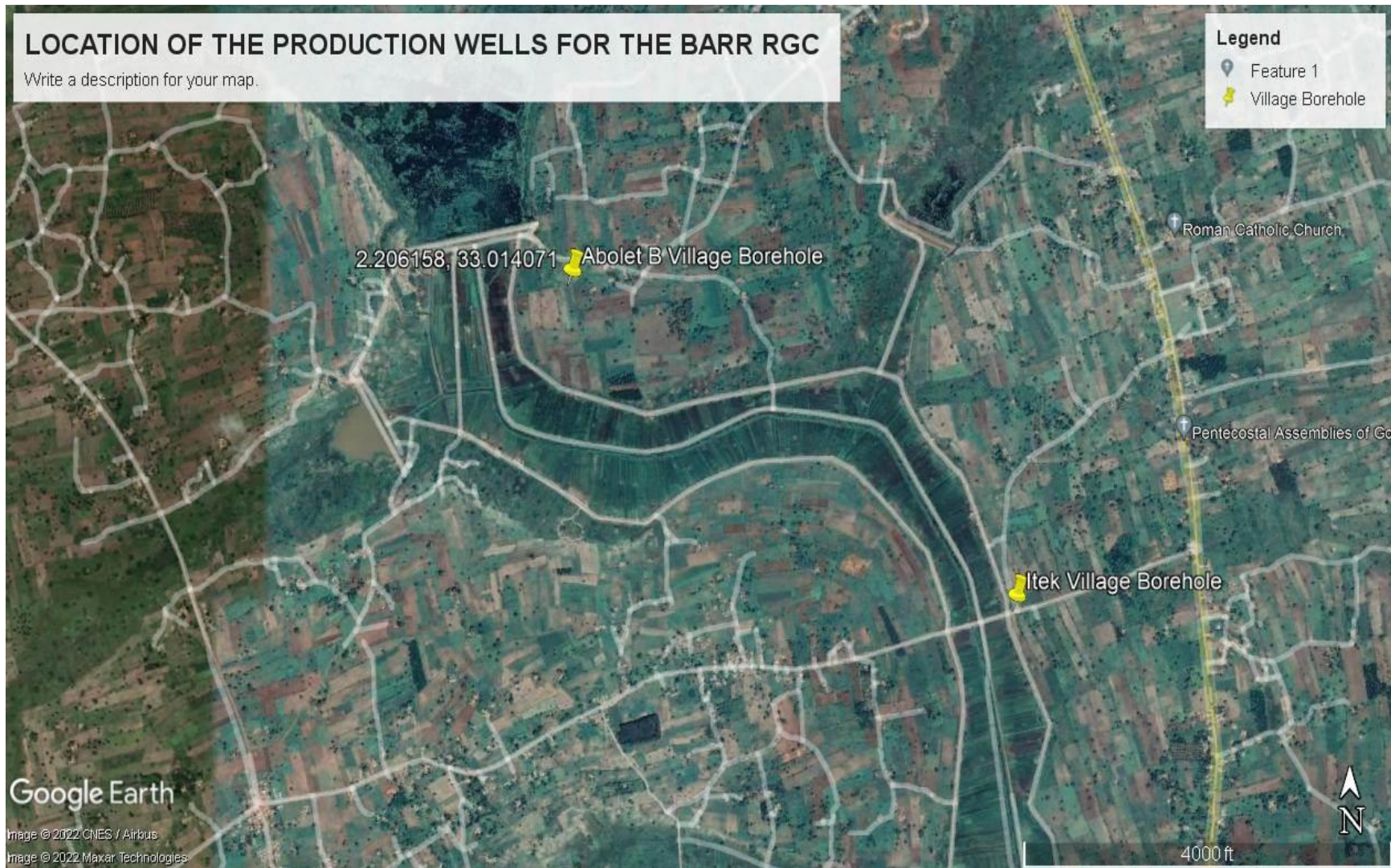


Figure 2: Google Map of Barr RGC showing the proposed project area and proposed location of the system components

3.3 Description of the main project components

3.3.1 Water Source/Intake Infrastructure

The pumps for the production wells and size of the pumping main were designed using Hazen-Williams Formula and a spread sheet was used to design the main requirements in the design year 2046. The Two proposed motorized boreholes, **DWD79455 (Lat 2.206158; Long 33.014071)** and **DWD79457 (Lat 2.197317; Long 33.027308)** are located in **Abolet B Village** and **Itek Village** respectively as potential sources of water for the proposed Water Supply System. These boreholes were drilled under another arrangement and therefore, the proposed project will involve construction (motorizing them) for purposes of extending water to the project area. These production wells will be configured as follows;

- ❖ Flow of 4.6m³/h at 187m head for newly drilled well DWD79455; borehole riser pipe of OD50 HDPE PN20, 87m long; and pumping main of OD50 HDPE PN10, 3300m long up to a sump to be located at the DWD 79457 well site.
- ❖ Flow of 4.0m³/h at 113m head for newly drilled well DWD79457; borehole riser pipe of OD50 HDPE PN16, 100m long; and pumping main of OD50 HDPE PN10, 20m long up to a sump located within the well site.

The borehole pump house will be the standard 3.5m X 3.0m floor area pump house with a semi-detached office/store room giving a total floor area of 7.2m X 3.0m. The pump house will contain the associated pipework, fittings and electrical switch gear. The pump houses should have the following characteristics

- The pump houses are to be made in block work.
- The pump houses and all necessary auxiliary facilities are envisaged to fit on a size of land of about 81m².
- Fencing in chain link of about 60m with 1No. double leaf access gate

Table 8: Raw Water Pumping Main Details

Borehole Number	DWD79455 Abolet B Village	DWD79457 Itek Village
Borehole Yield to be Used (m³/hr)	4.60	4.0
Hours of Pumping (hr)	16.0	4.00
Efficiency Pump (%)	60.0%	16.0
Efficiency Motor (%)	80.0%	60.0%
Total Daily Delivery (m ³ /day)	74	80.0%
Pumping Main Section No. 01 (From Pump Installation Point to Ground Level at Borehole)		
Ground Level at Borehole (m AMSL)	1055.100	1065.600
Pump Installation Depth in Borehole (m BGL)	87.000	100.000
Cwh	140	140
Pipe Details	OD50 HDPE PN20	OD50 HDPE PN16
Pipe Diameter ND (mm)	38.80	40.80
Pipe Diameter ND (m)	0.039	0.041
Flow in Pipe (m ³ /hr)	4.600	4.000
Flow in Pipe (m ³ /s)	0.001	0.001
Velocity (m/s)	1.08	0.85
Length of Pipe Section No. 01 (m)	87	110
Friction Loss (m)	3.22	2.46
Fitting losses - 10% (m)	0.32	0.25
Total Headloss in Section 01 (m)	3.5	2.7
Pumping Main Section No. 02 (From Ground Level at Borehole to Ground Level at Reservoir)		
Ground Level at Sump (mAMSL)	1074.600	1074.600
Ground Level at Borehole (mAMSL)	1055.100	1065.600
Static Lift (m)	19.500	9.000

Cwh	140	140
Pipe Details	OD50 HDPE PN10	OD50 HDPE PN10
Pipe Diameter ND (mm)	44.00	44.00
Pipe Diameter ND (m)	0.044	0.044
Flow through pipe section 02 (m ³ /hr)	4.600	4.000
Flow through pipe section 02 (m ³ /s)	0.001	0.001
Velocity (m/s)	0.84	0.73
Chainage at Reservoir	3+300	0+020
Chainage at Borehole	0+000	0+000
Length of Pipe Section No. 02 (m)	3,300.00	20.00
Friction Loss (m)	66.24	0.31
Fittings losses - 10% (m)	6.62	0.03
Total Headloss in Section 02 (m)	73	0
Total Pumping Head from Borehole to Reservoir		
Total Static Head from Borehole Installation Point to Reservoir	107	109
Total Headloss from Borehole Installation Point to Reservoir	76	3
Total Pumping Head from Borehole to Reservoir	183	112
Source: Project estimates.		

The Pump details are as follow;

Table 9: Submersible Pump Details

Borehole Number	DWD79455 Abolet B Village	DWD79457 Itek Village
Head (m)	183	113
Flow (m ³ /hr)	4.6	4.0
Power (kW)	4.8	2.6
Source: Project estimates.		



Plate 1: The Itek Village Borehole (DWD 79457) in Itek Parish, Itek Sub County.



Plate 2: The Abolet B village Borehole (DWD 79455) in Itek Parish, Itek Sub County

3.3.2 Sump and Pump House

The sump and pump station will be located at the DWD79457 BH site in Abolet LC. A 30m³ sump capable of storing 3.5hrs of water will be constructed as a single unit with the pump house housing the high-lift pumps and electrical switch gear. Two pumps will be installed, to operate on a duty/standby schedule. These will be electric pumps with the following main parameters:

Table 10: Summary of the sump and Pump House

Booster Pumps	Flow (m³/hr)	Head (m)
2No. each	8.6	140

Source: Project Estimates

3.3.3 Sump Transmission Mains

A OD75mm HDPE PN16, 3900m long will be used to deliver water to the Barr tank. The transmission main was also designed using Hazen-Williams Formula with the summary of the details shown in the table below

Table 11: Sump Transmission Mains

Parameter	Transmission Main
Total Amount of Water in Sump (m³/day)	137.60
Hours of Pumping (hr)	16
Efficiency (%)	60.0%
Required Delivery (m ³ /hr)	8.60
Required Delivery (m ³ /s)	0.0024
Pump Installation Level (m amsl)	1065.000
Inlet Level (m amsl)	1134.860
Static Lift (m)	69.9
Hazen Williams Coefficient, C _{wh} (C)	140
Pipe Details	OD75 HDPE PN16
Pipe Diameter ND (mm)	61.40
Pipe Diameter ND (m)	0.061
Velocity (m/s)	0.807
Flow in Pipe (m ³ /s)	0.0024
Length of Pipe (m)	3900
Friction Loss (m)	49.2
Fittings losses - 10% (m)	4.9
Total Friction Loss (m)	49.2
Total Head (m)	124.0
Head Used (m)	124
Power (kW)	4.8

Parameter	Transmission Main
Source: Project Estimates	

The transmission mains as seen from the table above has capacity to deliver 70% extra of the total maximum day demand when pumping at a 16hr pumping regime. This gives some flexibility such that in the event that other wells are drilled, water will be delivered to the sump only and the same pipeline will be used to deliver water to the tank. What will only change, is the pump head.

3.3.4 Energy and Power Provision Costs

The power supply option to the borehole and sump is by use of mainly HEP from the national grid. However, if production costs are to be reduced, then solar power other than Generator power is to be utilised as the main source with HEP as a backup option. The generator option cannot be used due to the following factors attributed to the use of them to run the systems.

- Fuel costs required to pump water over a 16hrs pumping regime throughout the day;
- From the environmental view, the use of Generators would lead to increased pollution of the environment due to carbon emission;
- High costs incurred in paying for carbon credit;
- Vandalization of other alternative options to the power supply such as solar in order to create the need to utilise the generator. This would give an opportunity to get some finance in disguise of purchasing fuel to run the generator.

The power requirements of the pumps have been calculated using the formula seen in the table below.

Table 12: Pump Power Requirement Equation

$P = [\rho \times g \times h \times Q / 3600] / (e1 \times e2)$	
Where;	
P is required input power (Watts)	
ρ is water density (kg/m ³)	= 1000
g is gravity constant (m/s ²)	= 9.81
h is pump head (m)	
Q is pump capacity (m ³ /hr)	
e1 is efficiency of pump	= taken from selected pump details
e2 is efficiency of pump motor	= taken from selected pump details

The pump power requirement and associated investment and O&M costs is summarized in the tables below

Table 13: Power Requirements

Location	Head (m)	Flow (m ³ /hr)	Power (kW)	Qty	Required Motor Size KW	Available Motor (kW)	duty	Total power (KV A)	Amperage (A)	Starting KVA
DWD79455	183	4.6	4.8	1	5.5	6.0	1	7.50	10.43	8.00
DWD79457	112	4.0	2.5	1	2.9	3.0	1	3.75	5.22	4.00
Sump Pump	124	8.6	4.8	2	5.6	6.0	1	7.50	10.43	8.00
Total										

Table 14: Solar Power Components

Location	Solar Panels No. (1x280pW)	Solar Panels area (m2)
DWD79455	26	42.90
DWD79457	13	21.45
Surface Pumps	26	42.90
Source: Project Estimates		

The power requirement for the boreholes includes the supply and installation of a total of 66No. mono crystalline PV Solar panels rated at 280pW 12 Volts DC, including: PV solar panel support

structure (solar array) for mounting solar panels; all electrical accessories; complete as per specifications, the extension of three (3) phase HEP power lines of total length of 0.4km including the supply and installation of a 2No. 25kVA oil filled transformers to the 2 wells.

3.3.5 Power Consumption Configuration

Since 16hrs pumping is required to meet the demand in the intermediate year (2031), Hydro Electric Power has been considered into the design in order to meet necessary power requirements. This has been done due to the limitation of solar working hours considered at 6hrs maximum per day for design purposes. The energy cost has been optimised by taking into the account the power requirements to meet the demand at the intermediate year (2036) and at the ultimate year. (2046). As for the intermediate year, the HEP shall be used for 10hrs which takes the total pumping hours to 16hrs and then between the intermediate year to the ultimate year, the system runs on HEP for the extra pumping regime adopted. Through this, the energy cost for running the system is optimised without compromising pumping delivery to the tank.

3.3.6 Disinfection Facilities

The chemical storage, mixing and dosing will be performed at the sump or DWD79457 borehole site in an elevated separate room constructed together with the sump. A set of two DOSATRON inline proportional chemical dozers shall be used to dose chlorine solution from the mixing tanks directly into the sump through the sump roof by use of a OD30mm plastic pipe.

3.3.7 Storage Reservoir

The required storage capacity has been computed as 30% of the maximum day demand. The required storage capacities for the system is 61m³. However, the consultant has adopted an 83m³ tank due to the fact that a 61m³ tank does not exist in the market.

It is recommended to place the pressed steel tanks on a 10m high steel tower due to the topography of the project area and the low pressures experienced in the far reaches of the distribution network. The reservoir's storage capacity at various stages of the design period is reflected in the table below.

Table 15: Reservoir Storage Capacity

Item	Storage					
	2021	2026	2031	2036	2041	2046
MD Demand- m ³ /day	99	114	132	152	176	202
Storage Capacity (m ³)	83	83	83	83	83	83
Hours of Storage	20	17	15	13	11	10
Storage Capacity (%)	84%	73%	63%	55%	47%	41%
Source: Project Estimates						

The reservoir will be made of square cold pressed steel panels of length 1.22m. The reservoir shall be provided with inlet, overflow, outlet, and drain pipe work. The following fittings shall also be provided for the reservoir;

- a) Internal ladder of galvanised steel,
- b) Wall mounted level indicator,
- c) Vents on the tank roof,
- d) Roof level access cover of galvanised steel.

The access covers shall be at least 100 mm above the finished level of the roof and shall be lockable. The roof vents shall be similarly set out and shall be fitted with vermin proofing and mosquito proofing fabric. The overall internal dimensions of the reservoir (83m³) are as follows: -

- Length - 4.88m,
- Width - 4.88m,
- Depth - 3.66m.

The pipe work (rated PN10) of the reservoir shall be in Epoxy Coated Steel Pipe work as follows;

- Inlet - DN 65,
- Outlet - DN 100,
- Overflow - DN 100,
- Drain - DN 50.



Plate 3: The proposed site for the Reservoir near the Barr Sub County Headquarters

3.3.8 Main Reservoir and Sump Site Works

The site works at the reservoir consists of the following:

- a) The general earthworks,
- b) The site pipe work,
- c) The site drainage,
- d) Miscellaneous works.

The outlet from the main reservoir shall be fitted with new bulk flow meters

3.3.9 Distribution Network

The downstream of the distribution systems reservoir has been modelled using EPANET 2.0. A peak hour factor of 2.0 was used. Due to the topography being flat, in some pipe sections the flow velocities lower than 0.6m/s have been considered to achieve the recommended residual pressures.

The network was designed for those areas with defined access roads but the possibility of extending it was catered for as the project area is expected to expand. Consequently, the smallest size of pipe chosen is OD 50 HDPE. Pipes smaller than OD50, will be laid as Network Intensification lines.

Table below shows the estimated sizes and length of the distribution networks while the figure below shows the Epanet Model.

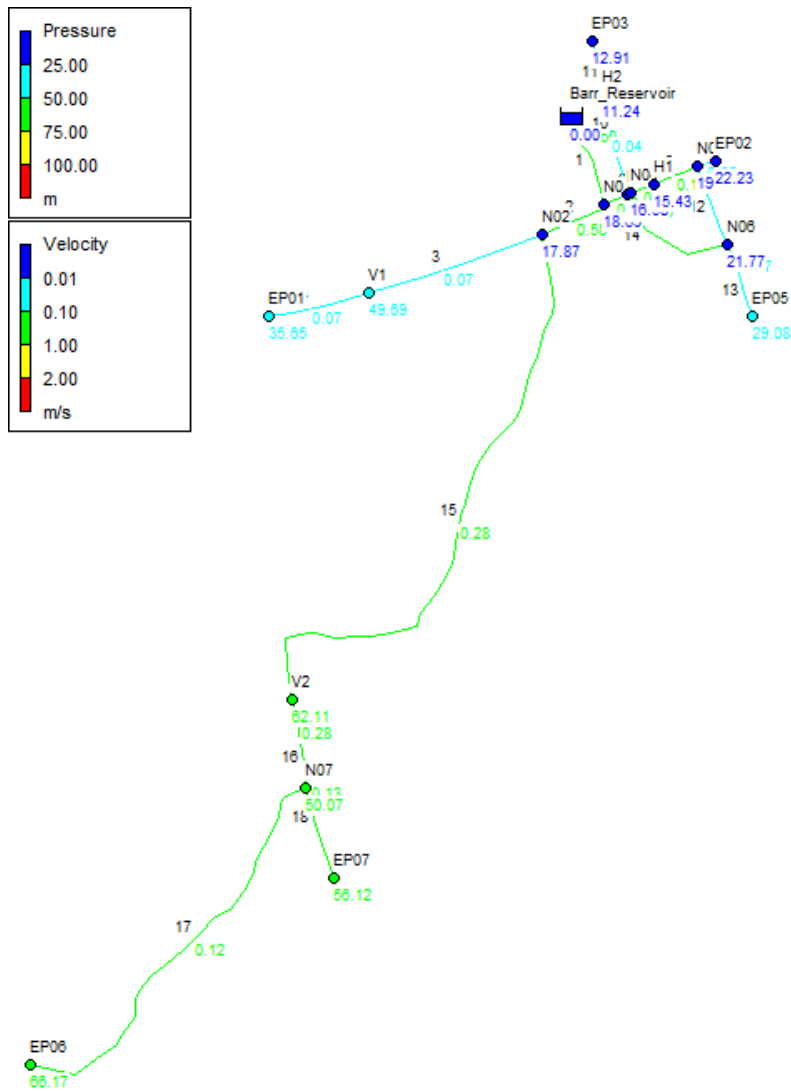


Figure 3: Distribution Network Model

Table 16: Distribution Mains

No.	Pipe Material	Length (m)
1	OD110uPVC PN10	500
2	OD75 HDPE PN10	5,400
3	OD63 HDPE PN10	2,173
4	OD50 HDPE PN10	4,269
Total		12,342

Source: Project Estimates

3.3.10 Service Connections

The location of the service pipes will not be known until applications for connections are received. At this stage, only an estimate of the sizes, quantities and costs can be given. On the basis of the population to be served at the tariff of UGX 50/20 litres for the project area, the total number of connections required in the ultimate 2046 has been estimated as in the table below. The criteria used to determine the number of service connections for each served population category is as follows.

Table 17: Population per Category Criteria

Category	Population Served	Source of Criteria
House Connection	5 persons per household	Socio-Economic Study Data

Yard Taps	2 Households per yard tap	Project Estimates
Standpipes	150 persons Per Standpipe	Maximum Number- DWD Water Manual 2013
Urban Poor	150 persons per Standpipe	Standpipe coverage

The required number of service connections is given in the table below.

Table 18: Required Service Connections

Year	House Conn	Yard Tap	Stand Pipe	Total
2026	12	1	18	31
2031	14	1	21	36
2036	16	1	24	41
2041	18	2	28	48
2046	21	2	32	55
Total	81	7	123	211

A total of 211no. service connections which only comprise of yard taps and stand posts are to be made in the ultimate year 2046 as seen in the table above while a total of 31 will be made in the initial year 2026. However according the consultant has is considered a total of 130no. connections which are to take into account the un-expected increase in the demand for connections during implementation as is the norm and these have been catered for in the bills of quantities. It has been assumed that the connection materials will be supplied by the project on the payment of the connection fees. The number and location of the public stand posts will be determined during the construction period.

3.3.11 Air Valves

Air valves have been allowed for at all high points at significant changes in downward slope. Even in flat areas an air valve at every 600 m to 1000m is necessary as air bubbles form as water pressures fall. The following factors have been considered;

- To help prevent the formation of air pockets, minimum slopes are 0.3% for DN ≤ 200 mm and 0.2% for DN > 200 mm.
- Air valves are required to vent any air bubbles that are conveyed or formed in the water as the development of air pockets at high points can greatly reduce or even stop the flow of water.
- They are also required to vent large quantities of air when pipelines are filled and as noted above to help deal with the problems associated with surge.
- Suitably sized air valves will be located at upturned tees at all high points fitted with an isolating valve.
- The air valve tee is designed as an air accumulator tee with the initial tee branch 0.6 times the main pipe diameter

3.3.12 Washouts

Washouts are required at low points so as to be able to periodically flush out the pipeline to help remove any matter that tends to accumulate at such points.

3.3.13 Network Intensification

There are some parts of the proposed water supply areas where the trunk mains are adequate but the mains are too far away for the customers to be able to connect at reasonable cost. As a measure to increase the densification of the distribution networks as a drive to increase the customer base, and allow a neater layout of the service connection pipes, some pipe work intensification will be required. The intensification lines will be demand-driven, and installed where there are adequate applications for connections. Estimated quantities for this item have thus been included in the Bills of Quantities to cater for this.

3.3.14 Pump Attendants Houses

A single roomed 3.0m X 3.0m floor area pump attendant and guard house with a drainable VIP toilet will be constructed at each of the borehole sites.

3.3.15 Water Office Building

An office block as proposed in the initial report to be constructed in Barr trading centre to house the staff responsible for the operation and maintenance of the system will be maintained.

3.3.16 O&M Tools and Equipment

Part of the investment will be used to supply new O & M tools and equipment. Equipment will be supplied for running the water supply system and as well as equipping the water office. These will include;

- i) Plumbing Tools and Equipment,
- ii) Mechanical Tools and Equipment,
- iii) Chemical Equipment and Chemicals.

The O&M will be undertaken by the operator who will charge a reasonable fee for this purpose. This fee has not been established at this stage of the project since the MWE/WSDF-N will hand over to the Operator preferably the Umbrella.

3.4 Project Phases

3.4.1 Mobilization Phase

This phase will involve mobilisation of the construction human resource, equipment, construction materials, erection of temporary worker's camp and storage yard. The location of the project temporary camp will be agreed upon with the local leadership, landowners and contractors or its sub-contractors. The Contractor will temporarily acquire land and therefore, the necessary agreements will be prepared including any compensation for temporary loss of use, or degradation of the land between the land lord and the contractor.

3.4.2 Construction Phase

Upon completion of preliminary activities and onsite investigations, actual construction of the project components and facilities will start which will involve:

- setting out to demarcate rights of way, work areas, clearing limits. Access paths, detours, bypasses and protective fences or barricades should all be in place before construction begins.
- Excavation of trenches for water pipe transmission and distribution;
- Trench sheeting and bracing to protect collapsible trench side walls;
- Placing concrete to bases of foundations;
- laying of main water pipes;
- Backfilling, disposal of overburden and surface restoration to at least match the condition that existed prior to the water works construction.

All project activities under this phase are supposed to be carried within the boundaries of the identified project sites without disturbing or obstructing the people from carrying out their activities. To ensure this, the contractors and the sub-contractors will seal off the different site perimeters (where necessary) with corrugated iron sheets or other suitable material during project implementation. In case of trenches, proper barricade have like warning tapes to be applied to warn and protect the people of impending dangers of falling into open pits and trenches. Open trenches should not be kept open for a long period without covering them to avoid accidents of the local community members and animals falling into them.

3.4.3 Demobilization Phase

Demobilisation phase will involve clearing of the project sites of all construction and unwanted material. The disposal of any unwanted material will be done by the contractor. The waste materials may include packaging, wood, steel crates, cardboard, wrapping materials, construction debris, boxes, sacks, drums, cans and chemical containers, etc. Damaged areas will need to be restored before commissioning the project. Upon completion of the contractor's obligations, the contractor will hand over the project to MWE, WSDF-N the client and the Operator.

A site restoration and rehabilitation plan which spells out the areas that must be rehabilitated to their natural state, describe the procedures that should be followed for soil stabilization and planting provide a framework for monitoring and reporting on the success of the rehabilitation and assign roles responsibilities to the different parties will be required and prepared and implemented by the contractor as part of the defect liability period.

3.4.4 Operation Phase

This will involve employment of operators both skilled and unskilled, operation of the water supply system and sanitation facilities, maintenance of the facilities put in place, etc. Implementation of the water source protection measures as outlined in the water source protection plan will continue

during the operation phase of the project. There will be continuous ground water monitoring in relation to the conditions of the abstraction permits so that the permitted abstraction yields are not exceeded. The Operator will continue to undertake the O&M and the intensification of the water supply.

4 ESIA METHODOLOGY

4.1 Introduction

This section outlines the methodology that was used to assess the environmental baseline and to identify, predict and assess the environmental impacts of the project on each relevant environmental component. It also covers the methodology for the identification of mitigation and monitoring measures that were recommended to address these impacts and identification of relevant stakeholders. The methodology consists of a review of Uganda's institutional arrangements, regulations and policies. Environmental impacts of the proposed project were predicted in relation to environmental receptors and natural resources while comparing prevailing pre-project conditions and post-project situations.

The requirement for environmental impact assessment in Uganda is set out by the *National Environment Act No. 5 of 2019* and the *Environmental and Social Impact Assessment Regulations of 2020*. This process was guided by the Environmental Impact Assessment (EIA) Guidelines (NEMA, 1997) and the process is schematically presented in Figure 4. In addition, safeguards implementation has to comply with the requirements of investment project financing and the World Bank Group Environmental, Health, and Safety (EHS) Guidelines for general Construction and Decommissioning as well as the EHS guideline for Water and Sanitation.

4.2 Impact Assessment Approach

The significance of environmental and social impacts was established based on the comparison with the baseline situations in the project area. Generally, the environmental and social impact study involved various methods including:

- Review of relevant literature and secondary baseline data on legislation, policies and guidelines, bio-physical environment, including among others, area land use, sensitive receptor systems and ecology likely to be affected.
- Field studies included flora and fauna species counts, receptor systems baseline data including baseline noise and air quality measurements. Water quality analysis was done at pre-determined locations to set an environmental baseline and establish status;
- An inventory of activities in the neighbourhood likely to be affected by proposed project;
- Safety and health impacts on workers during construction and operation, protection from injury and adequacy of sanitation provisions for the workers;
- Consultations with stakeholders, including the regulatory agencies, and the local community;
- Study and analysis of engineering designs and drawings for civil solutions to be implemented by the developer, including safety measures;
- Prediction and analysis of environmental and social impacts resulting from the project activities such as water abstraction, pump house, distribution lines, reservoir tanks, water offices, sanitation facilities etc., and proposing appropriate mitigation measures, and preparation of an Environment Management Plan (EMP) for implementation by relevant stakeholders;
- Preparation of E&S Scoping report/Terms of Reference Report and ESIA Report and presentation to NEMA by the developer for review and approval.

Figure 4 shows the ESIA process that has been followed.

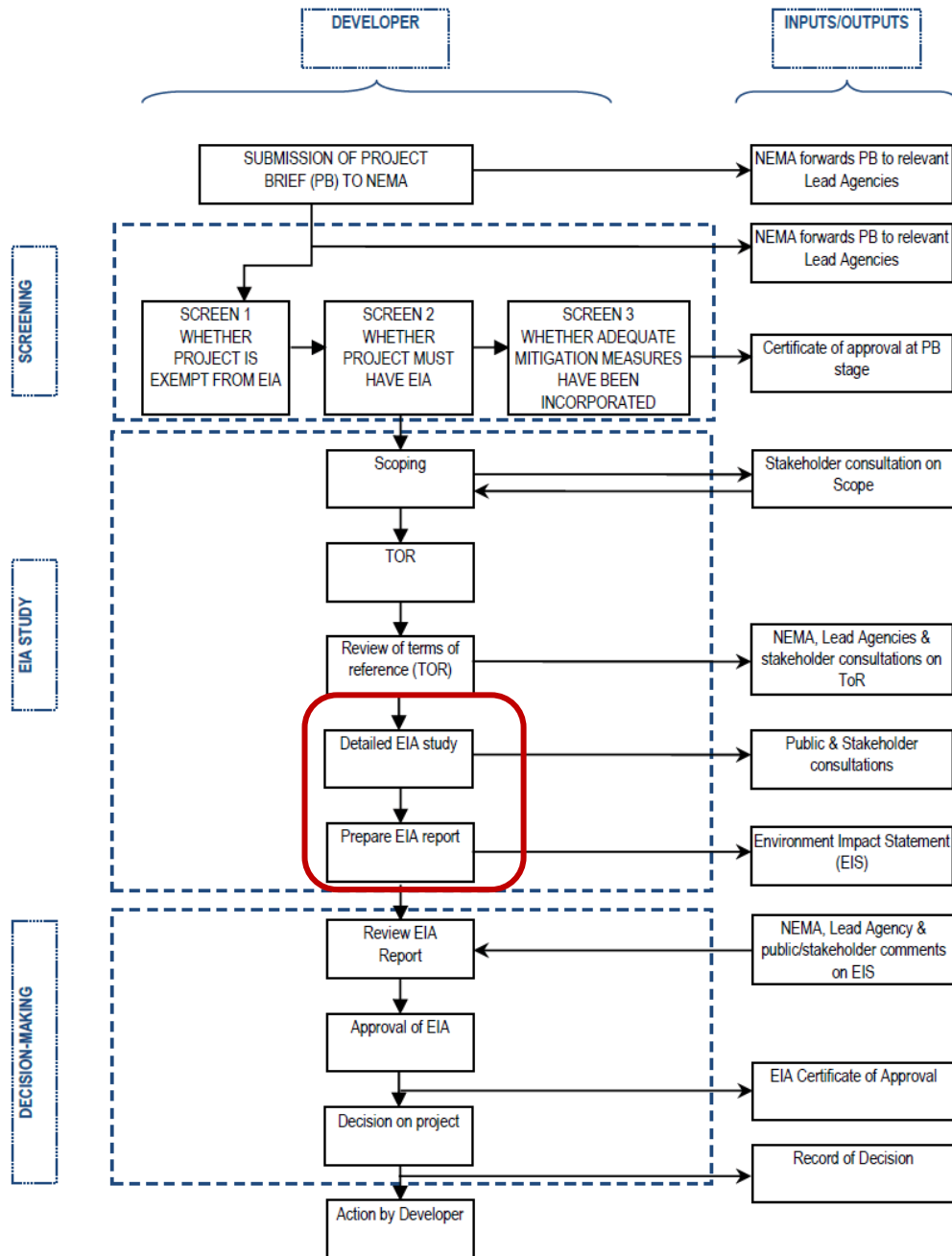


Figure 4: ESIA process that was adopted as provided for under the Laws of Uganda

4.3 Physical Environment

Baseline noise levels and air quality were measured, not only to inform construction contractors about pre-construction conditions existing at proposed sites, but also the first annual environmental audit. These were determined through the following actions:

4.3.1 Land Surface and Visual Impact Assessments

Under the land surface investigations, the character and resources of the landscape, including effects on the aesthetic values of the landscape, caused by changes in the elements, characteristics, character and qualities of the landscape was investigated. The visual amenity, including effects upon potential viewers and viewing groups caused by change in the appearance of the landscape as a result of the development, was also considered.

The landscape and visual impact assessment methodology is applicable, both to the assessment of short-term impacts during the construction of the Project, and to the long term impacts once completed. The landscape character and resources are considered to be of importance in their own right, and valued for their intrinsic qualities regardless of whether they are seen by people or not. Impacts on landscape are therefore considered as distinct from impacts on visual amenity as perceived by people. For purposes of clarity, Landscape Impacts relate to the effects of the Project on the physical and other characteristics like fabric, character and quality of the existing landscape, whereas Visual Impacts relate to the effects on views from visual receptors (e.g. residents, workers, visitors to the area, etc.) at specific viewpoint locations. The key steps of the methodology for the assessment were as follows:

- The project study area was determined using maps and aerial photos data and field observation.
- Local landscape character areas within the study area were identified.
- The sensitivity of each landscape and potential visual impact was assessed.

The magnitude of change in the character of each landscape character area and the magnitude of change in the view at each viewpoint location was predicted.

4.3.2 Air Quality measurements

Baseline air quality was measured using a pair of digital MX6 iBrid™ portable gas meters (Industrial Scientific-Oldham) and a Microdust 880nm digital aerosol monitor (Casella®). Measurement points or locations were selected basing on presence of potential receptors (such as construction sites for the pumpstation, sanitation facilities etc.) and an averaging period of 8 hours was used. For gaseous emissions.

- The equipment was powered on and left in measuring mode for the first two minutes to allow zeroing and self-calibration. This was followed by ten minutes of measurement to allow digital readings to stabilize before they could be recorded.
- Measurements were conducted at each of the selected points to determine whether there would be any gaseous emissions detected.
- Values for Lower Explosive Limit (LEL), Carbon monoxide (CO), Oxygen (O₂), Hydrogen sulphide, H₂S, volatile organic compounds (VOCs) will be noted.

For particulate matter.

- The equipment was allowed for two minutes for zeroing down and thereafter, it captured the samples for five minutes with interval of 10 seconds.

For every sampled point, a GPS coordinate was noted.

4.3.3 Ambient Noise Measurements

Baseline noise measurements were undertaken at locations around the proposed facility sites (i.e. at production well and construction site for the pumpstation) with potential receptors. Measurement of ambient noise levels were carried out using a precision integrating sound level meter, with an active range of 0-130 decibels (dB) and complying with IEC 651 and ANSI S4 standards. A Casella CEL-621C digital noise logger will set to record for a sample period of 10 minutes at each of the selected locations. The assessment procedure involved recording the LA_{MAX} and LA_{MIN} decibel levels. Measurement points were recorded using a GPS receiver and the noise sources together with the ambient environment at each location noted. The obtained results have been compared against the National Environment (Noise Standards and Control) Regulations, 2003. The regulations require that persons to be exposed to occupational noise exceeding 85 dBA for eight hours in a day should be provided with requisite hearing protection.

4.4 Biological Environment

4.4.1 Flora

Transect walks were taken along the proposed project area, with emphasis around the specific areas of proposed infrastructure facilities development, with the aim of observing and recording vegetation types or any plant species listed on the IUCN list (2015).

4.4.2 Fauna

- *Birds* -Point count surveys were performed to detect and record Bird species occurrences. Great emphasis was placed on identification of species of conservation importance as per Stevenson and Fanshawe (2002).
- *Butterflies* - Random sweeping using sweep net was done (Biodiversity Rapid Assessment) and it involved a transect walk through the areas recording all butterfly species encountered on wings. Sample specimens were to be taken for most of the species, except for those whose identification could be easily confirmed in the field. Opportunistic observations were included to help build the species list. Each of the butterfly species was to be assigned to one of the ecological categories (Akite, 2008).
- *Herpetiles* - Both reptiles and amphibians were surveyed using Visual Encounter Survey (VES) method (Rodda *et al.*, 2007). Visual Encounter Surveys were conducted by observation while walking through a designated area for a prescribed period of time, visually searching systematically along transects for animals. VES involved a search on the ground, trees and grasslands. Herpetiles were surveyed during the day from 08:00 am to 07:30 pm (Spawls *et al.*, 2006). Some of the equipment that was used include: GPS, camera and snake stick.

4.5 Socio-Economic Environment

A detailed social impact assessment and evaluation of the positive and negative, direct and indirect, immediate and long term, and permanent and temporary impacts due to the construction and operation of the water supply facilities and associated works was carried out. An assessment of the impacts identified in either qualitative or quantitative terms, according to their inherent nature and the availability of adequate data to enable predictive analysis was undertaken. Specific activities undertaken included:

- a) Land use in site zone of influence: Types of land use were established from observation and consultation with Local/district Planning Authorities on existing land use.
- b) Existing infrastructure (water, sanitation, power, telephone): Their presence was established by observation and consultation with relevant utility companies. Potential impact of line during construction on any such existing facilities has been predicted.
- c) Settlement patterns including induced unplanned development: Population numbers, characteristics and dynamics were analyzed to predict potential induced developments.
- d) Circulation patterns (people and livestock): These were established by observation with the aim of identifying any potential severance of access when existing paths get blocked by construction works.
- e) Social cohesion was established from community consultations and literature review to predict any disruption of social ties during or after project construction.
- f) Population demographics: Population numbers, education levels, age, gender disparities, access to factors of production, disease burden, income sources and expenditure were established from a social survey and consultations.
- g) Community structure: were established from observation, surveys and community consultation.
- h) Employment characteristics: were established from social surveys, consultations and review of existing local and national census or labour reports/surveys undertaken by Uganda Bureau of Statistics (UBOS)
- i) Local economy and income distribution: were determined through a socio-economic survey by a socio-economist, observation and interviews.
- j) Social services: Presence or lack and efficacy of existing services were determined through a socio-economic survey, observations and community consultations.
- k) Sociologist established any unique ethnic or tribal customs, traditions/ethos and values which might be affected by the construction works in the project area, we looked out for known sites of significant historic, cultural merit (locally, regional or internationally). A "chance finds procedure" has been prepared.
- l) Public health: Potential public health and occupational Health & Safety (OHS) impacts during construction were outlined. Measures to manage dust plumes from excavations, construction; noise levels from construction equipment during construction were developed. Other impacts established included risk of exposure to hazardous substances without adequate protection (skin contact); disease vectors, machine-related accidents and inadequate sanitation, HIV/AIDS.

- m) Gender analysis: was carried out to identify potential gender impacts. The SWOT tool was applied during community consultations to reveal expected opportunities that can be evaluated.

4.6 Impact Assessment and Evaluation Method

The purpose of this section is to predict and make an assessment of the impacts on the environment that may potentially arise as a result of the implementation of the proposed project. An assessment of these impacts was made on the basis of information gathered during the environmental baseline study of the project area, which included several field visits to the project sites/area and its surroundings, as well as a desk study of relevant existing documents and information pertaining to the project and information describing the nature and design of the proposed project. From this, mitigation measures have been drawn up to be recommended for incorporation into the design and implementation of the project so as to minimize, compensate for or avoid the occurrence of anticipated potential impacts.

The potential positive and negative impacts were discussed below in terms of the various environmental components. The potential impacts that could occur during the construction and operation phases are categorized and assessed as follows:

- i. Type of impact – whether direct or indirect;
- ii. Status/Direction Positive or negative;
- iii. Duration - Temporary (1 year), short term (1-3 years), medium term (3 -5 years) long term (> 5 years - L) or permanent;
- iv. Intensity/Magnitude - Low, medium or Major;
- v. Extent: within limited area (1km radius from site), local (up to 5 km) or wide (> 5km radius, district wide, regional or global)
- vi. Probability of occurrence: Low (25%), Medium (25-75%) or High (>75%); and
- vii. Overall Assessment- Negligible, Minor, Medium or Severe/Significant

Based on the project details and the baseline environmental status, potential impacts as a result of the construction, operation and decommissioning of the proposed project were identified. We therefore propose an impacts analysis criteria that takes into account the magnitude or intensity of impacts based on project activities and sensitivities to receptors in the project areas that were identified in the environmental and social baseline.

Table 19: Impact Assessment and Evaluation

Criteria	Description
Type of Impact	<ul style="list-style-type: none"> ▪ Direct - An impact that appears immediately as a result of an activity of the project. For example, the loss of vegetation is a direct impact of site clearing. The direct impacts would be experienced mainly during the construction process, and include effects on the physical environment, health and safety of the construction workers. ▪ Indirect - An impact that is related to the project but that arises from an activity of the project at a secondary level. For example, the demand for supplies and services may cause indirect impacts on the local economy by increasing indirect employment opportunities.
Status	<ul style="list-style-type: none"> ▪ Positive ▪ Negative
Duration	<p>The lifetime of the impact; this is measured in the context of the life-time of the proposed development. Whether the Impact will be:</p> <ul style="list-style-type: none"> ▪ Intermittent – not occurring at all times. ▪ Temporary-only for a short period. ▪ Short term - the impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase. ▪ Medium term - the impact will last for the period of the construction phase, thereafter it will be entirely negated. ▪ Long term - the impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter ▪ Permanent
Intensity	Whether or not the intensity (magnitude) of the impact would be high, medium, low or negligible (no impact). An attempt to quantify the impacts on components of the

	<p>affected environment to be described whether destructive to alter its functioning or harmless:</p> <ul style="list-style-type: none"> ▪ Negligible ▪ Low - where impact alters the affected environment in such a way that natural processes of functions are not affected in any significant way. ▪ Moderate - where the affected environment is altered, however, function and process continue, albeit in a modified manner. ▪ High - where function or process of the environment is seriously altered and disturbed to the extent where it temporarily or permanently ceases.
Spatial Extent	<p>The physical and spatial size of the impact; a description of whether the impact would occur on a scale described as follows:</p> <ul style="list-style-type: none"> ▪ Site - whether the impact will be within limited locale of the project site / study area affecting the whole or measurable portion of the area. ▪ Local - whether the impact will affect the environment or communities along the border of the study area or in the extended area adjacent to the site or perhaps outside the immediate environment. ▪ Regional - whether the impact extends beyond the study area affecting areas on a regional scale.
Likelihood	<p>The probability or likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The probability that a certain impact will in fact realize:</p> <ul style="list-style-type: none"> ▪ Uncertain - insufficient information to determine its probability. Because the precautionary principle is followed, this increases the significance of the impact. ▪ Improbable - the impact is unlikely to occur. ▪ Probable - the impact could possibly happen, and mitigation planning should be undertaken. ▪ Highly probable - it is most likely that the impact will occur at some or other stage of the development. ▪ Certain - the impact will take place regardless of any prevention plans, and only mitigatory actions can be relied on to contain the effect.
Sensitivity	<ul style="list-style-type: none"> ▪ Degree of change effected on natural processes or people's livelihoods; the sensitivity of the receptor of the impact to change ▪ Very low ▪ Low ▪ Moderate ▪ High

Table 18 below presents a quantitative format for ranking impacts based on parameters above, summarised as magnitude and sensitivity.

Table 20: Quantitative rating of impacts

Significance			Sensitivity			
			Very low	Low	Medium	High
			1	2	3	4
Magnitude	Very low	1	1 Negligible	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Moderate
	High	4	4 Minor	8 Moderate	12 Moderate	16 Severe

Table 19 below presents the overall impact rating criteria, with illustrations of such impacts.

Table 21: Overall Impact Rating and Description

Overall Impact Rating	Description of Impact	Significance
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Severe	<ul style="list-style-type: none"> ▪ Non-compliance with national policy, environmental laws and regulations; WB Safeguards Policies and International Treaties on Environment ▪ Highly noticeable, irreparable effect upon the environment and the people ▪ Significant, widespread and permanent loss of resources and livelihoods ▪ Major contribution to a known global environmental problem with demonstrable effects ▪ Causing mortality to individuals of a species classified as globally or regionally endangered ▪ Major exceedance of water/air quality and noise standard quantities representing threat to human health in long and short term ▪ Causing widespread nuisance both on and off site ▪ Extensive property damage or loss, ▪ Widespread effects on livelihoods. 	>12
Moderate	<ul style="list-style-type: none"> ▪ Frequent breaches of national regulations, WB Safeguards Policies and International Agreements and Treaties including water/air quality and noise guidelines, wetlands and river banks regulations causing localised nuisance both on and off site ▪ Noticeable effects on the environment and the population, reversible over the long term ▪ Localised degradation of resources restricting potential for further usage ▪ Sub-lethal effects upon a globally or regionally endangered species with no effect on reproductive fitness and/or resulting in disruption/disturbance to normal behaviour but returning to normal in the medium term ▪ Elevated contribution to global air pollution problem partly due to preventable releases ▪ Unplanned immigration flows ▪ Increased traffic in sensitive environments ▪ Increased serious crime rates ▪ Widespread physical resettlement, affecting livelihoods 	6 – 12
Minor	<ul style="list-style-type: none"> ▪ Noticeable effects on the environment and the population, but returning naturally to original state in the medium term ▪ Slight local degradation of resources but not jeopardising usage ▪ Disruption to normal behaviour of a globally or regionally endangered species returning to normal in the short term ▪ Small contribution to global air problem through unavoidable releases ▪ Elevation in ambient water/air pollutant levels greater than 50% of guidelines ▪ Infrequent localised nuisance ▪ Population increase not expected to stress existing infrastructure 	2 – 4
Negligible	<ul style="list-style-type: none"> ▪ No noticeable or limited local effect upon the environment and the population, rapidly returning to original state by natural action ▪ Unlikely to affect resources to noticeable degree ▪ No noticeable effects on globally or regionally endangered species ▪ No significant contribution to global air pollution problem ▪ Minor elevation in ambient air pollutant levels below guidelines ▪ No reported nuisance effects. ▪ Temporary or intermittent changes to livelihoods or life quality aspects 	< 2

4.7 Identifying Mitigation Measures and ESMP Preparation

The ESIA team identified and described in detail possible mitigation measures considering all the project implementation phases. Measures and actions to address negative impacts favor avoidance and prevention over minimization, mitigation or compensation. Measures proposed are in compliance with the Ugandan legislation and other development partners (such as African Development bank).

We would ensure that our outcomes are well defined and are measurable events with performance indicators, targets and acceptable criteria that can be tracked over defined periods, with estimates

of the resources (including human resource and training requirements) and responsibilities for implementation.

The ESMP format is flexible to ensure the integration of project specific mitigating, enhancing and monitoring requirements. The ESMP's scope and level of details are proportional to the number and complexity of the measures required to ensure the project's environmental and social sustainability. The following components constitute the minimal contents of an ESMP:

- a) *Objectives of the ESMP* - This section specifies that the ESMP aims to bring the project into compliance with applicable national environmental and social legal requirements and the Bank's safeguards policies and procedures. The other objective of the ESMP is to outline the mitigating/ enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts. It shall also address capacity building requirements.
- b) *Context the ESMP* - briefly describes project activities and major environmental and social components that are likely to be affected positively or negatively by the project. It describes and analyze the physical, biological and human conditions prevailing in the project area, highlighting relevant environmental and social issues among others.
- c) *Beneficial and Adverse Impacts* - This section focuses on beneficial impacts that can be enhanced to improve the project environmental and social performance as well as on adverse impacts that require mitigation measures to be minimized or compensated.
- d) *Enhancement/Mitigation Measures and Complementary Initiatives* - This section proposes feasible and cost effective measures to address the impacts previously defined, in order to accrue project benefits through enhancement measures or to reduce potentially adverse environmental and social impacts to acceptable levels (mitigation measures).
- e) *Environmental and Social Monitoring Program* - A monitoring program aims to ensure that mitigation and enhancement measures are implemented, that they generate intended results and that they are modified, ceased or replaced when inappropriate.
- f) *Consultations* - The implementation and monitoring of some mitigation or enhancement measures may require that consultative mechanisms be used. In such cases, the ESMP first identifies for which measures consultations would be undertaken as well as the goals and expected outcomes of these consultations. Then the ESMP specifies the target groups, appropriate consultative processes, consultation frequency, reporting methods and result disclosure procedures.
- g) *Responsibilities and Institutional Arrangements* - The implementation of enhancement and mitigation measures and the completion of the monitoring program require to clearly establish responsibilities among the various organizations involved in project implementation and operation. The ESMP proposes support to the organizations that may have insufficient capacities to fulfill their obligations. This support could be provided through various means including technical assistance, training and/or procurement.
- h) *Estimated Cost* - This section estimates the capital and recurrent cost associated with the various proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements. The cost of each mitigation and enhancement measure shall be estimated, including the cost for environmental and social capacity building.
- i) *Implementation Results Schedule and Reporting* - The ESMP includes a results matrix, an implementation schedule taking into account all activities related to the proposed measures (enhancement and mitigation), the monitoring program, consultations, complementary initiatives and institutional arrangements.
- j) *Conclusion* - The conclusion summarizes the main expected environmental and social impacts and mitigation and enhancement measures that would ensure that the project meets the Bank's safeguards requirements. It also specifies the environmental and/or social loan conditions or covenants that are part of the project loan agreements.
- k) *References and Contacts* - The documents consulted to prepare the ESMP are listed. In addition, the persons to contact for comments or further information shall be mentioned in the ESMP.

4.8 Identifying Monitoring Measures & Monitoring Plan

Monitoring planning includes baseline monitoring, impact monitoring and compliance monitoring. Monitoring points, measures, frequency, cost, reporting format, responsible agency and implementation agency would be identified. Monitoring measures proposed are in compliance with the Government of Uganda legislation and Safeguard Policies of the AfDB. The table below provides a summary template for Monitoring Requirements.

Table 22: Summary Template for Monitoring Requirements

Phasing	Mitigation Measure	Parameters to be Monitored	Location	Measurements	Frequency	Responsibilities	Cost
Pre-Construction Phase							
Construction Phase							
Operation and Maintenance Phase							

A monitoring program aims at ensuring that mitigation and enhancement measures are implemented, that they generate intended results and that they are modified, ceased or replaced when inappropriate. Further, it allows assessing compliance with national environmental and social policies and standards. A monitoring program shall include two parts:

- a) *Surveillance activities* - The surveillance aims to ensure that the proposed mitigation and enhancement measures are effectively implemented during the construction phase.
- b) *Monitoring activities* - These activities consist in measuring and evaluating the project impacts on some environmental and social components of concern and to implement remedial measures, if necessary.

The program defines as clearly as possible the indicators to be used to monitor the mitigation and enhancement measures that need to be assessed during project implementation and/or operation. The monitoring program would also provide technical details on monitoring activities such as methods to be used, sampling locations, frequency of measurements, detection limits, and definition of thresholds that will signal the need for corrective actions. The process for establishing a monitoring programme would consist of the following actions:

- Specific management and monitoring objectives;
- Identification of the scope of monitoring;
- Recommend appropriate monitoring environmental and social aspects and technology;
- Specify how the information collected should be used in decision-making;
- Define the spatial boundaries and select map scales and sites for observation, measurement or sampling;
- Select key indicators for direct measurement, observation or sampling;
- Define how the data will be analysed and interpreted and how it should be presented in monitoring reports;
- Define the precision and accuracy required in the data;
- Consider compatibility of data to be collected with historical data and with related contemporary data;
- Set minimum requirements for monitoring.

5 DESCRIPTION OF THE ENVIRONMENT AND BASELINE CONDITIONS

5.1 Project location

The Two proposed motorized boreholes are located in Itek village and Abolet B villages in Itek parish. The locations of the RGC that will constitute the project area lie in Barr Sub- County though due to recent administrative changes, the sub county is now Itek in Lira District. The Sub- County is situated about 17Km to the east of Lira City and is one of the nine sub-counties that make up Lira district and its about 389 km from Kampala City along the Lira-Kotido Road east of the country. It is bordered by Alebtong district to the north and east, Lira city to the west, Amach subcounty to the south. The sub-county is composed of nine parishes with a total of 74 villages. The coordinates of project area are, 504407.54m E, 248566.50 N.

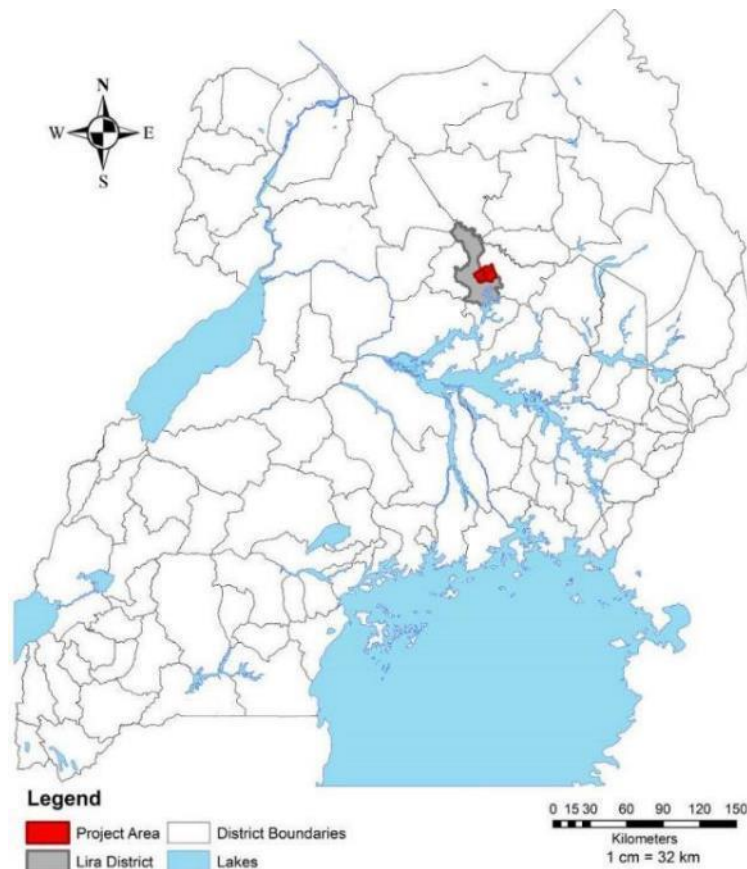


Figure 5: Map showing the location of the project area in relation to the location of the district

5.2 Physical environment

5.2.1 Topography

The topography of Lira contains only modest variations in elevation, with a maximum elevation change of 61 meters and an average elevation above sea level of 1,091 meters. Within 16 kilometers contains only modest variations in elevation (187 meters). Within 80 kilometers contains large variations in elevation (525 meters).



Plate 4: Topographical view of the project area

5.2.2 Climate

The climate of Lira district is influenced by the Inter-Tropical Convergence Zone (ITCZ) and by the large swamp area surrounding the southern part of the district. As described in a study undertaken by DWRM in 2007 (unpublished report, cited in DWRM, 2012), Lira district lies within an area that receives an average annual rainfall of between 1000 mm to 1500 mm. Although the rainfall pattern shows a bimodal distribution, it has a single rainy season extending from April to November but broken in June and July with a short dry season. Peak rainfall occurs in August to October and a secondary peak in April/May.

a) Sun

The length of the day in Pader does not vary substantially over the course of the year, staying within 15 minutes of 12 hours throughout. In 2021, the shortest day is December 21, with 12 hours, 00 minutes of daylight; the longest day is June 21, with 12 hours, 15 minutes of daylight as seen in the figure below.

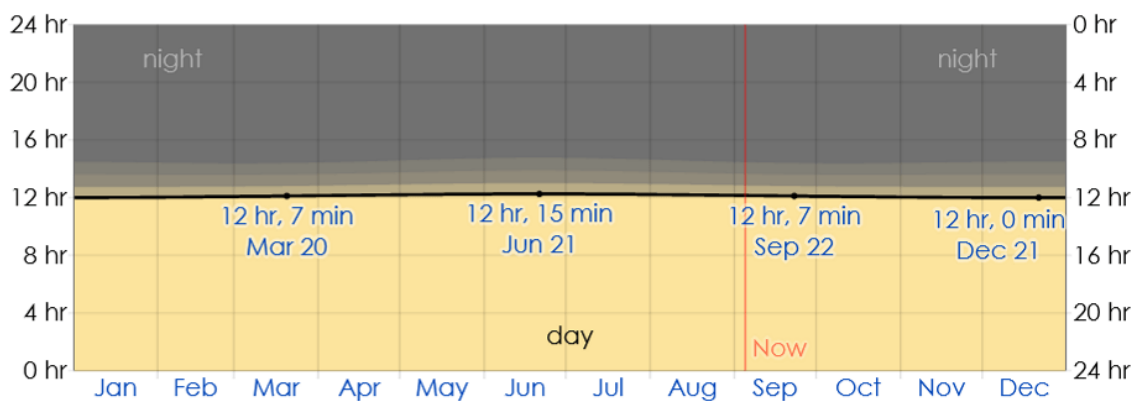


Figure 6: Hours of Daylight and Twilight

The earliest sunrise is on October 28, and the latest sunrise is on February 7. The earliest sunset is on November 6, and the latest sunset is on February 15 as seen in the figure below

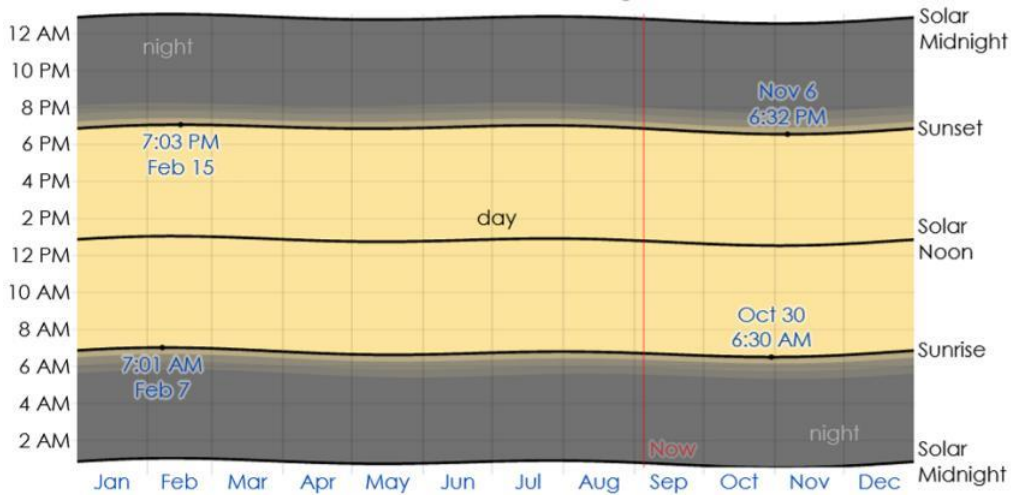


Figure 7: Sunrise and Sunset with Twilight

The solar day over the course of the year 2021. From bottom to top, the black lines are the previous solar midnight, sunrise, solar noon, sunset, and the next solar midnight. The day, twilights (civil, nautical, and astronomical), and night are indicated by the colour bands from yellow to grey.

b) Humidity

Lira experiences significant seasonal variation in the perceived humidity. The muggier period of the year lasts for 8 months, from March 21 to November 20, during which time the comfort level is muggy, oppressive, or miserable at least 16% of the time. The muggiest month of the year is May, with muggy conditions 59% of the time. The least muggy month of the year is January, with muggy conditions 1% of the time as seen in the figure below

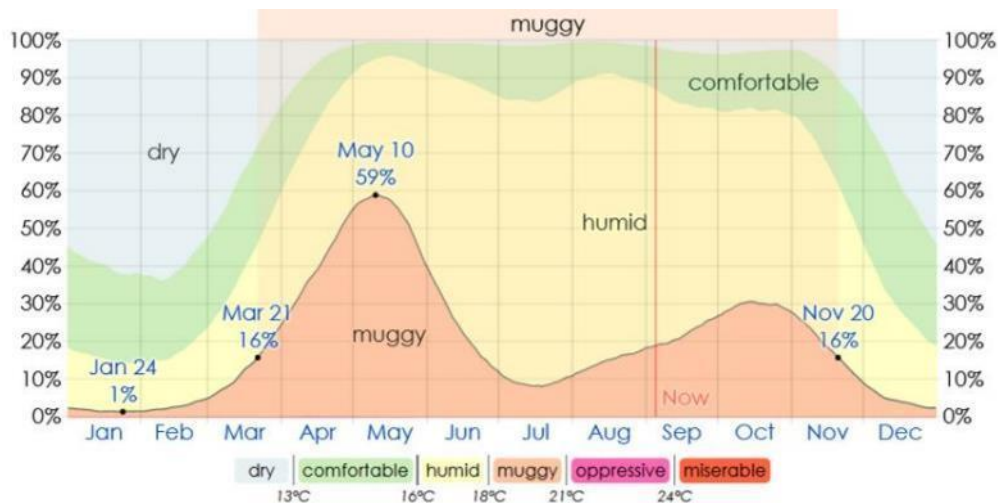


Figure 8: Humidity for Lira

c) Solar Energy

The average daily incident shortwave solar energy experiences some seasonal variation over the course of the year. The brighter period of the year lasts for 2.3 months, from January 13 to March 23, with an average daily incident shortwave energy per square meter above 6.6 kWh. The brightest day of the year is February 28, with an average of 6.9 kWh. The darker period of the year lasts for 3.4 months, from April 30 to August 9, with an average daily incident shortwave energy per square meter below 5.5 kWh. The darkest day of the year is June 22 with an average of 5.2 kWh. The Figure below best illustrates the solar energy trend in the district.

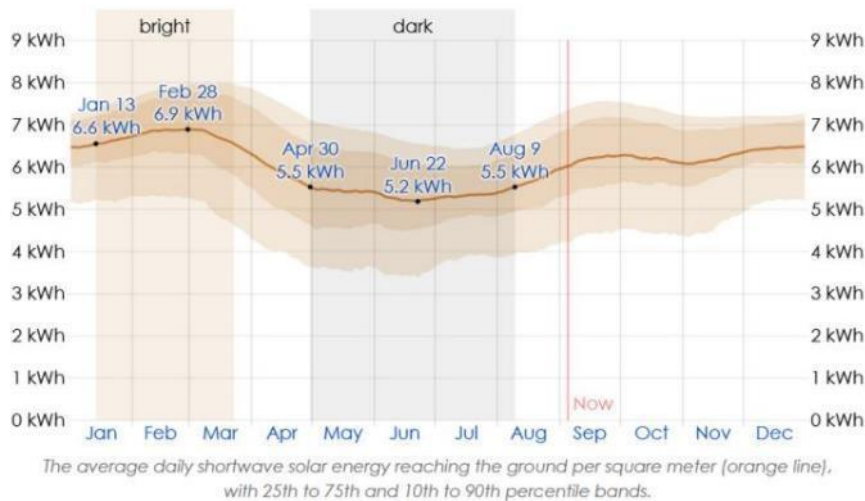


Figure 9: Average Incident Shortwave Solar Energy for Lira

5.2.3 Water Resources

Boreholes are the most common form of groundwater in Barr Sub County. There are also wetlands and swamps within the project area. They support livelihoods of local communities. Many boreholes have been protected to provide water for the rural communities. Critical assessment of the geology and hydrogeology of the region shows that springs are the most feasible groundwater sources for sub counties' water supply.

Very few boreholes have been drilled in the project area by previous projects and organizations. From the analysis of the available data base, all the boreholes in the area were either low yielding or dry, an indication of a low ground water potential. The highest yield of 3.5 m³/h was reported at Ober Primary School, some 4km towards Lira Municipality from the core of the RGC.

The Akworo and Agwok streams are permanent and all flow into the Agulutwo dam. Ajekere and Okalereng wetland feeds into the Abolet dam. These make the Agulutwo and Abolet dams reasonably good potential candidates as a source of water for the Barr RGC. The contributing catchments of Abolet and Agulutwo dams are 47.3 km² and 29.8 km² respectively. The relative Barr RGC water demand is relatively small; and provided that the capacity of the dams exceeds 50,000 cubic meters, and the consumptive water demand placed on the dams rarely cause a drawdown exceeding 50%, we are led to conclude that from the consideration of water availability, any of these two dams can easily provide water in sufficient quantities to meet the Barr RGC water demands.

5.2.4 Drainage and Hydrology of Barr RGC.

The project area generally stands at a low slope gradient running into seasonal swamps which form water collection points. Ground water has been tapped mainly in form of boreholes. The project area has a number of dams constructed by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) to support the local communities for irrigation scheming. However, most of these dams have been neglected and are currently used as fishing grounds.



Plate 5: Itek Dam-1 about 200m from the Abolet B Production well.

5.2.5 Geology and Soils

The geology of the area mainly consists of crystalline rocks of the Precambrian basement complex system. The rocks are described mainly as the undifferentiated gneisses including elements of partly granitised and metamorphosed formations.

The soils are generally sandy clay and some loam soils in some parts with average fertility suitable for crop farming. The vegetation is combretum savannah, associated with hypermedia. This type of vegetation covers about half of the sub-county. The soils of Barr sub-county are mainly sandy loam. The main types of this soil are ferrallitic sandy sediments and alluvial deposits rendering the area relatively fertile allowing extensive growing of cassava and maize, millet Pease etc. The sub-county is endowed with both human and natural resources in terms of able manpower, forest, livestock, markets, etc. natural and planted vegetation on average covers a total land area of about 20 hectares.



Plate 6: Examples of the soils within the project area of Barr RGC

5.2.6 Climate Change

Lira experiences extreme seasonal variations in monthly rainfall, falling throughout the year in the district. The rainy period of the year lasts for 11 months, from February 4 to January 11, with a sliding 31-day rainfall of at least 13mm. The most rain falls during the 31 days centred around May 7 with an average total accumulation of 118mm. The least rain falls around January 22, with an average total accumulation of 12mm,

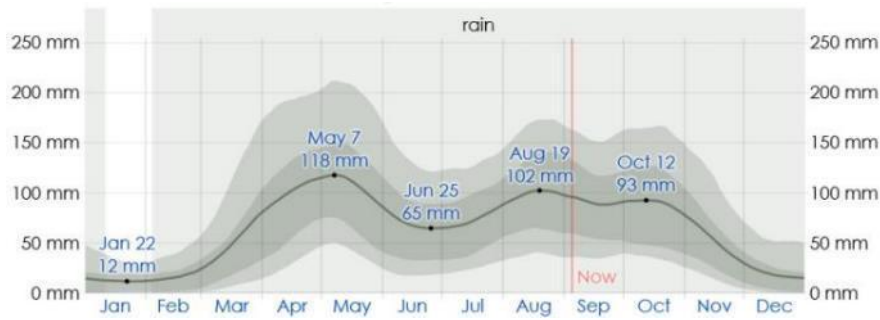


Figure 10: Average Monthly Rainfall for Lira District

The annual mean average temperature in Lira is 34°C with the lowest being 18°C as shown in the figure below.

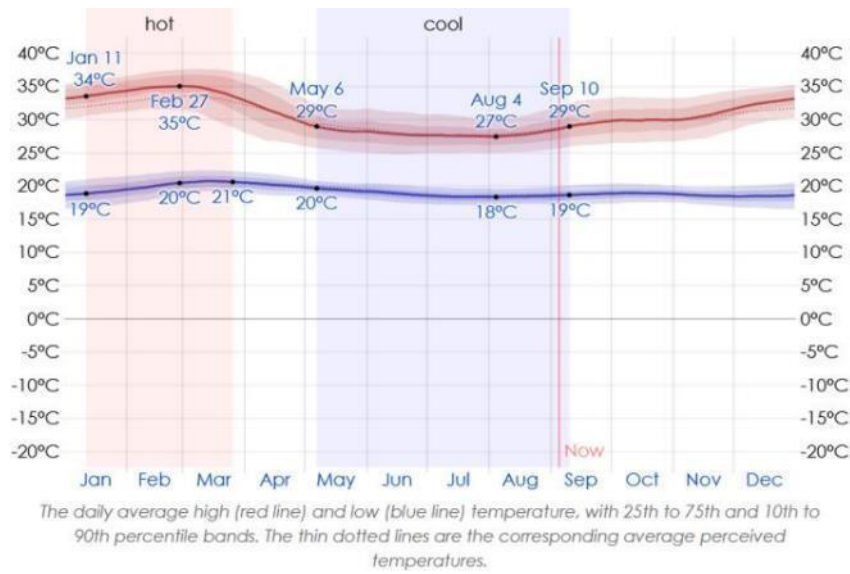


Figure 11: Average High and Low Temperatures for Lira District

5.2.7 Noise Levels

There are no cases of noise pollution at the proposed project location sites. Thus, the project sites indicate a generally pristine environment with respect to ambient noise. However, as would be expected due to the increased human activities and construction activities noise levels are likely to increase. The levels are based on land use Category D (Residential plus Industry or small-scale production and commerce) for which daytime and night limits are 60 and 50 dBA, respectively according to The National Environment (Noise Standards and Control) Regulations 2003.

Table 23: Noise levels measured at the proposed project sites.

Project Component	Latitude	Longitude	LA _{min} dB	LA _{max} dB	LA _{Eq} dB	Comments (source of the noise and background noise)
Abolet B Borehole site	2.206158	33.014071	37	70	48	Twittering birds, Swishing tree leaves and consultants' conversations
Itek Borehole site	2.197317	33.027308	34	76	46	Twittering birds, Swishing tree leaves and consultants' conversations

Reservoir site near the S/C	2.248805	33.039334	33	80	51	Twittering birds, Swishing tree leaves, consultants' conversations and pedestrians' conversation
Office site (near S/C offices)	2.248805	33.039334	33	80	51	Swishing tree leaves, twittering birds and human conversations

5.2.8 Air Quality

Proposed project sites currently have no ongoing activities that contribute to air emissions thus an indication of a free environment (generally pristine environment) from key air pollutants such as CO_x and NO_x. The proposed pumpstations or abstraction points can be easily accessed by a foot path, however now a road infrastructure will be graded to open up access to the lake by vehicle.

Table 24: Results of air quality measurements taken in the project area

Project Component	Latitude	Longitude	Particulates (µg/m ³)			CO ₂ (%)	Comments
			Pm2.5	Pm10	Particles (per/l)		
Abolet B Borehole site	2.206158	33.014071	6.9	9.3	489	Preheating	Distant vehicular movement
Itek Borehole site	2.197317	33.027308	6.7	9.2	486	Preheating	Distant vehicular movement
Reservoir site near the S/C	2.248805	33.039334	7.0	9.0	480	Preheating	Dust elevated by wind
Office site (near S/C offices)	2.248805	33.039334	6.8	9.2	481	Preheating	Dust elevated by wind

Air quality measurements were taken after sunny day and at one of the corners of the site where air quality monitoring was conducted, Total Suspended Particles (TSP) levels conformed to the draft national limit of 300 µg/m³, concluding a clean environment with respect to air quality. Further still, at the location where measurements were made, gas monitoring equipment did not detect combustible gases, SO_x, VOCs, CO, H₂, NO_x, H₂S, and Cl.

5.3 Biological Environment

5.3.1 Flora

The original vegetation of the project area was intermediate savanna grassland with scattered trees, (Langlands 1974). Today the original vegetation of the project area has been destroyed in many places and replaced with exotic species of trees, shrubs and grasses like elephant grass for grazing livestock. However, remnants of the original natural vegetation are still evident by the presence of some trees and grass species.

The project area has a main vegetation type including moist thickets, woodland, moist acacia savanna, Moist Combretum Savanna, Butyrospermum Savanna, Palm Savanna, Dry Combretum Savanna, Communities on sites with impeded drainage and swamp. Observations indicate that due to increased urbanization and population growth particularly from the internally displaced people, most of the natural vegetation has been cleared for commercial, residential and agricultural activities.

The predominant species include Combretum savanna associated with Hyparrhenia spp. The other species include Butyrospermum savanna associated with Hyparrhenia spp within the project area, and interspersed with Combretum collinum (Luo-odugu) and piliostigma thonngii (Luo-ogali) in the

part of the project area. There is also dry Acacia savanna associated with Hyparrhenia spp in the part of the project area.



Plate 7: Examples of the moist thickets and savannah grassland within the project area.

Nearly all survey points along the BH sites, Main transmission line and distribution lines had trees and shrubs individuals in the emergent tree layers whose heights were over ranging between 2-8m for trees, especially the *Maesopsis eminij*, fruit trees such as *Mangifera indica*, *Persia americana* along access roads, where *Eucalyptus spp* were recorded. However, many plants in the shrub layer were between 1-2 m and those in the herbaceous and grass layers between 0-0.5 m. Generally, habitat modification within the project area was evident through small scale farmlands like that at bore hole site, settlement along the main distribution lines. *Lantana camara* was the most evident invasive species across all sample points

5.3.2 Fauna

There is no possibility of finding large mammals around the proposed site environment due to the fact that the land area is heavily modified by farming activities; with trees and fewer thickets, where birds were seen and heard in trees and shrubs. There could be some other wildlife species that could typically be found within the proposed project area.

An example of such would include snakes and rodents for instance, as they usually associate themselves with the current ecosystems and have been reported to be resident in some areas. No other wildlife species among global, regional or national threatened wildlife, endangered endemics, was identified in the area. These habitats provide favorable areas, with relatively few species.

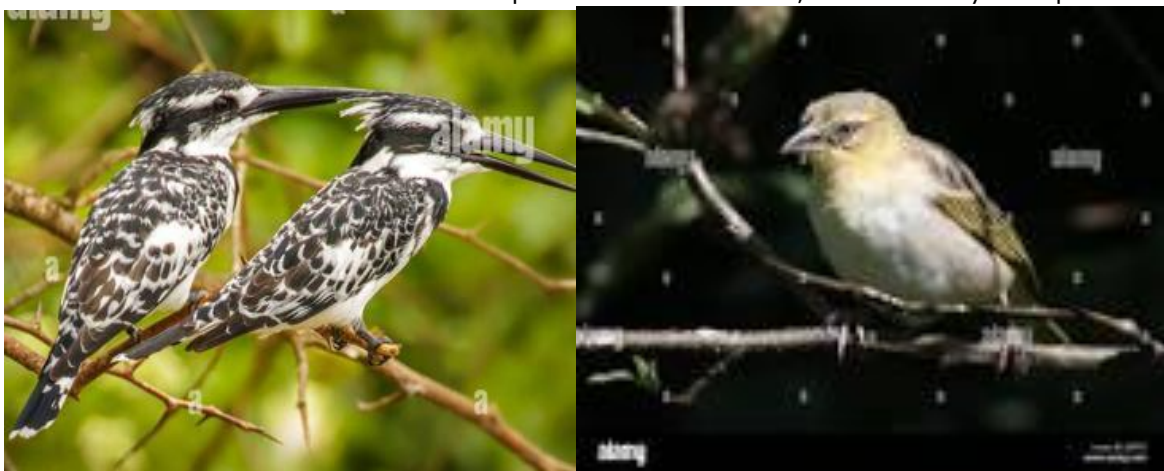


Plate 8: Some of the Birds found within the project area of Barr RGC

5.4 Socio-Economic Environment

5.4.1 Demography

A base year of 2013, Initial Year of 2014 and the intermediate year of 2024 and Ultimate year of 2034 were considered. The basic data for the domestic population are the UBOS Population and Housing Census 2014 figures. A population growth rate of 3.37% was used (for Lira District; UBOS 2014). It is expected that the institutional, Industrial and commercial activity will grow at the same rate as the domestic population.

During the Initial Year (2014) 3,705 people will be living in the project area, while in 2034, the population will have increased to 7,189 people as seen in the summary below

Table 25: Population Projection Summary

Sub-County	Parish	(Enumeration Area)	Population Projections					
			2013	2014	2019	2024	2029	2034
Barr	Ober	Corner Ober	116	119	141	166	196	232
		Parish Total	116	119	141	166	196	232
	Abunga	Aberamaido	31	32	38	45	53	62
		Parish Total	31	32	38	45	53	62
	Ayira	Barr TC	437	452	533	629	743	877
		Awebada	177	183	216	255	301	356
		Ayira	345	356	421	497	586	692
		Atyena Owe	459	474	560	661	780	920
		Apit Pe Nyek	207	214	253	298	352	415
		Ogena	40	41	48	57	68	80
		Olo Lango A	19	19	23	27	31	37
		Olo Lango B	374	386	456	538	635	750
		Akutu B	104	108	127	150	177	209
		Lwero A	631	652	770	909	1,073	1,266
		Ommara	355	367	433	511	603	711
		Obot Central	259	268	316	373	441	520
		Angucami	32	33	39	46	54	64
		Parish Total	3,438	3,554	4,194	4,950	5,842	6,895
		Barr RGC Total	3,584	3,705	4,373	5,161	6,091	7,189

Source: Field Visits and Project Estimates

5.4.2 Socio-economic Activities

The main economic activities include peasantry farming, with wide range of livestock rearing of pigs and cattle of local breed. There are no significant differences in economic activities among the parishes of the of Barr Sub-County. There is one daily central market controlled by vendors dealing in vegetables and other consumables where all road side vendors are located. The second market is a weekly market just above the subcounty headquarters where most of the people within and around the subcounty sell their merchandise every Tuesday as seen in the plate below.



Plate 9: Weekly Market above Subcounty Headquarters

Several households are fully involved in brewing of local potent varieties. The most grown crops are millet, rice, maize, sweet potatoes, soya beans, cassava, pigeon peas, sorghum and vegetable. Other activities include; 40 eating places, 15 salons, 1 micro finance, 4 garages, 64 shops involved in small scale trading in produce and merchandise (wholesale and retail shops), brick making and butcheries. The trading centre does not have any significant industrial activity except for the small-scale agro-industries in existence, carpentry workshops, grinding mills, and restaurants. Fishing is also common especially at the different Itek dams constructed by MAAIF within the region.



Plate 10: Fishing done on Itek Dam-1 within the project area

5.4.3 Sources of Energy

Barr RGC is connected to the national electricity grid as seen in the plate below. Other forms of power also used are Solar and Generators.



Plate 11: Transformer in Barr trading Centre

5.4.4 Land use

The major land use in the project area is subsistence agriculture in the fringes of the project area with the major crops being grown such as cotton, sim-sim, maize, millet, sugarcane, sorghum, upland rice, ground nuts, sweet potatoes, cassava, groundnuts, beans, peas, tobacco and sunflower among others.

5.4.5 Infrastructure

The project area is well covered with mobile telecommunication network services (AIRTEL, UTL and MTN). Various FM radios and Television stations are received as well in the area especially trading centres.

The project area is accessible by a network of Marrum roads through Lira-Abim Road while others can only be accessed by existing gravel and local footpaths. The main means of transport are pickups which connect to the neighbouring towns. Boda bodas on the other hand are most used mode of transport within the villages in the project area. The national electricity grid traverses the part of the project area with the trading Centre's connected through step down transformers. However, majority of households within the project area use solar system and tadooba. A tadooba is a small cheap paraffin lamp fashioned out of soldered tin cans and fitted with a wick, which is the principal source of domestic illumination in areas without connection to the electricity grid or access to where electricity grid exists. Charcoal and firewood remain the main source of fuel for households.



Plate 12: The dusty Lira-Abim Road through Barr Sub County

5.4.6 Health

Barr RGC has one Government Health Centre III (HCIII) located in Barr Town Council. However, because of the inadequate existing safe water source points to meet the needs of the community in the project area, It is evident that part of the population depends on the unsafe water sources like swamps thus pausing health hazard to the users in the area.

5.4.7 Water and Sanitation

According to the Socio-Economic survey conducted and as per the existing water supply system, Water is being pumped into the 2No. Plastic storage tanks, each of capacity of 10m³ at an elevation of about 6m.

- i) One borehole supplies the water system; The borehole is equipped with an electric submersible pump powered by solar mains power.
 - ii) Water is pumped from the borehole to the storage reservoirs through two DN40 GI transmission mains.
 - iii) No disinfection is done.
 - iv) The main storage reservoir for the area water supply is the two 10m³ each elevated PVC tanks on a 6m high tower, adjacent to the borehole source
 - v) The water distribution system consists of HDPE pipe work limited within 200m from the borehole and the water is dispensed only through the public stand posts as seen in
- The Socio-Economic Household Survey also investigated the sanitation situation in the project area and Key areas of interest were:
- Human excreta disposal facilities and practices.
 - Waste Water Disposal Practices in the town.
 - Hygienic practices such as hand washing, boiling of drinking water.

There is no centralized system of managing the sanitation in Barr RGC. There is no home/facility with water borne toilets. Therefore, all facilities and homes rely on non-water borne point source sanitation systems. There is only one public toilet in the RGC and is located at the Sub- County Headquarters.

The results of the household survey in Barr RGC indicated that 93% of the households use pit latrines. None of the sample households reported using a flush toilet connected to a septic tank and neither reported going to the bush or using a plastic bag/bucket for excreta disposal. Of the 94 households that use pit latrine, 30 households (20%) report they share the latrine with other households. The remainder, 80% have a pit latrine for exclusive use by their household members.

Over 70% of households have rammed earth floors for their latrines and similarly 17% of the public latrine users report the floors as earthed. On the ability to wash hands after visiting the toilet, 49% of the households reported being able to wash hands while 51% were unable. On the disposal of rubbish, 66% of the households reported disposing their rubbish in the open in the garden and only 0.5% reported pouring it in a pit within the compound to be burnt later.



Plate 13: One of the boreholes that supply water in the project area of Barr

5.4.8 Waste management

There are no designated solid waste management sites within the Project area of Barr RGC. However, at institutional level like schools, the current disposal sites are dumps located very close to their classrooms. This is an issue of public health concern especially during the wet season and since most of the solid waste may be combustible or recyclable, sorting of the waste at source is recommended in garbage bins at designated locations within the schools shall be made so as to aid in the collection and transportation to a burning or composting site.



Plate 14: Signs of poor solid waste management within the project area of Barr RGC (Barr Trading Centre)

5.4.9 Gender and vulnerable groups

Like any other part of Uganda, there are existing gender inequalities in the distribution and access to resources, and power dynamics in the project area of Barr RGC. Women are less educated and comparatively, they occupy far less and lower levels of responsibilities in the management of public affairs. During the implementation of the project, awareness creation and sensitization interventions shall deliberately include messages about gender equality and social inclusivity thereby addressing social impediments that limit the active participation of women in project management and implementation such as sexual and gender-based violence (SGBV) as well as violence against children (VAC).

Additionally, vulnerable segments of society such as the elderly, people with disabilities (PWDs), youths, orphans shall be targeted in line with the existing government interventions such as the Social Assistance Grants for Empowerment (SAGE) targeting the elderly, the Youth Livelihood Programme (YLP) targeting youths and the Uganda Women Empowerment Programme (UWEP) targeting women. Such on-going government interventions shall be promoted alongside those of the water project.

5.4.10 Religion and culture

The project area is made up of different ethnic groups with varying customs and norms. These play a major role in shaping the behaviours and ways of life of the people. The project district (Lira) and particular the Barr sub county is a home of different refugees from different countries like South Sudan, Sudan, and Somalia among others and all these with different ethnic groups and cultures. Some of the traditional values have changed due to the integration of the people as a result of migration and/or intermarriages. However, no cultural and/or historical sites were identified or reported by stakeholders within the project area. The project area also has a number of worship places like Pentecostal churches for Born again, Church of Uganda for Protestants, Catholic churches and Mosques for Muslims

5.4.11 General social challenges within the project areas

A number of people also reported that they walk for 1.5km - 3km, which is above the national standard of 1km. At household level, the average amount of water collected is estimated at 4-5 jerricans, which is approximately 13 litres per person per day. It is estimated that 32% of the population in the project area gets water from unprotected water sources. Besides the boreholes, other sources of water in the area include seasonal rivers/ streams, ponds, the constructed dams, and from rain water harvesting - mainly used for health centres, markets and school institutions. Queuing was observed in some of the boreholes, and the environmental condition around the water facilities are generally poor and the information received from the district water office is that they conduct quarterly water tests (biological) to check the quality of boreholes suspected to be contaminated.

6 PROJECT NEED AND ANALYSIS OF ALTERNATIVES

6.1 Introduction

This Section evaluates available options to the proposed action, so as to arrive at the most environmentally friendly alternative, which maximizes economic, social and technical benefits resulting into minimal or insignificant environmental impacts.

6.2 Project Need

Barr RGC in Barr sub county currently has no water supply system serving it with all its water being obtained from boreholes drilled by government and some streams/rivers and the constructed dams like the Itek dams for water for production located in the fringes of the town. The borehole sources which are approximately 3Km from the Town Centre and the system has exceeded its design life due to the rapid growth in the Sub County. The source also has limited quantity and quality of water and water supply to the town is intermittent and unsafe for drinking.

Given the increasing urban population growth in the sub county and surrounding areas coupled with an increased water demand, a reliable piped water supply system that conveys adequate water that meets the drinking water standards and a suitable sanitation system are a pre-requisite for public health and socio-economic development of the project area.

Water Supply System in the project area will generally come along with several benefits. These will include; improved access to clean quality water, quantity and coverage of water supplied, reduced morbidity and increased productivity of households; and increased enrolment of children in educational institutions, better livelihood opportunities and induced development and employment opportunities. Besides, project development and operation will provide considerable economic opportunity for material/ equipment suppliers, construction contractors and other project-relevant professionals. The challenges brought about by using unsafe water such as spread of communicable diseases are likely to decrease as the project will also put in place sanitation facilities as well as creating awareness. The challenge of moving longer distances especially by women and children to collect water from wells and springs will be lessened.

6.3 No Project Alternative

Analysis of the “no project option” as an alternative provides an environmental baseline against which impacts of the proposed action can be compared. This alternative means that the water supply system sites will be left in their original state. The alternative ignores all positive impacts likely to be realized in the project area and throughout the region due to the proposed water supply system like provision and access to clean safe water, creation of employment to both skilled and unskilled labour, better livelihood opportunities and induced development, considerable economic opportunity for material/ equipment suppliers, construction contractors and other project-relevant professionals.

This option implies that the existing situation prevails (status quo remains) i.e., no implementation of the proposed Barr RGC water supply system. This option is mostly applicable in situations where the proposed project area is in ecologically or socially sensitive areas and the negative impacts will be of significance and no proper mitigation measures can be formulated to eliminate or minimize the impacts to manageable or acceptable levels. The land on which the water supply system infrastructure will be constructed is not ecologically sensitive and no households will be displaced. The community in the project area has been engaged and are willing to make land available for this project as they are in agreement it will address their dire need and access to clean water. Sub County local leaders will engage the owners of land especially the land for new proposed intake works, WTP and the reservoir will be situated at the Sub County Headquarters.

The No Project Option is the least preferred option from both the socio-economic and environmental perspective because the Sub County and surrounding areas would be deprived of increased accessibility to clean and suitable water in addition to the socio-economic benefits especially during construction i.e., provision of jobs for skilled and non-skilled workers.

6.4 Alternatives to Sources

Three options for provision of water to the project area were explored, notably tapping water from existing springs and exploring untapped springs, drilling of the more boreholes and building a new system spring in the project area. The options have been assessed as follows;

6.1.1 Point Water Sources

The communities rely on water sources such as; springs, boreholes, shallow wells and streams. Low safe water access and functionality both impact on open water sources as people are forced to directly draw water or carry out illegal activities in open water bodies thus contaminating them. However, these streams easily dry up during the dry periods. Communities also depend on rainwater harvesting in the institutions like schools and the health centres however, this water source is only reliable during the rainy season.



Plate 15: A Woman carrying a jerrycan of water from a borehole within Barr RGC

6.1.2 Surface Water Sources and Rainwater Harvesting

There are a number of streams, rivers and constructed dams for water for production (though they have been abandoned) within project area. Some people also rely on these streams for water supply like washing clothes and making of bricks especially during the rainy seasons in some cases. However, these streams easily dry up during the dry periods. Rainwater harvesting is done by the institutions like schools, markets and the health centers within the project area and this water source is only reliable during the rainy season. Queuing was observed in some of the boreholes, and the environmental condition around the water facilities were generally poor as some are shared with animals.



Plate 16: One of the constructed dams in Itek village in Barr RGC

6.5 Environmental and Social Considerations

The potential impact of the water supply scheme infrastructure on the landscape and ecology were considered, this was mainly from the field studies. These factors have been subsequently addressed within the interactive process of environmental assessment and the findings presented in this ESIA report.

- **Noise and proximity of housing:** The proposed water system infrastructures were judged to lie distant from homesteads and settlements but within the commercial centre of the project area; that adequate separation distances could be achieved to avoid noise nuisance during both the construction and operation phase given the nature of the development. Construction activities for the water system should be carefully controlled. In addition, apart from the vehicle movements, the noise in this kind of project is minimal.
- **Land ownership:** The local landlords including the Sub County officials are willing to donate the required pieces of land for the construction of the proposed project components and therefore, the Sub County and district officials should engage the local land lords to willingly offer the required land. The transmission lines will pass along road reserves but where peoples land will be affected, local leaders and the local communities have been engaged. Resettlement Action plan (RAP) shall be conducted for survey, valuation and subsequent compensation for those whose property will be affected during the construction especially the transmission lines and for some of the water infrastructures. However, there are no resettlement and displacement issues anticipated.
- **Community Opinion:** Water supply systems elsewhere in Uganda have not attracted local concern and resentment among the local residents. Likewise, in the case of the Barr RGC Water Supply System, the development would not have much significant negative impact on the dwelling and settlements. The communities and the local leaders consulted welcomed the proposed project.

6.6 Technical and Design Considerations

There is a wide range of construction and furnishing materials which can be sourced locally for example sand, aggregates, bricks, etc. During construction, certified equipment and modern technology e.g. Water pipes, Storage Reservoirs, metal bars and fittings that meet the Uganda National Bureau of Standards (UNBS) requirements. Implementing the Water Supply System according to approved designs will be a priority as it will lead to the provision of improved quality and quantity of water supplied, reduced morbidity and increased productivity of households; and increased enrolment of children in educational institutions, better livelihood opportunities and induced development and employment opportunities. Therefore, it will be paramount that WSDF-N and the Operator ensure that the Water Scheme has the following in place:

- An area of 50m x 50 is recommended for fencing in order to prevent vandalism of the infrastructure and for the safety of hydraulic structures and installations of the pumpstations.
- Well-designed drainage system at the Water offices and around the pumpstations
- Consideration of noise and traffic generated by the trucks to and from the site during the construction, solid waste management itself at the site both during construction and operation (especially at the offices premises)
- Security mechanisms including fire safety mechanisms and security guard at all the water infrastructure facilities
- Well-designed access route from the main road

6.7 The Action Alternative as Described in this ESIA

This option implies that WSDF-N continues with the implementation of the proposed project as per the project designs and recommendations by different stakeholders. We have made a comprehensive Environmental study for the proposed project area. Details of the study are the subject of this ESIA report. The study has found no significant issues (environmental, economic or social) to stop the implementation of the project. Mitigation measures for the identified negative impacts of this alternative have been thoroughly discussed throughout this Report. If they are implemented as proposed, the project will not do any damaging to the environment. It is here thus we recommend that this alternative is the most appropriate.

7 STAKEHOLDER CONSULTATION AND ENGAGEMENT

7.1 Introduction

Consultation with relevant stakeholders and regulatory institutions was carried out to ensure participation of relevant stakeholders, as recommended by the National Environment Act, No.5 of 2019, EIA Regulations (2020), and conduct of Environmental Practitioners (2001) and guidelines for EIAs in Uganda. The consultations aimed to identify and take note of environmental and social concerns and views of all the stakeholders at an early stage so that appropriate mitigations are incorporated in the final implementation plan for the proposed project.

Stakeholder meetings were held at Lira District, Barr Sub County. The consultation process ensured that their concerns were captured and have been addressed during ESIA. A wider intensive consultation process was carried out during the Environmental and Social Assessment.

Informal conversational interviews and observations were the key data collection methods applied. The consultation process ensured that their concerns were captured and addressed. A wider intensive consultation process was carried out during the Environmental and Social Assessment. In general, the majority of stakeholders supported the project and found it to be beneficial.

7.2 Objectives of Public Disclosure and Consultations

The primary purpose of the stakeholders' consultations was to provide an overview of the project to the relevant agencies, stakeholders and all the communities where the Barr RGC Water Supply System components are to be located and therefore impact on the communities. It further helps them to understand how the WSDf-N and the project team will operate to the highest possible environmental, social, health and safety standards prior, during and after the construction of the Water Supply System related infrastructure.

7.1.1 The specific objectives of the Consultations were;

- i) obtain an understanding of the number and types of stakeholders in the socio-economic study area
- ii) To provide information about the project and to tap stakeholders' information on key environmental and social baseline information in the project area
- iii) To provide opportunities to stakeholders to discuss their views, opinions and concerns
- iv) To manage expectations and misconceptions regarding the project
- v) To discuss potential impacts and verify significant or major environmental, social and health impacts identified.
- vi) To inform the process of developing appropriate mitigation and management measures as well as institutional arrangements for effective implementation.
- vii) inform stakeholders about the engagement process and grievance management
- viii) provide a mechanism for ongoing stakeholder engagement and ways in which the stakeholders can continue to participate in the stakeholder engagement process
- ix) Ensure regulatory requirements and project standards are met.

Stakeholder consultations and public participation during the ESIA process were conducted in line with the requirements of the National legislation and regulations. According to the National Environment (Environmental and Social Assessment) Regulations, 2020, Part III under section "Procedure for Undertaking Scoping and Environmental and Social Impact Study", Sub-section 16; "Stakeholder consultation during the environmental and social impact study", stakeholder consultation is crucial during the ESIA study.

7.3 Stakeholder identification and analysis

7.3.1 Stakeholder Identification

A stakeholder may be defined as 'any individual or group who is potentially affected by the project or can themselves affect the project. To develop an effective stakeholder involvement programme, it is necessary to determine exactly who the stakeholders are based on their roles, influence, objectives and priorities specific to the project. The ESIA team formulated a stakeholder matrix and identified key stakeholders who were engaged during the study. A stakeholder engagement plan was drafted and populated with additional stakeholders during the ESIA study. The study targeted individuals, groups/institutions and communities that have a stake in the priority water project. Thus, only such entities as identified in the stakeholder analysis were selected to participate in the consultation process.

When identifying and prioritizing stakeholders, the following aspects were considered:

- (i) Who could be adversely affected by environmental and social impacts?
- (ii) Who are the most vulnerable among the potentially impacted, and are special engagement efforts necessary?
- (iii) Which stakeholders can best assist with the early scoping of concerns and impacts?
- (iv) Who strongly supports or opposes the changes that the project will bring and why?
- (v) Who is it critical to engage with first, and why? (IFC 2007) Stakeholders were then identified:

7.3.2 Stakeholder analysis

The stakeholder categories and sub categories identified are presented in table below

Table 26: Stakeholder Matrix

Group	Stakeholder	Description and key attributes
Funder	AfDB	<ul style="list-style-type: none"> ✓ To ensure that the Banks Operational Safeguards have been observed and implemented as appropriate. ✓ Support the project with funding
National Level Stakeholders	Ministry of Lands Housing and Urban Development (MoLHUD)	<ul style="list-style-type: none"> ✓ Approves all reports presented by the consultant regarding valuation
	Ministry of Gender, Labour and Social Development (MoGLSD)	<ul style="list-style-type: none"> ✓ Protection of human rights and vulnerable social groups. ✓ Occupational and community health and safety of roads. ✓ Approval and monitoring of the social safeguards ✓ Approval of permits like workplace permits, OHS
	Ministry of Water and Environment (MWE)	<ul style="list-style-type: none"> ✓ Overall mandate to monitor, assess and regulate water resource ✓ Monitor and guide the use of wetlands for sustainability and other water bodies within the project areas ✓ Approval of the Water abstraction permits ✓ The implementer of the Project ✓ Overseeing and monitoring the project activities

	NEMA	<ul style="list-style-type: none"> ✓ Regulation of the environmental aspects of the project(s). ✓ Legally mandated to handle certain critical environmental issues ✓ Provide the necessary permits and approvals for quarries, borrow pits and other auxiliary sites ✓ Work closely with the project team to handle all matters related to environmental protection ✓ Overall clearance of ESIA and other project briefs about the project facilities. ✓ Monitor and supervise the ESIA's compliance
Local Governments	District (Lira District Local Government)	<ul style="list-style-type: none"> ✓ Mobilize various stakeholders including the communities/beneficiaries ✓ Monitoring and supervision support for the implementation of the projects. ✓ Offer security to the project team (RDCs Office) ✓ Review the ESIA and give comments (Environment Office)
	Barr Sub County (Technical and political staff)	<ul style="list-style-type: none"> ✓ Make decisions that may affect the project, ✓ Offer support and supervision of the project ✓ Help in the identification of the location of the water and sanitation facilities.
	Local Councils	<ul style="list-style-type: none"> ✓ Mobilize communities ✓ Offer support in the planning, implementation and operation of the project ✓ Offer support in the identification of the locations of the water and sanitation facilities ✓ Monitoring of the projects ✓ Provide social justice to vulnerable communities ✓ Incorporate information about the project in their teachings, gatherings/meetings for acceptance especially regarding water and hygiene-related information.
Different Community groups,	Traders, landlords, tenants, business people, affected persons (Landowners who offered land for the project)	<ul style="list-style-type: none"> ✓ Develop construction (works) schedules in their respective areas. ✓ Participate in the scheduled meeting regarding the project activities and progress ✓ Identify mitigation measures of the environmental and social issues ✓ Monitor the progress of the project activities ✓ Input in the planning and identification of water and sanitation facilities.

7.4 Methodology for stakeholder engagements

Different methods were espoused to undertake the stakeholder engagements on this project. These were taken up depending on two major premises; the type of information required and the number of participants involved in the data collection process. These methods were used to inform the development of an appropriate water supply system within this proposed project area. Here-under are the methods that guided the stakeholder engagement process;

7.4.1 Formal meeting with the Stakeholders

The project had an inception workshop where all the stakeholders were invited as a start meeting to inform all the stakeholders about the project. MWE/WSDF-N organized the meeting to inform all stakeholders about the project, its objective, the intended activities, the project extent, and the related

studies to be undertaken, including the RAP and ESIA, water-related studies, source of water among others. The main object was to solicit, potential impacts and possible mitigation measures and also solicit initial community responses. The stakeholders were able to express comments and queries during this meeting as seen under table 27.



Plate 17: Consultants engaging the Senior District Environment Officer LDG



Plate 18: Consultants engaging the Sub County Chief; Barr Sub County



Plate 19: Consultants engaging some of the Local community members at Barr Sub County

7.4.2 Key informant interviews; .

Key informant interviews (KIIs) were held with individuals who were assumed to have specific information related to the project. Some of these were pre-set while others were identified during the interactions with other stakeholders. Some of such stakeholders included; The LCV Chairperson's office of Lira, the District Engineers office, the Office of Public Health, CDO, Environmentalist among others.

7.5 Key findings from stakeholder consultations

In relation to the project, the main findings from the engagements and public participation were largely categorized into two parts; the envisaged impacts (Both negative and positive) and general concerns on the project. The main findings from the engagements are presented below; For example, according to the local leaders and community members, the establishment of the water scheme is expected to have the following benefits:

- Improved and increased access to clean and safe water
- Improved health conditions due to access to safe clean water
- Employment during construction and operation of the water supply system
- Eradication of poverty and improved livelihoods of the local people
- Reduced expenditure on water and medical bills due to diseases
- Reduced time spent walking long distances to wells and Springs
- Reduction of child mortality
- Ensure environmental sustainability

However, some concerns were raised as regards to the project and these include:

- Destruction of crops especially during construction works
- Contamination of water from runoff water off project sites
- Land conflict issues could arise,
- Dust and vehicle emissions,
- Increase in noise and injuries on duty,
- Increased spread of communicable disease,
- Poor waste management practices at construction sites
- High water prices

However, there were also issues that rotated around the following during the community consultation meetings;

- **Signing of the Compensation Data Capture Forms by the PAPs** - Signing such forms does not relinquish one's rights to land and improvements. It only depicts that such PAP was present during the data collection and affirms all that is recorded on such form.
- **Property to be assessed** - Land, structures (or improvements) and Perennial crops will be assessed. However, the project designs were developed in such a way that there is no physical displacement of PAPs.
- **Connection to water for households far away from the built system** - Upon completion of the water system, households will be encouraged to apply to the operator for water connection and water pipes will be extended.

Stakeholder engagements will continue throughout the implementation and operational stage with different stakeholders. It is likely that more relevant agencies and stakeholders will be identified during these phases, and will be engaged accordingly.

7.6 Public Consultations and Sensitization

Consultation and participation is a process through which stakeholders influence and share control over development initiatives, and the decisions and resources that affect them. It is a two-way process where the executing agencies and developers, policy makers, beneficiaries and affected persons discuss and share their concerns in a project process. The specific aims of the consultation process were to:

- Collect individual responses reflecting knowledge and attitudes towards the project;
- Conduct informal discussions with earlier identified opinion leaders to enrich the social survey
- The main objectives of community consultations were to:

- Provide clear and accurate information about the project to the communities;
- Obtain the main concerns and perceptions of the population and their representatives regarding the project;
- Increase the effectiveness and sustainability of income restoration strategies, and improve coping mechanisms;
- Identify local leaders with whom further dialogue can be continued in subsequent stages of the project.



Plate 20: Community Engagement meeting at Itek Sub County

7.7 Public Disclosure and Consultation Plan

Public Consultation and Disclosure (PCDP) is a key element in the engagement and essential for collective involvement of stakeholders in the proposed development. Disclosure refers to the provision of relevant and adequate project information to enable stakeholders understand risks, impacts and opportunities of the project. Consultation is an inclusive and appropriate process that provides stakeholders with opportunities to express their views which should be considered, responded to and incorporated into the decision-making process. In the context of the proposed development, stakeholder consultation aimed at:

- Generating good understanding of the project;
- Enabling stakeholders to engage and participate in proposed project design;
- Understanding what local community expect throughout the life of the project;
- Optimizing local benefits of the project;
- Developing effective mitigation measures and management plan;
- Characterizing environmental, health and Socio-economic impacts of the project.

The proposed project is within the jurisdiction of Lira District Local Government headed by a Local Council V (LCV) Chairman and Chief Administration Officer (CAO) who is the political head and technical head respectively. Various district offices whose functions would be relevant to the project include offices of Natural Resources/Environment, District Health Inspector, District Planner, Community Development Officer, District Health Officer, District Water Officer and District Engineer. Equally important are village-level local council administration (LC I and LC III). Leaders at these levels of local administration are closer to residents and therefore important in effective community mobilization, sensitization and dispute resolution given that the proposed project is going to benefit communities.

Like stakeholder identification, public consultations and information disclosure is a continuous process throughout the ESIA exercise. KIIs and FGDs were utilized for PCDP. Key stakeholder concerns were also identified so that they could be considered in the implementation of the project. Key issues identified are outlined in Table 27 below.

Grievance Redress Mechanism (GRM) as a key element of the PCDP to actively identify, manage and follow up grievances received to ensure that appropriate resolutions and actions are taken by relevant authorities especially MWE, Lira District Local Government and Barr Sub County.

In order to ensure transparency and accountability, a GRM shall be established by the Project Support Team in line with the guidance provided in the ESMF. The GRM shall have a clear set of goals and objectives and a well-defined scope for its interventions, especially geographical area coverage to ensure its accessibility and effectiveness. A set of procedures for receiving, recording, and handling complaints shall be available in the GRM. This will be managed by a National Grievance Redress Committee (GRC) consisting of a MWE/WSDF-N Chair, the Project's Environmental Focal Point, the chair of the community mediation board, a member of a recognized non-government organization, and a community leader. The GRC members shall be qualified, experienced, and competent personnel who can win the respect and confidence of the affected communities.

GRCs shall also be established at District and Lower Local Government Levels as appropriate. For easy accessibility, GRCs shall also be formed at or closer to project implementation site at Lira District. Grievances shall be first reported and handled at the lowest level or project site, and referred to the next level if not resolved. The GRM shall include procedures for:

- recording, registering, and sorting grievances;
- conducting an initial assessment of grievances;
- referring grievances to appropriate units or persons;
- determining the resolution process;
- making decisions, including parameters and standards for accurate and consistent decision making;
- directing relevant agencies responsible for implementing decisions;
- notifying complainants and other affected parties of eligibility, the resolution process, and outcomes;
- tracking, monitoring, documentation, and evaluation; and
- a Grievance Log, that shall summarize all grievances registered, resolution reached, and feedback provided.

Depending on the nature and the severity of the complaint/s, the GRC in consultation with the Project Affected Persons (PAPs) or Complainant, shall identify and decide on an approach for grievance resolution. Where appropriate, complainants shall be given the choice of selecting an affordable approach with which they are comfortable and confident and that is beneficial to them. For construction-related complaints, it will be the Contractor's responsibility to address them. Usually, these kinds of complaints are described as environmental and social impacts and include issues related to dust, flooding, blasting (noise, vibration, and evacuation), lost access, and dangers to life, damage caused to public roads from heavy machinery, deteriorating water quality and quantity, damage to property and crops, soil erosion, workers misbehavior, defilement/child abuse, and others.

7.8 Feedback from All Stakeholders Engaged

Many of the comments captured from stakeholders presented views on the expected benefits and concerns on the adverse impacts the proposed project may have on the environment and the existing activities. A summary of key environmental and social issues and recommendations raised by stakeholders during the meeting at Itek Sub County are presented in Table below 27.

Table 27: Key environmental and social issues and recommendations raised by stakeholders

NAME AND POSITION	ISSUES RAISED
Mr. George Obia 0774190680 SAS/Sub County Chief Barr Sub County	<ul style="list-style-type: none"> • Aware of the project and the office has been involved so far. • The project is welcome in the area and it will help to extend safe water to the community members • People are willing to welcome and accept the project in the area
Mr. Peter Alunga 0782518328 GISO Barr Sub County	<ul style="list-style-type: none"> • The project is welcome in the area • It has even taken long to start as people are eagerly waiting for it • It will minimize health hazards related to water challenges • The community will be more productive and this will increase the standard of living and incomes of the people • The project will come with grass and tree planting and this will improve on the Environmental conditions of the project area • There should be fencing around the project components • Access road should be considered • The contractor should employ local people so as they can own and protect the project. • During project implementation gender issues should be incorporated and women should be protected. • Children should not be employed • The contractor should provide workers with PPEs and enforce their use • Contractor should ensure workers are paid and at the right time • First aid kits should be place in case of an emergency • Working conditions should be pleasing • We are willing as district leaders and local communities to work together to benefit from this project • Contractors should allow district leaders to access the project sites for supervision • Some dams were constructed by MAAIF but now look abandoned • Fishing is the commonest practice around these dams
Mr. Alfred Onyanga 0786817910 LCI Abolet A Village Chairperson	<ul style="list-style-type: none"> • He pledged his support towards the project • Local people are suffering a lot to access safe water. • Jobs should be offered to local people also
Ms. Molly Alwedo 0774267825 CDO Barr Sub County	<ul style="list-style-type: none"> • Consult all the relevant stakeholders including district leaders, sub-county offices and where necessary town council leaders • It is okay if you want us to be part of the project team • Has been involved in the implementation of the project so far
Mr. Thomas Akaa 0772514964 Chairperson LCIII Barr Sub County	<ul style="list-style-type: none"> • The system will support the livelihoods of people • The system will provide water for two purposes; domestic consumption and production. • It should supply public institutions like schools, hospitals and churches • Mobilize and sensitize the communities to understand the benefit of the water system • Water should be used to enhance value in the community. • Issues on land consent should be clear (consent letter should be signed)

	<ul style="list-style-type: none"> • Gender issues should be incorporated while implementing the project • Sustainability should be considered (will the water be for free or at a fee, and if at a fee, how much will it be, it should be affordable) • Stakeholders should be identified at an early stage so as to get to know the project and the benefits • Sub county consultations are important
Mr. Charles Olet Ogwang 0704148450 Senior Environment Officer, LDLg	<ul style="list-style-type: none"> • Since the Water Supply System is ground water source, there may be limited impacts • Efforts to mitigate the anticipated impacts should be made • The office will be willing to help and offer any technical support needed during the implementation of the project. • Consider the health and safety of both the workers and community members
Local Community Members	<ul style="list-style-type: none"> • The project is welcome in the area • It has taken even long to start • People are really suffering to long distances and unsustainable water sources • Water borne related diseases are common in the area since people use unsafe water • Will the project serve all the villages in the RGC of Barr? • The names of the villages were charged since Itek is now a Sub County of its own.
<p>MINUTES TAKEN DURING THE MEETING HELD ABOUT THE ESIA FOR BARR RGS WATER SUPPLY SYSTEM IN LIRA DISTRICT.</p> <p>DATE: 04/10/2022</p> <p>Agenda</p> <ol style="list-style-type: none"> 1. Prayer 2. Introduction 3. WELCOME REMARKS FROM C/P S/C 4. GISO 5. CDO 6. Communication from the consultant 7. reactions 8. creating the committee 9. AOB 10. Closure <p>Minutes;</p> <ol style="list-style-type: none"> 1. Prayer was led by was the led by mr. Denis who is the area chairman. 2. The GISO welcomed the project and said that supplying the community with clean water will reduce on the rate of diseases. 3. The CDO (mr. Opolo) –Itek S/C said that the sub county will provide all the support needed for the project to take place. 4. The consultant welcomed the people and explained the purpose of the meeting which was; the government initiative to supply clean water to Itek sub county. 5. He said that the government does not want to bring a project that will affect both the people and the environment negatively. He therefore, said that the people’s views are important in this process. 6. He sensitized the people about the water source protection committee whose role is to protect the water source. 7. The chairman LC1 said that the community is engaged in farming and small scale business as sources of living. The community grows crops like; Sunflower, cotton, cassava, beans, millet, sweet potatoes, sorghum and they rear animals like cows, goats, pigs and chicken. 	

8. One of the members informed the team that the community gets water from rain, protected and unprotected springs, boreholes which are inaccessible.
9. The chairman asked why the project is taking long because he thought it would begin in a months.
10. Mr. Ocen Patrick asked to know how deep the trenches will be and how far they will be from the road reserve. He also asked if their will be compensation for the pipe to go through a person's land.
11. The consultant clarified that trenches will be dug within the road reserve and he said that land agreements will be signed between land owners and the relevant authorities concerning compensation.
12. The consultant also noted that the committee will be available when trenches are being dug to avoid grievances and he said that the trenches will be deep and the pipes will not be affected by ox ploughs.
13. He also informed the community that local labour will be got from within the sub county.

All the stakeholders consulted supported the project on the basis that it would solve the water scarcity problem that serious affects the entire community. However, concerns of ownership and sustainability were mentioned, locals are also worried of possibility of their land being taken for free, and expect the authorities to mitigate all project related negative impacts such as destruction of crops, Increased spread of communicable diseases, lake contamination from surface runoff and any other negative impact as would be realized.

8 POTENTIAL IMPACTS AND MITIGATION MEASURES

8.1 Introduction

Key potential environmental and social impacts of the project for each stage of the project cycle are assessed in this chapter and an Environmental and Social Management Plan (ESMP) is provided in Chapter 9. The ESMP seeks to translate mitigation measures into actions. Prediction and analysis of possible positive and negative impacts of construction of the water treatment plant and intake works in neighbouring Barr are discussed. Impact analysis involved determination of nature of impact, its magnitude, extent, duration of potential impacts. For the proposed development, potential positive and negative impacts were identified both for the construction phase and operation phases. Throughout this report, impacts have been characterized as:

- a) "Positive" when they;
 - Enhance socio-economic welfare e.g., health, employment,
 - Enhance quality of existing environment.
- b) "Negative" when they;
 - Reduce socio-economic welfare of people,
 - Reduce quality of existing environment,
 - Reduce economic value e.g., of surrounding property.

An increase in coverage for potable water supplies and sanitation may generate interrelated improvements in health, economic and social welfare of the community. However, in addition to the many possible beneficial impacts, adverse impacts may arise from these improvements. The impact of potable water supply and sanitation on health depends on the quality and quantity of the piped water supply; the proportion of population covered; and the utilization of the water and sanitation facilities by the population. In this chapter, prediction and analysis of possible positive and negative impacts of construction and operation phases of the water extraction and treatment system and water reservoir is presented, with main focus on the proposed construction of the water treatment plant and intake works. Table 24 below provides a summary of the Positive benefits that will be realised as a result of implementation of this project.

Table 28: Over view of Positive Impacts of the Proposed Project

No.	Impact	Remarks
1.	Increased access to clean water	<ul style="list-style-type: none"> ▪ Elimination of current water shortages. ▪ Improvement of water quality. ▪ Reduction of the time spent and distance travelled to fetch water, which would signify an improvement in the general living conditions of the people. ▪ Improvements in public and household sanitation. ▪ Awareness of personal hygiene. ▪ Overall improved health conditions for the beneficiary population. ▪ Income generating activities for the poor will increase as result of availability of reliable supply of water in public places e.g. commercial water service providers.
2.	Employment opportunities and increased household incomes and revenues	<ul style="list-style-type: none"> ▪ The use of appropriate labour-intensive methods for some of the construction activities (e.g. construction of the pumpstation, office block and Reservoir) would present employment opportunities for local people and generate direct income benefits to local households. ▪ Some people will be employed in the digging of the transmission and distribution networks, sand and stone quarries, and sale of earth materials to the proposed project and in the service sector around the project site.

3.	Income to material/equipment suppliers and contractors	<ul style="list-style-type: none"> ▪ Earth materials needed for construction, for example, aggregate (stones and sand) will be obtained from quarry operations. ▪ Number of equipment and materials (such as gravel, bricks, plumber, steel reinforcement and cement for civil works) will be sourced locally within Lira district and the neighbouring districts.
4.	Increased Public Revenue / Taxes	<ul style="list-style-type: none"> ▪ People who have never worked on such projects would acquire such skills, which they would use to seek employment in future. ▪ The Project would provide grassroots management opportunities for the local people to both be involved in the management of the water supply and protect their local environment.
5.	Boost to the local economy	<ul style="list-style-type: none"> ▪ Provision for direct employment opportunities to the workforce thus contributing towards alleviation of poverty and income generation for the local community; ▪ Stimulation of business activities related to contracting works for local entrepreneurs (sub-contractors); ▪ Providing trading opportunities for local communities and other small enterprises in the area; ▪ Providing opportunities for provision of basic and other services for the contractors and immediate community. The project will consider employment of locals.
6.	Gender Benefits	<ul style="list-style-type: none"> ▪ The expected reduction in water collection distances and times will be particularly beneficial to women and children, especially girls, who bear the burden of fetching water and have to walk long distances or queue for long periods. ▪ It will mean more opportunities for girls to attend schools and more time for women to engage in other economically and educational beneficial activities.
7.	Health Benefits	<ul style="list-style-type: none"> ▪ Direct health benefits of the project to the affected population will result in a reduction in the incidence of water-related diseases particularly diarrhoea, typhoid, intestinal worms, skin and eye problems, and dysentery and cholera. ▪ Loss of productivity resulting from sickness related to water-borne diseases and expenditure on related medical care will therefore reduce.
8.	Improved service delivery	<ul style="list-style-type: none"> ▪ The proposed project would result in bringing improved water and sanitation services closer to the people.
9.	Eradication of poverty and improved livelihoods of the local people	<ul style="list-style-type: none"> ▪ The proposed project would result in an increase in the volume of water for production which could result in improved livelihoods of the local people. ▪ Water is indispensable for survival and improving the quality of life – for health (drinking, eating and bathing) and for economic development (agro-processing and business). The project would, therefore increase productive activities through reduced sick days and time saved in fetching water.
10.	Combat HIV/AIDS, malaria, typhoid, and other diseases	<ul style="list-style-type: none"> ▪ The awareness campaigns for public health, hygiene and sanitation particularly targeted at women and girls would be widened to include measures for tackling HIV/AIDS and other diseases such as schistosomiasis and diseases related to excreta contaminated water and poor hygiene (cholera, typhoid, and diarrhoeal diseases).
11.	Ensure environmental sustainability	<ul style="list-style-type: none"> ▪ Implementation of catchment and water source protection measures would ensure reliability to the water source.
12.	Develop a global partnership for development	<ul style="list-style-type: none"> ▪ The Project would provide opportunities for the GoU through MWE/WSDf-N to aim at achieving the Sustainable Development Goals (SDG) specifically SDG 6.
13.	Increase in investment in the area standard of living	<ul style="list-style-type: none"> ▪ MWE/WSDf-N will invest heavily in the construction and operation of the Barr RGC water supply system which would involve use of locally available materials.

		<ul style="list-style-type: none"> ▪ The business community could take advantage of the proposed development to establish businesses that would otherwise be impossible without safe piped water.
14.	Develop a global partnership for development	<ul style="list-style-type: none"> ▪ The project will provide opportunities for the GoU and in particular the Ministry of Water and Environment to work together to achieve the Sustainable Development Goals (SDGs) specifically SDG 6 and 12

8.2 Positive Impacts during Construction Phase

Few impacts of construction phase for example construction of the new pumpstations are permanent and majority of the environmental impacts attributed to construction works are temporary in nature, lasting mainly during the construction phase or quite often little beyond the construction period. However, certain conditions could lead the impacts (positive or negative) to continue even after the construction phase for longer duration.

a) Employment opportunities

The design, feasibility and planning phase provided financial benefit and employment for local consultants. This was a positive but short-term and reversible socio-economic impact. Contract provisions for construction require most of the labour force (at least 70%) to be drawn from the local population with particular emphasis on youth and women. Since construction is estimated to go on for about a year, this phase will provide short-term job opportunities for local people. The project is estimated to employ around 50 workers during the construction phase.

Furthermore, indirect opportunities for employment will be stimulated in the other sectors related to construction, such as manufacturers of local raw materials and finished products and providers of services. It is also anticipated that indirect employment opportunities will be created within local communities through the provision of services to the construction teams, such as the sale of food and beverages.

Impact enhancement

The contractor should involve local leaders in recruitment process to ensure full and fair participation of local communities. Wherever feasible, local people should be considered for job opportunities commensurate with their level of skills. Adequate occupational health and safety standards should be provided to ensure the work environment is conducive. A training programme for artisans (builders, carpenters, plumbers) in the project area could be facilitated by the project to ensure skills transfer during the construction period.

b) Income to material/ equipment suppliers and contractors

Although some of the equipment and materials required for the project will be sourced nationally or even internationally to ensure quality is achieved, a number of equipment and materials (such as gravel, bricks, lumber, steel reinforcement and cement for civil works) can be sourced locally within Barr Sub County or Lira district and the neighbouring districts. Local suppliers of materials and equipment involved in the project will benefit financially. This is a positive but short-term and reversible impact.

Enhancement measure

Earth materials needed for construction, for example, murrum; aggregate (stones and sand) will be obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly promotes environmental degradation at illegal quarry sites and can cause medium to long-term negative impacts. It should therefore be a contractual obligation for contractors or/and the Sub Contractors to procure construction materials from quarries legitimately licensed by the respective district authorities.

c) Acquisition/improvement of skills

People who have never worked on such projects would acquire such skills, which they would use to seek employment in future, and as a benefit from the capacity building incorporated in the program, the implementing authorities would have adequate capacity for managing the environmental and social assessment and permitting processes. The Project would provide grassroots management opportunities for the local people to both be involved in the management of the water supply and protect their local environment.

Enhancement measures

The Local leaders will play a vital role in screening and recommending those seeking for employment to weed out wrong elements who may instead cause serious setbacks to the project in terms of offering labour both skilled and unskilled.

d) Increased Public Revenue / Taxes

The implementation of the project will increase revenue and taxes for both the central and local authorities. This includes indirect taxes resulting from the construction project such as Value Added Tax (VAT) on materials and services, Pay As You Earn (PAYE) for construction workers and other formally employed persons who will form by far the majority of created employment opportunities) as well as revenue to pension funds such as National Social Security Fund (NSSF).

e) Impacts on Local Capacity

The scale of the construction of the project with the logistics involved and speeds of construction that will be required, while maintaining construction, health and safety standards will involve considerable management and planning skills and will contribute to capacity building within the country's engineering and construction sector. Co-operation between international suppliers of specialized equipment and contractors and local contractors and sub-contractors and companies will result in the transfer of skills and will also build additional local capacity.

f) Boost to the Local Economy

The workforce will get most of their food and other necessities from the surrounding area and this will provide a market for the local agricultural producers, and craft producers and other small businesses (local shops). This will in turn increase the incomes of the local people, which can be invested in other (productive) activities and be used for paying school fees, medical expenses and other domestic needs. The project will stimulate local economic activities by:

- Provision for direct employment opportunities to the workforce thus contributing towards alleviation of poverty and income generation for the local community;
- Stimulation of business activities related to contracting works for local entrepreneurs (sub-contractors);
- Providing trading opportunities for local communities and other small enterprises in the area;
- Providing opportunities for provision of basic and other services for the contractors and immediate community. The project will consider employment of locals.

g) Capacity Building

It is expected that for the construction of the water source points, some degree of capacity building will be provided (organised and un-organised) through the transfer of new technologies and new skills to (un-skilled) labour. This will happen through on-the-job training as well as through exposure to modern water quality practices, management and logistics procedures. Local sub-contractors and companies will also benefit from the transfer of skills and will also build additional local capacity.

Enhancement Measures

To maximise capacity building for local communities, programs and technical training courses as well as on-the- job training will be provided in specific skills areas for suitable candidates from local communities to enhance minimum levels of education and the possibility of being employed during operational phase.

h) Infrastructure

The community will benefit from an improved road network, as the construction activities will necessitate roads to be graded in some cases to improve access especially to the proposed site for water pumpstations, Office blocks and the Reservoir sites.

Enhancement measure

The communities along the road should be sensitized and encouraged to be cooperative when this kind of infrastructure, for example, new access roads will be established.

i) Rise in value of land and property

The value of land within the project area could go up due to the likely increase in activity in the area due to the construction and operation of the project.

8.3 Positive Impacts during Operational Phase

a) Improved health status of households of the project host communities

The provision of an adequate, safe water supply and sanitation has positive impacts on the health of users by greatly reducing the incidence of communicable enteric and infectious related diseases, which, in many instances occur in communities due to lack of adequate sanitation and potable water supply. Both potable water supplies as well as safe disposal of human excreta are needed to break the chain of transmission diseases. Changes in water supply may affect different groups of disease in different ways; one group may depend on changes in water quality, another on water quantity and availability and another on indirect effects of standing water which is related to sanitation. Therefore, improvement in water supply in several of the poor informal settlements will directly contribute to improved public health within the project communities.

Enhancement measures: Educate users on the proper use, regular cleaning and effective maintenance of both the household and public facilities.

b) Educational enrolment and attendance

Construction and Operation of the water system will lead to considerably increased and consistent access to safe water for the project host communities. In relation to increased provision of potable water supply, time savings are the most immediate and easily measured benefits although its magnitude will depend on the conditions prevailing before the construction of the piped water supply. Consequently, time spent on searching and waiting for water by women and children will be saved. This will enable children, especially the girl child to regularly and promptly attend school, while mothers will get more time to prepare their children for school. Assuming other factors are available (such a scholastic material, teachers) school attendance and performance will improve.

c) Acquisition of new skills

Most water supply and sanitation projects are built through the labour of local residents who are directed by a small cadre of sub-professional or supervisory personnel from outside the community. Community participation can also have a great impact on the effectiveness and sustainability of water supply and sanitation programs. It can also help to minimize many of the potential negative environmental impacts associated with them.

Enhancement measures: Where the required skills are available locally, the local people should be given first priority commensurate to their level of training.

d) Improvement in household economic status

The increased provision of potable water supply and sanitation has positive beneficial impact on health and ultimately directly and indirectly on productive and economic benefits.

- *Livestock and poultry keeping:* Improved water supply would lead to an increase in poultry and livestock keeping in homesteads. A permanent water source near or on the farm will permit an increase in cattle and improve the production of milk and beef. Those farmers who previously felt water to be a crucial constraint preventing them from keeping such livestock as grade cows and pigs, poultry like chicken or expanding their activities in this regard, may find it feasible to do so.
- *Small scale gardens:* The increased provision of piped potable water supply may have positive beneficial impact on the irrigation of small-scale gardens around homes if there is excess water available and it can be used for irrigation of small-scale garden plots near each household or tap. This will have positive beneficial *impacts* on increasing agricultural productivity and perhaps also improving nutrition status of households.
- *Small scale industries:* The ample availability of piped potable water supply may lead to improvements in the small-scale industrial development and increased production.

Enhancement measures: Water supply should be set taking into consideration the different levels of users. The users should also be educated to avoid wasteful use of the resources through stakeholder engagement, social and environmental risk management.

e) Employment opportunities

Operation of the constructed water supply system will create additional long-term technical and non-technical job opportunities for professionals, casual labourers, etc. Staffing will be required in the Sub County and Rural Growth Centre (RGC) to operate the constructed water supply system by: Operating the system in accordance with the service standards; Maintaining the system; Developing the system; Billing the consumers; Collecting revenue; Receiving applications for and making new connections; Making extensions to the system or assets; Attending to all customers; Keeping records of the operations of the system; and Writing status reports for the operations of the system.

Enhancement measure: Wherever feasible, local qualified people will be considered for job opportunities. Adequate occupational health and safety standards should be provided to ensure the work environment is conducive.

f) Promotion of gender equality and empowerment of women and the girl child

The proposed project would free women and girls of the burden of having to spend a lot of their time collecting and carrying water almost on a daily basis often from sources distant from their houses. This reduction in burden would allow women and girls time for other activities including involvement in economic ventures that could contribute to reducing poverty and furthering their education (thus increasing school enrolment).

g) Attainment of the Sustainable Development Goals; SDGs

The effect of providing safe water and hygienic sanitation services would help in the attainment of all other Sustainable Development Goals (infant mortality, poverty reduction, improved health and increased school enrolment rate).

h) Increase in investment in the area

Through the MWE/WSDF-N investing heavily in the construction of the Barr RGC water system which would involve use of locally available materials, the business community will take advantage of the proposed development to establish businesses that would otherwise be impossible without piped water.

i) Environmental sustainability

The skill for managing water supply and sanitation facilities would result in building social capital which could be extended to better manage the local environment and water resources. The project would include environmental awareness which could be deployed to manage the environment better.

j) Combat HIV/AIDS, malaria, and other diseases

The Project would result in prevention of vector borne diseases related to water sources (such as guinea worms, Onchocerciasis, and schistosomiasis) and diseases related to excreta contaminated water and poor hygiene (cholera, typhoid, and diarrhoeal diseases) due to the increased provision of safe and clean water. Safe drinking water, personal/household hygiene and improved sanitation would reduce infant/child morbidity and mortality; improve their nutritional status and their ability to perform better in schools. The marginal price of improved hygiene and sanitation promotion would make them cost effective health interventions.

8.4 Negative Impacts during Construction

a) Land acquisition for infrastructure

This is likely to be a moderate impact of the proposed project. It includes permanent land acquisition for the construction of the water source intake (Motorized boreholes), office block, pipeline network and trenching to the detriment of land owners. The land-take would be permanent where all the project components would be constructed and temporary along the pipeline network. However, both the transmission and distribution lines would be confined to the road reserves where possible.

Proposed Mitigation Measures

- The district and local authorities in Barr Sub County have already been engaged together with the local land lords and they agreed with communities whose land will be used for the proposed project construction (Consent forms were signed and they have been attached to this report; **see appendix III**). No grievances were reported and are envisaged.
- Land owners that require compensation (where possible) as project affected persons should be compensated before commencement of the project activities.

b) Loss of vegetation cover and top soil

The existing vegetation and top soil will be cleared to give way to the construction process on all sites. The study team discovered that the project area will cover a small space and therefore limited flora of significant impact will be affected. However, clearing of this vegetation will lead to permanent loss of vegetation cover and likelihood of soil erosion due to removal of top soil. The project activities are likely to destroy vegetation with subsequent loss of some shrubs and grasses from the area of operation albeit on a small scale. This is likely to cause loss of habitat and disturbance to faunal communities in the affected sites but at an insignificant level.

Proposed Mitigation Measures

- After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees.
- The water source should be fenced off to reduce on going agricultural activities around the boreholes to avoid pollution entering the boreholes especially when it rains heavily.
- Minimize vegetation clearance by clearly demarcating work areas.
- Provide environmental awareness training to all employees.
- A site restoration and rehabilitation plan which spells out the areas that must be rehabilitated to their natural state, describe the procedures that should be followed for soil stabilization and planting provide a framework for monitoring and reporting on the success of the rehabilitation and assign roles responsibilities to the different parties will be required and prepared and implemented by the contractor and should be costed as part of the BoQs.

c) Fauna

Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles).

Mitigation / Enhancement Measures

- Minimize vegetation clearance.
- Protect water resources from pollution.
- Protect soils from contamination.
- Rehabilitate all disturbed areas.

d) Increase susceptibility to Soil Erosion

Increased soil erosion is likely to occur in the vicinity of project sites during the construction of the water source points and other related construction works. The site earthworks will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.

Mitigation / Enhancement Measures

- The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.
- The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion.
- The Project Contractor should backfill all trenches immediately after laying the pipes for the transmission and distribution networks and compact such areas as to near level prior to excavation.
- Pursuant to Section 23(1) of The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, No. 3/2000 (under section 53 of the National Environmental Act NO.5 of 2019), the 100m protection strip is administered by NEMA and the developer shall apply for a permit from NEMA in order to undertake planting, to reduce erosion; and improve the biodiversity of the area by re-establishing indigenous grass/ tree species on site especially at the water sources/boreholes. Any replanting will be undertaken in consultation with the District Environment Office (DEO) and District Forestry/Natural Resources Office.
- Use proper techniques for trenching and shoring.

Impact Significance after mitigation

After application of the above mitigations, the impact significance was of a minor ranking. Therefore, no further mitigations are proposed at this stage.

e) Effects of Poor Solid Waste Management

Waste will be generated from the construction sites. The waste to stream from the construction sites will include Cement bags, timber and pipe cuttings empty water bottles, food remains from the construction workers and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases.

Impact significance: Extent of this impact will be local to areas where waste is dumped or their immediate neighborhoods. The impact **intensity** is assigned **low** due to the lack of a well streamlined waste management system in Lira. The **sensitivity** of receptors is assessed as **'low'** given that similar activities have and are taking place in the area and that an experienced contractor will be hired. This gives rise to minor impact significance.

Proposed Mitigation Measures

- Waste collection bins will be provided at strategic positions at the construction sites for temporary waste storage.
- The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes.
- The contractor will hire a certified waste collection company to transport the waste for final disposal to designated waste dumping sites by NEMA/LDLG/Barr Sub County.
- Burning of waste on-site shall not be allowed.

Impact Significance after mitigation

After application of the above mitigations, the impact significance was of a minor ranking. Therefore, no further mitigations are proposed at this stage.

f) Generation of Noise

Due to the nature of the construction process, noise levels will fluctuate in line with the combination of machinery or equipment being used at any one time. Noise and vibrations will mainly result from use of equipment like excavators and including bulldozers, graders and dump trucks during site preparation and construction activities. However, noise levels will also vary depending on time and distance as the construction spread progresses along the pipeline route thus the local residents will not, therefore, be continually exposed to the noise levels for extended periods. Construction traffic associated with the pipeline construction will be routed via main roads and along the ROW as far as is possible. Some minor roads will have to be used for access to the pipeline spread itself and some new access roads will be created.

The increase in traffic movements on minor roads may cause a noticeable increase in daytime noise levels through small villages; this effect will be localised and temporary, and will, for the most part, be restricted to the construction phase of the project. A number of roads will require repair prior to use for construction vehicle access. These repairs will help to reduce noise levels generated by such access, and other vehicular movements.

Impact significance: Due to the intermittent and short-term nature of the activities, the **intensity** of impact is assessed as **low** and **sensitivity** of the receptors as **medium**, given that most of the proposed routes for the water pipelines are located in relatively noisy mixed residential and commercial areas of the project area and its neighbourhood. This results into **moderate** impact significance.

Proposed Mitigation strategies:

- Contractor will be careful when selecting the working equipment to avoid use of old equipment or damaged equipment with high level of noise emissions that would have a negative impact in the environment.
- Contractor will ensure that equipment is properly maintained and fully functional in accordance with the manufacturer's recommendations.
- The contractor should ensure that noise levels emanating from machinery, vehicles and noisy excavation and construction activities are kept at a minimum for the safety, health and protection of people in the nearby areas.
- Regular maintenance, monitoring and, where necessary, the use of silencing equipment will be employed with the aim of reducing noise emissions.
- The selected contractor will be required to submit detailed information on the noise levels which will be generated by the specific methods and equipment proposed and to identify actions required to minimise the noise impact.
- Pumps, generators and other mobile equipment will be sited as far as practicable from housing and other noise sensitive locations, work will not be carried out Sunday during service time or hours.

- During periods of inactivity, equipment will be switched off whenever possible. A limited number of construction activities may have to continue on a 24-hour basis. These include horizontal direction drilling, pipeline cleaning and hydrostatic pressure testing which are relatively low noise activities.

Adoption of the above mitigation measures will reduce impact intensity to “very low” resulting in a residual impact of minor significance.

g) Increased siltation of the aquatic habitats

Some of the excavated sediments from the project site and the construction spoils emanating from the excess excavated material and construction debris are likely to increase siltation especially in the nearby wetland and swamp ecology or nearby constructed Itek dams and therefore affecting the associated aquatic habitat.

Mitigation / Enhancement Measures

- Ensure that the site is at all times drained adequately and surface run off is directed appropriately to avoid water logging of adjacent area and of the undulating drainage channel in the Sub County.

h) Increased incidences of diseases

The increase of people involved in the project activities is likely to increase the incidences of diseases in the area. The above situation will be aggravated by the entry of commercial sex workers into the area following the commencement of the project activities. Consequently, there will be potential risk of contracting sexually transmitted diseases (STDs) especially the Human Immuno-Deficiency Virus/Acquired Immuno-Deficiency Syndrome (HIV/AIDS) among the program workers and the local communities. This will be increased due to influx of people seeking for employment.

Mitigation / Enhancement Measures

- The contractor should liaise with the District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled.
- The contractor should emphasise equal opportunities for both men and women.
- The Contractor should, in conjunction with local health authorities, undertake to educate and sensitise the workforce on communicable diseases such as cholera, STDs and HIV/AIDS. Condoms must be made available to the workforce.

i) Visual intrusion

This will mainly arise from the erection of service reservoir tanks on the high altitude. In addition, visual intrusion will occur where project activities are likely to create disfigured landscapes in the project area especially where the construction activities will result in deposition of large spoils and digging of the trenches.

Mitigation / Enhancement Measures

- The contractor should maintain as much as possible the existing landscapes and plant trees and vegetation to enhance the visual aspect.
- Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs

j) Increased accidents and occupational hazards

Implementation of the project will definitely increase volume of human and motor traffic in the project area. The increase in human and motor traffic will be aggravated by the transportation of construction materials, water pipes and other equipment required in the construction of the water supply facilities.

This is likely to result in a higher risk of accidents and occupational hazards occurring in the area of operation. Factors that may exacerbate this situation are inadequate appropriate working gears for project workers including the helmets, overalls, boots and gloves.

Impact significance: Accidents could cause considerable ecological damage, financial loss and harm to human life. While largely reversible, some impacts such as loss of human life are irreversible. The receptor **sensitivity** is considered **high** given that such impacts may be irreversible once they occur. The impact **intensity** is considered to be **low** since MWE/WSDP-N will procure a qualified contractor who is aware of OHS measures. Nevertheless, this gives rise to an impact of **moderate** significance

Mitigation / Enhancement Measures

- The contractor should ensure that workers are provided with adequate personal protective wear to mitigate injuries such as gloves, helmets, overalls and gumboots.
- Traffic guides and signs should be utilized to avoid accidents on busy roads and junctions especially with vehicles transporting materials.

k) Sourcing of Construction Materials

Sourcing of materials such as sand, gravel bricks/blocks and timber if not well regulated and controlled can have a significant impact in the points of sourcing.

Proposed Mitigation Measures

- The Contractor should liaise with local authorities to ensure that materials such as sand and gravel are only taken from quarries and borrow pits with the necessary environmental permits.

l) Archaeological / Historical Sites

Throughout the consultations with the locals and local leaders, no known archaeological or historical sites exist on the proposed project routes, and proposed construction sites. Therefore, no impacts on any features of importance to national heritage are expected.

Proposed Mitigation measures

- Although no archaeological features were observed or known to exist at the proposed project sites and on transmission routes & sites, the Contractor shall ensure that key members of his staff are briefed. Any such features that may be found that were not apparent on surface investigation will be reported by the project management and appropriate procedures followed to hand them over to the authority responsible for national heritage and antiquities.
- Develop a Chance Find Procedure to cater for any unknown PCRs that could be intercepted during the construction at the different sites and the transmission and distribution pipe networks

m) Groundwater Quality

Disturbance or loss of protected/endangered plant species or communities (terrestrial, wetland, aquatic) due to construction activities of the different project components.

Proposed Mitigation measures

- The borehole should be covered and sealed so that dirt, flooded water, sand and other debris cannot fall in.
- The boreholes should have a raised concrete apron around its base to prevent dirty water seeping back into the hole.
- Do not develop pit latrines close boreholes.
- Dispose of all waste in an approved disposal site.

n) Risk of Accidents

The water pipelines will have to be laid across existing roads that are used by motorists and cyclists in addition to pedestrians. The trenches created for the pipe crossing can lead to accidents if proper signage is not put in place. Construction traffic accidents would be a significant social impact and likely to affect public members like children, women, disabled, elderly people and livestock, etc. The duration of the risk will be short-term occurring only during the construction phase. Although some effects of the accidents (e.g. minor injuries) may be reversible, some, for example, loss of human life are irreversible.

Impact significance: The receptor sensitivity is **medium** given the number of pedestrians and commercial activities along the roads while the intensity is **medium** given the temporary nature of the construction activities, however, some of the impacts may be irreversible. The impact significance is thus assessed to be **major**.

Proposed Mitigation measures

- Best transport safety practices will be adopted with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public by: employing safe traffic control measures, including road signs and flagmen/traffic guides to warn of dangerous conditions and children crossings; and setting speed limits on all access roads in the project area will be 30km/h for light vehicles and 20km/h for heavy vehicles.
- Service ducts installed by the road contractor will be used where applicable to avoid cutting through roads that have just been upgraded.
- All workers, including sub-contractors and casual labour, will undergo an environmental, health and safety induction before commencing work on site. This will include a full briefing on site safety and rules.
- The affected communities will be informed of the timing and duration of the construction activities across access roads and any uncertainties or potential for change and also sensitised on the dangers of construction sites and the need to keep away.
- Identifying optimum routes from pipe storage areas to the ROW to avoid sensitive receptors such as schools and hospitals, wherever possible and putting in place journey management plans.
- Restrictions on hours of driving (including night time restrictions where sensitive receptors may be affected) and timing of vehicle movements to avoid busy periods in urban areas, particularly the start and end of school and the working day
- Control over routes used by vehicles to avoid construction traffic using inappropriate roads and other road users gaining access to the pipeline spread and access roads.
- Ensuring adequate vehicle maintenance to ensure that vehicles do not produce significant emissions and that all safety features including brakes, lights etc. are in good condition.

Adoption of the above mitigation measures will reduce impact intensity to “very low” resulting in a residual impact of minor significance.

o) Social Misdemeanour by Construction Workers

While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS. Irresponsible sexual relationships in project communities can break families and heighten risk of contracting HIV/AIDS. Illicit sexual relationships can be short-term but have long-term and irreversible effects. The Code of Conduct for Contractors has to be signed by contractor upon award of contract and copies displayed for workers to view. It ought to be translated into predominant local language of the workforce.

Impact significance: Duration of the impact will be short-term or long-term depending on whether

HIV/AIDS is contracted and the extent of the impact will be local or national depending on origin of construction workers. The **intensity** of the impact is **very low** given the small size of the project and

other similar construction activities like for roads are already taking place in the area. **Sensitivity** of the receptor is rated **high** given that some of the outcomes have a long-term effect. Therefore, significance of the impact is **minor**.

Proposed Mitigation measures

- As a contractual obligation, contractors shall be required to have an HIV/AIDS policy and a framework (responsible staff, action plan, etc.) to implement during project execution.
- A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation.
- A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE/WSDP-N which will be signed by all workers on the project.
- Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled.
- All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities.

p) Destruction of Cultural Resource/Heritage

No known archaeological or historical sites exist in the project area or around proposed project sites and no impacts on any features of importance to national heritage are expected. Any such features that may be found (e.g. during excavation works) that were not apparent on surface investigation or that did not come to light during the ESIA study will be reported by the project and a chance finding procedure will be followed as annexed.

8.5 Negative Impacts during the Operation Phase

i) Water quality and pollution

The quality of water recommended is that which is physically, chemically and bacteriologically safe for human consumption. When not thoroughly treated, water could be a source of water related diseases which could affect the whole project communities, thereby causing an epidemic in the area. Transmission of water can also result into pollution entering the boreholes.

Proposed Mitigation Measures

- The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure.
- The boreholes should have raised concrete aprons around their bases to prevent dirty water seeping back into the hole.
- The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around them.

ii) Water quantity and yield

This could be due to declining groundwater recharge and over pumping. The project sites are prone to suffering from rapid land use change (deforestation, soil erosion, etc.) thus the recharge of the ground water supplying the boreholes may be affected in the long run.

Mitigation / Enhancement Measures

- Get involved with catchment management planning that could improve land management and restore groundwater recharge.

- Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer.
- Reduce the amount of water being taken – if demand in the area is growing then look at developing new water sources.
- Keeping records of how much is being pumped (either volumes or number of hours for which the pump is being used per day). Find out if sudden drops in level correspond to pumping activity.

iii) Water supply system failure

Insufficient cost/funding for operation and maintenance would lead to poor maintenance of the system which eventually could lead to frequent breakdowns of the water supply system and consequent shut down, which further could require major and costly rehabilitation. Other sources of failure in the water system could be due to sabotage (possibly by the water vendors who envisage loss of livelihoods), illegal connections which could result in decreased water pressure, and vandalism (theft of water system parts)

Mitigation / Enhancement Measures

- Payment for water supply services is the only way to keep the service running continuously and therefore tariffs would be designed to ensure financial viability. Cost recovery would be achieved through service fee payments.
- Put in place a water user committee to oversee the operations of the water system.
- Fence off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like the community tap stands to mitigate trespass and sabotage.

iv) Pollution of water due to cutting of pipes.

Digging and construction of water facilities within close vicinity/on the water transmission network could result in pollution and loss of water

Mitigation / Enhancement Measures

- The developer should hire services of security guards to monitor and guard the water supply system facilities.
- Sensitization and awareness about the dangers of vandalising the water supply system facilities should be done especially by the local leaders and the developer (MWE/WSDF-N).
- Legal and applicable punitive measures like arrests and prosecution should be taken to those caught vandalising the water system facilities in order to curtail and to serve as an example to those who would want to engage themselves in such acts.
- The developer should fence off all the premises of the different project components like the pumping stations, reservoir sites and any other erected structures.

v) Soil erosion from pipeline failure and loss of water due to high pressure

There could cases of soil erosion and water loss in case pipes burst and water flows for a long time without any attention.

Mitigation / Enhancement Measures

- The recommended pipes in the design should be used and emphasized.
- The operator should employ skilled plumbers to always attend to such cases in time
- The developer should hire services of security guards to monitor and guard the water supply system facilities.
- Sensitization and awareness about the dangers of vandalising the water supply system facilities should be done especially by the local leaders and the developer (MWE/WSDF-N).

8.6 Impacts of Decommissioning

After the water scheme infrastructure has attained its lifetime, it will either be rehabilitated or decommissioned to return the affected area to a natural environment similar to that which would have

existed prior to construction. However, some of the structures/facilities may still have other beneficial uses such as: run-off control, recreation, and water supply among others. Therefore, prior to destroying the structure it is crucial to know whether the structure can be reused through refurbishment of the structures and equipment.

Decommissioning of the water scheme can have negative impact on environment of the area from the release of built-up sediments into the neighbouring ecosystems. There will be changes in the quality of the different water sources (physical and chemical characteristics). These will include:

- *Changes to aquatic ecology:* The smaller animals like the macro-invertebrate's population distributions would be affected, as their digestions would become slower leading to unfavourable conditions for reproduction. When the levels of suspended solids are in excess, the non-organic sediments loading increases where the sediment particles are ingested and becomes hard to digest.
- *Pollution:* Decommissioning will lead to temporary increase in noise and vibration as well as air pollution due to emissions of dust. The removal of concrete and similar non-recyclable construction materials may cause land degradation.
- *Socio-economic impacts:* Removal of structure may impact the socio-economic conditions such as loss of employment thus reduced livelihoods damage of land use.

Mitigation / Enhancement Measures

The water system infrastructure can always be rehabilitated from time to time and might not necessarily have a life span and with the passage of time social and environmental scenario will change. Therefore, the decommissioning plan discussed above cannot be framed in present scenario however; the various mitigatory measures should meet the following requirement in addition to decommissioning plan to be developed before decommissioning:

- Decommissioning will be undertaken in accordance with the legislation prevailing at that time, in liaison with the relevant regulatory authorities and adhere to the health and safety guidelines to ensure that the decommissioned facilities do not deteriorate to the point where they become a hazard to the public or the environment.
- Safe disposal of waste and concrete and similar non-recyclable construction materials, restoration of all disturbed sites to pre-construction conditions through bioengineering measures.

8.7 Cumulative Impacts

Cumulative effects can be defined as "the impacts on the environment that result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions" (Council on Environmental Quality, US 1978). Below are some of the envisaged cumulative effects:

a) Physical Impacts

Predicted physical impact is increasing recession area and water pollution. Also, activities like clearing of vegetation may increase the intensity and frequency of erosion/land degradation. This results in increased sediment concentration in receiving water bodies hence hindering other water usage purposes of affected water sources.

b) Biological Impacts

Changes in the physical and chemical characteristics of water from increased runoff inevitably affect distribution and abundance of aquatic biota. This can be attributed to increased nutrients leached from flooded soils and vegetation, enhanced productivity throughout the food chain.

c) Socio-economic Impacts

The development of proposed project over the time would generate many employment opportunities directly as well as indirectly in the form of various service providers e.g. operation and maintenance.

d) Increased water demands due to increase in the population

Increase in population in the project area will lead to increase in water demand and therefore, this may lead to over abstraction of water from the existing system in order to meet the demand. This may have impact on the ground water recharge and aquifers.

There could also be cumulative impacts on the water quality resulting from the contamination from an increase in sanitation requirements of a higher population and pit latrines proximal to the water sources (Boreholes)

Tables 25, 26, 27 and 28 below presents a summary of an evaluation of the above envisaged impacts as a result of the implementation of the project

Table 29: Identified Environmental and Social Impacts during phase.

Item	Environmental Component	Potential Environmental Impact	Potential Mitigation Measure	Impact Rating
D1.	Groundwater Resources	Local lowering of water table levels, due to abstraction of groundwater for the water supply system.	<ul style="list-style-type: none"> Undertake a hydrological study of boreholes to determine water table depths, borehole yields and local use of groundwater. 	Minor
D2.	Groundwater Quality	The groundwater could become polluted as a result of pit latrines and indiscriminate waste disposal practices.	<ul style="list-style-type: none"> Avoid prospecting in areas that are prone to flooding, waste disposal sites and pit latrines. 	Moderate
D3.	Soils	Soil erosion/damage due to survey activities and vehicle tracks. Soil contamination from oil and diesel spills.	<ul style="list-style-type: none"> Minimize number of tracks. Use right angle intersections & use bunding. Avoid seasonally marshy areas & floodplains. 	Minor
D4.	Flora	Disturbance or loss of endangered plant species or communities (terrestrial, wetland, aquatic) due to survey activities.	<ul style="list-style-type: none"> Discourage any wanton destruction of vegetation and habitats beyond the designed project works. 	Minor
D5.	Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat.	<ul style="list-style-type: none"> Minimize vegetation clearance. Protect water & soils from pollution. 	Negligible
D6.	Noise and vibration	Noise generated by survey activities, especially vehicles, pump testing activities	<ul style="list-style-type: none"> Working hours should be restricted from 7am – 6pm. 	Minor
D7.	Air quality	Dust from vehicle movements.	<ul style="list-style-type: none"> Avoid excessive vehicle movements. Limit vehicle speeds on unsurfaced tracks to 20kph. 	Negligible
D8.	Health and safety	Risk of accidents and ill health as a result of the project.	<ul style="list-style-type: none"> Hold safety talks with workers before work. 	Minor
D9.	Public nuisance	General nuisance such as noise, waste and dust.	<ul style="list-style-type: none"> Minimize number of workers at site. 	Minor

Negative Impacts during the Construction phase

Table 30: Environmental and Social adverse/negative impacts during Construction Phase

Item	Environmental Component	Potential Environmental Impact	Potential Mitigation Measure	Impact Rating
C1.	Land acquisition for infrastructure	The land-take would be permanent where all the project components would be constructed and temporary along the pipeline network. However,	<ul style="list-style-type: none"> The district and local authorities in Barr Sub County have already been engaged together with the local land lords and they agreed with communities whose land will be used for the proposed project 	Moderate

		both the transmission and distribution lines would be confined to the road reserves where possible	<p>construction (MoUs/Consent forms signed as attached see appendix III). No grievances were reported and are envisaged.</p> <ul style="list-style-type: none"> ▪ Compensation (where possible) to land owners as project affected persons. 	
C2.	Loss of vegetation cover and top soil	The existing vegetation and top soil will be cleared to give way to the construction process on all sites. This is likely to cause loss of habitat and disturbance to faunal communities in the affected sites but at an insignificant level.	<ul style="list-style-type: none"> ▪ After construction, there should be landscaping and re-vegetation. The premises will be planted with vegetation/grass and ornamental trees. ▪ The water source should be fenced off to reduce on going agricultural activities around the borehole to avoid pollution entering it especially when it rains heavily. ▪ Minimize vegetation clearance by clearly demarcating work areas. ▪ Provide environmental awareness training to all employees. ▪ Rehabilitate all disturbed areas. 	Moderate
C3.	Increase susceptibility to Soil Erosion	Increased soil erosion is likely to occur in the vicinity of project sites during the construction of the water source points, pump stations, installation of the water pipe reticulation and other related construction works. The site earthworks will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.	<ul style="list-style-type: none"> ▪ The sites will be hoarded off to intercept any eroded material and any soil material will remain within the site. ▪ The project proponent will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. ▪ Use proper techniques for trenching and shoring 	Moderate
C4.	Increased siltation of the aquatic habitats	Some of the excavated sediments from the project site and the construction spoils emanating from the excess excavated material and construction debris are likely to increase siltation especially in the nearby seasonal swamp to the motorized borehole and therefore affecting the associated aquatic habitat.	<ul style="list-style-type: none"> ▪ Ensure that the site is at all times drained adequately and surface run off is directed appropriately to avoid water logging of adjacent area and the undulating drainage channel 	Moderate
C5.	Effects of Poor Solid Waste Management	Waste will be generated during the construction of the WSS. The waste stream from the construction will include cement bags, timber and pipe cuttings, empty water bottles, food remains from workers onsite and other forms of waste. If not well managed, the area could be prone to nuisance from foul smell, breeding of vermin and vectors, and lead to outbreak of diseases.	<ul style="list-style-type: none"> ▪ Waste collection bins will be provided at strategic positions at the sites for temporary waste storage. ▪ The waste collection bins should be provided with covers to avoid spillage by scavengers and clearly coded for sorting purposes. ▪ The proponent will hire a certified waste collection company to transport the waste for final disposal to 	Moderate

			designated waste dumping sites by NEMA/LDLG/Barr Sub County.	
C6.	Increased incidences of diseases.	The increase of people involved in the project activities is likely to increase the incidences of diseases in the area. Consequently, there will be potential risk of contracting sexually transmitted diseases (STDs) especially the Human Immuno-Deficiency Virus/Acquired Immuno-Deficiency Syndrome (HIV/AIDS) among the program workers and the local communities. This will be increased due to influx of people seeking for employment.	<ul style="list-style-type: none"> ▪ Burning of waste on-site shall not be allowed. ▪ The contractor should liaise with the District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled. ▪ The contractor should emphasise equal opportunities for both men and women. ▪ The Contractor should, in conjunction with local health authorities, undertake to educate and sensitise the workforce on communicable diseases such as cholera, STDs and HIV/AIDS. ▪ Condoms must be made available to the workforce 	Moderate
C7.	Visual intrusion	This will mainly arise from the erection of service reservoir tanks on the high altitude (hills). In addition, visual intrusion will occur where project activities are likely to create disfigured landscapes in the project area especially where the construction activities will result in deposition of large spoils and digging of the trenches.	<ul style="list-style-type: none"> ▪ The contractor should maintain as much as possible the existing landscapes and plant trees and vegetation to enhance the visual aspect. ▪ Rehabilitate all areas disturbed by construction and landscape with trees, grass and shrubs. 	Moderate
C8.	Increased accidents and occupational hazards	Implementation of the project will definitely increase volume of human and motor traffic in the project area. The increase in human and motor traffic will be aggravated by the transportation of construction materials, water pipes and other equipment required in constructing the water supply facilities. This is likely to result in a higher risk of accidents and occupational hazards occurring in the area of operation.	<ul style="list-style-type: none"> ▪ The contractor should ensure that workers are provided with adequate personal protective wear to mitigate injuries such as gloves, helmets, overalls and gumboots. ▪ Traffic guides and signs should be utilized to avoid accidents on busy roads and junctions especially with vehicles transporting materials ▪ Fence all construction sites. ▪ Place warning signs. ▪ Enforce maximum traffic speeds to 20kph 	Minor
C9.	Sourcing of Construction Materials	Sourcing of materials such as sand, gravel bricks/blocks and timber if not well regulated and controlled can have a significant impact in the points of sourcing.	<ul style="list-style-type: none"> ▪ The Contractor should liaise with local authorities to ensure that materials such as sand and gravel are only taken from quarries and borrow pits with the necessary environmental permits. 	Moderate
C10.	Occupational Health and Safety Risks for the Workforce	Construction traffic, excavation machinery, blasting of rocks and trenches may pose accident risk to workers either when equipment is operated by inexperienced workers or when in a poor mechanical condition or falls into the trenches.	<ul style="list-style-type: none"> ▪ All construction workers will be oriented on safe work practices and guidelines and ensure that they adhere to them. ▪ Training will be conducted on how to prevent and manage incidences. This should involve proper handling of electricity, water etc. and sensitization 	Moderate

			<p>on various modes of escape, conduct and responsibility during such incidences. All must fully be aware and mentally prepared for potential emergency.</p> <ul style="list-style-type: none"> ▪ Regular drills will constantly follow on various possible incidences. This will test the response of the involved stakeholders. Such drills will keep them alert and they will become more responsive in the case of incidences. ▪ Signage will be used to warn staff and/ or visitors that are not involved in construction activities of dangerous places. 	
C11.	Social Misdemeanour by Construction Workers	While most workers may originate from the local community where they have families, there might be others from distant places and working away from their families. With some disposable income to spend, this might induce illicit sexual relationships, with attendant risk for spread of HIV/AIDS	<ul style="list-style-type: none"> ▪ framework (responsible staff, action plan, etc.) to implement during project execution. ▪ A sensitisation programme for the would-be affected local communities will be conducted prior to commencement of and during the project implementation. ▪ A code of conduct (appropriate to behaviours in workplace and with respect to relations with local community) will be developed and approved by MWE/WSDP-N which will be signed by all workers on the project. ▪ Local workers will preferentially be employed, paid directly through their banks and access to bars by workers from outside the project area in the local communities controlled. ▪ All construction workers shall be orientated and sensitized about responsible sexual behaviour in project communities 	Moderate
C12.	Archaeological / Historical Sites	Throughout the consultations with the locals and local leaders, no known archaeological or historical sites exist on the proposed project routes, and proposed construction sites. Therefore, no impacts on any features of importance to national heritage are expected.	<ul style="list-style-type: none"> ▪ The Contractor shall ensure that key members of his staff are briefed. Any such features that may be found that were not apparent on surface investigation will be reported by the project management and appropriate procedures followed to hand them over to the authority responsible for national heritage and antiquities. 	Minor
C13.	Groundwater Quality	The groundwater could become polluted as a result of construction activities, pit latrines and indiscriminate waste disposal practices.	<ul style="list-style-type: none"> ▪ The borehole should be covered and sealed so that dirt, water, sand and other debris cannot fall in. 	Moderate

			<ul style="list-style-type: none"> ▪ The boreholes should have concrete aprons around their base to prevent dirty water seeping back into the hole. ▪ Do not develop pit latrines close to boreholes. ▪ Dispose of all wastes in an approved disposal site. 	
C14.	Fauna	Disturbance or loss of protected/endangered animal species/communities and their habitat due to construction activities (noise, dust, fumes, pollution, vehicles)	<ul style="list-style-type: none"> ▪ Minimize vegetation clearance. ▪ Protect water resources from pollution. ▪ Protect soils from contamination. ▪ Rehabilitate all disturbed areas. 	Minor

Table 31: Operation Phase Adverse/Negative Impacts

Item	Environmental Component	Potential Environmental Impact	Potential Mitigation Measure	Impact Rating
OP1	Water quality and pollution	The quality of water recommended is that which is physically, chemically and bacteriologically safe for human consumption. When not thoroughly treated, water could be a source of water related diseases which could affect the project communities, thereby causing an epidemic in the area. Transmission of water can also result into pollution and pollution entering the boreholes	<ul style="list-style-type: none"> ▪ The borehole should be covered and sealed so that dirt, flooded water, sand and other debris cannot fall in. Transmission and distribution pipes should also be covered underground to reduce exposure. ▪ The boreholes should have raised concrete aprons around their bases to prevent dirty water seeping back into the holes. ▪ The drilled borehole areas should be raised well-head by building earthworks to prevent the flooded water, dirt and other debris to accumulate around it. 	Moderate
OP2	Water quantity and Yield	This could be due to declining groundwater recharge and over pumping. The project sites are prone to suffering from rapid land use change (deforestation, soil erosion, etc.) thus the recharge of the ground water supplying the borehole may be affected in the long run.	<ul style="list-style-type: none"> ▪ Get involved with Water source catchment protection and management planning that could improve land management and restore groundwater recharge. ▪ Encourage contour ploughing, mulching and other agricultural practices that increases soil water retention and percolation into the underlying aquifer. ▪ Reduce the amount of water being taken – if demand in the area is growing then look at developing new water sources. ▪ Keeping records of how much is being pumped (either volumes or number of hours for which the pump is being used per day). Find out if sudden drops in level correspond to pumping activity. 	Moderate
OP3	Water Supply System failure	Insufficient cost/funding for operation and maintenance would lead to poor maintenance of	<ul style="list-style-type: none"> ▪ Payment for water supply services is the only way to keep the service running continuously and 	Moderate

		the system which eventually could lead to frequent breakdowns of the water supply system and consequent shut down, which further could require major and costly rehabilitation. Other sources of failure in the water system could be due to sabotage (possibly by the water vendors who envisage loss of livelihoods), illegal connections which could result in decreased water pressure, and vandalism (theft of water system parts)	<p>therefore tariffs would be designed to ensure financial viability. Cost recovery would be achieved through service fee payments.</p> <ul style="list-style-type: none"> ▪ Put in place a water user committee to oversee the operations of the water system. ▪ Fence off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like the community taps like kiosks to mitigate trespass and sabotage 	
OP4	Water pollution due to cutting of the pipes	Digging and construction of water facilities within close vicinity/on the water transmission network could result in pollution and loss of water	<ul style="list-style-type: none"> ▪ The developer should hire services of security guards to monitor and guard the water supply system facilities. ▪ Sensitization and awareness about the dangers of vandalizing the water supply system facilities should be done especially by the local leaders. ▪ Legal and applicable punitive measures like arrests and prosecution should be taken to those caught vandalizing the water system facilities in order to curtail and to serve as an example to those who would want to engage themselves in such acts. 	Moderate
OP5	Noise levels from Generators	Using of generators to boost the pumping of the water at the pumping stations may lead to moderate noise levels around the project area	<ul style="list-style-type: none"> ▪ Installation of solar system instead of generator ▪ Service the generators regularly to minimize on the noise. ▪ Switch on generators only for few hours to boost on the pumping hours but always use the solar systems 	Moderate

Table 32: Decommissioning Phase Adverse Impacts

Environmental Component	Potential Environmental Impact	Potential Mitigation Measure	Impact Rating before Mitigation
Surface Water Quality	Pollution of water bodies from erosion of unconsolidated materials, contaminated soil, wastes (solid and liquid), etc. as a result of demolition activities.	<ul style="list-style-type: none"> • Rehabilitate all areas e.g. grass/tree planting. • Take samples of the runoff water into the receiving water body nearby and ensure free pollution. • Remove all contaminated soil identified and dispose of it in an approved site. 	Moderate

		<ul style="list-style-type: none"> Close any waste disposal facility on site and make provision for drainage in such a way as to prevent future pollution. 	
Flora	Disturbance or loss of plant species or communities (terrestrial, aquatic) due to dust fall-out onto leaves and soil, dump erosion.	<ul style="list-style-type: none"> Rehabilitate or stabilize all cleared areas using indigenous vegetation until handover of the site. 	Minor
Fauna	Disturbance or loss of animal species/communities and their habitat due to the lack of rehabilitation etc.	<ul style="list-style-type: none"> Rehabilitate or stabilize all cleared areas using indigenous vegetation where possible. 	Minor
Soils	Re-use of soils in rehabilitation and re-instatement of pre-project capability.	<ul style="list-style-type: none"> Replace subsoil and overburden first and then cover with saved topsoil. Do not use heavy equipment to replace topsoil because this can cause compaction. 	Minor
	Soil erosion from denuded areas and demolition activities.	<ul style="list-style-type: none"> Maintain erosion protection works. Rehabilitate or stabilize all disturbed areas. 	Minor
Topography	Reinstate the topographic profile.	<ul style="list-style-type: none"> Backfill, contour and landscape. 	Minor
Air quality	Dust from un-rehabilitated sites and demolition activities.	<ul style="list-style-type: none"> Avoid dusty activities e.g. loading and dumping on windy days & monitor dust emissions. 	Minor
	Odors from waste dump.	<ul style="list-style-type: none"> Avoid activities that can lead to pilling of wastes in the project area. Dispose off all the wastes in gazetted sites 	Minor
Noise and vibration	Noise generated by demolition equipment and earth moving equipment	<ul style="list-style-type: none"> Prescribe noise reduction measures if appropriate e.g. restricted working and transport hours and noise buffering. 	Minor
Health and safety	Risk of accidents and ill health as a result of the project	<ul style="list-style-type: none"> Fence all unsafe and dangerous areas & monitor environmental health (air quality, water quality). 	Minor
Aesthetic and amenity values	Improvement of the visual impact of the site on scenic views.	<ul style="list-style-type: none"> Rehabilitate with trees, grass and shrubs where possible. Consult with the local community and tourist industry. 	Minor

Note:

- Mitigation measures have been designed in order to avoid, reduce, mitigate, or compensate for adverse environmental and social impacts and inform the Environmental and Social Management Plan (ESMP).
- Closure and decommissioning of the facility was also identified as a key issue. An environmental management plan has been developed during the assessment that will prescribe procedures for closure and post-operation to ensure that the environment is restored as much as possible to its original state.

9 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

9.1 Introduction

The objectives of the Environment and Social Management and Monitoring Plan (ESMMP) include: compliance with applicable national environmental and social safeguards; propose mitigation, enhancing, management, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts and; address capacity building requirements. The Plan includes details such as the issue to monitor, the indicators, responsibility for collecting and checking data and reporting, costs of implementation (where applicable), responsibility for implementing the action and training or orientation of responsible person (if applicable). It should, however, be noted that the costs indicated in the ESMMP are indicative only and the responsible implementing parties such as Contractors, Supervising Consultants, and respective MWE/WSDP-N teams and other agencies responsible for monitoring should prepare budgets to include the aspects covered in this ESMMP. The proposed project may have minimal adverse environmental effects, provided that recommendations and mitigation measures identified in this Chapter are incorporated into all project phases and are implemented by the developer and the contractors.

Table 29 presents management plan with specific mitigation measures to be implemented during Design, construction, operation and Decommissioning phases of the proposed project.

9.2 Role of the Developer

The developer will be responsible for:

- Reviewing the approved ESIA document, particularly the required mitigation measures and the Environmental and Social Management and Monitoring Plan;
- Reviewing the approval conditions provided by NEMA (approval certificate), and permits from lead agencies including DWRM (Ground Water Abstraction Permit), MoGLSD, (Workplace Inspection Certification), Ministry of Water and Environment (River bank), NEMA (Environmental Management).
- The developer should prepare Environmental, Social, Health and Safety Action Plans to comply with the above requirements.
- Costs related to complying with the Environmental Safeguards as applicable to the construction and operation of the Water Supply System will be met by the developer.
- The day-to-day responsibility for implementing the ESMMP will be of the Developer/contractor.
- Include the ESMP costs in the procurement and contractual documents for appropriate adoption and costing by the contractor
- Implementing and complying with the conditions of the ESMMP forms part of the conditions of appointment of all Consultants and Contractors throughout the life of the project;
- Appointing Independent environmental experts to audit the implementation of, and compliance with, the ESMMP and monitoring plan, as well as the NEMA Approval conditions on an annual basis; and the independent environmental Compliance audits, together with other relevant monitoring information made available to the public, throughout the life of the project, summarized in lay person's terms and in a culturally accessible manner.
- Training and awareness creation in environmental and social management and the mitigation of impacts are provided to MWE Project staff, to ensure they are aware of their responsibilities and are competent to carry out their work in an environmentally and socially responsible manner

9.3 Role of Construction Supervision Consultants

The Supervision Consultants to whom work is outsourced during project implementation will be responsible for the following:

- Reviewing project design, contractor's contract, BOQs and all other project documents like the ESMP, ESIA report, NEMA project certificate conditions, RAP as to get familiar with in order to build up an additional mechanism for enforcing compliance as per those in contract.
- Ensuring that contractors familiarize themselves with the environmental and social management framework for the project sites and activities.
- Reviewing and approving Contractor's plans as required in the above documents like; EHS Plans, Waste Management Plan, Traffic Management Plan, Emergency Response Plan, Gender Management Plan, Erosion and sediment control plan, Decommissioning and Restoration Plans of the site; among others.
- Following up on Contractor's obligation in acquiring the various permits in relation to the project works which then will be verified like; permit for excavation, Permit for hoarding and scaffolding, Work registration permit.
- Monitoring the Contractor's performance in EHS aspects, particularly in regard to the above-mentioned plans; using the safeguards documents provided by MWE and NEMA, as well as permits from other Lead Agencies, using the safeguards documents provided.
- Ensuring that all the contractors and their subcontractors receive basic training or are sensitized on environmental and social matters, including acceptable conduct, storage and handling of potentially hazardous substances, waste management, and prevention of pollution of natural resources.
- Receiving daily, weekly and monthly reports from the Contractor on EHS aspects, and furnishing MWE/WSDF-N with the information during monthly meetings or site visits. Any urgent issues will have to be reported to MWE immediately to allow appropriate timely action to be implemented.
- Preparing the environmental supervision statement and also approving of invoices or payments with consideration of ESMP performance.
- Regularly engaging with the local communities to ensure continued social acceptance in the areas where the Contractor is in operation, and also to ensure that Contractor adheres to the recommendations made in this ESMP.
- Instructing the contractor to correct within the timeframe determined as per contract in case of any corrective actions. If there is breach of contract or strong public complaints on contractor's environmental performance, the Supervision Consultants is obligated to order the contractor to correct, change or stop the work, reporting to relevant agencies and the MWE/WSDF-N.

9.4 Role of Government Institutions

Agencies such as NEMA, MGLSD, LDLG will be involved in the various phases through the life of the Project as proposed in the ESMP. The responsibilities of each respective agency will be those that are within their mandate, and as such, no extra costing has been included in the ESMP since it is expected that their annual operational budgets will be made to include the required works for this Project. For this reason, MWE should regularly update the respective lead agencies with the Project progress, and challenges and opportunities presented during the implementation of the project.

9.5 The Role of the Contractor and/or subcontractors

During sites preparation and construction for the new Water supply system, the contractor and/or the subcontractors will be responsible for ensuring compliance with all national legislation and Policies as well as adherence to all environmental and socio-economic mitigation measures specified in the ESMP that has been developed during this ESIA study. The contractor and/or subcontractor will also be responsible for managing the potential environmental, socio-economic, safety and health impacts of all contract activities whether these will be undertaken by themselves or by their subcontractors.

9.6 The Monitoring Team

It is recommended that a core team of people preferably headed by the Lira District Natural Resources Office, District Water Office and composed of other officials from relevant ministry and respective local environment committees will carry out monitoring activities. The monitoring team will start its work during the site preparation and construction process and continue throughout the operation phase and should ensure that the proposed mitigation measures are implemented as

suggested and recommended in this ESIA study. The monitoring team will most particularly check for the following issues among others:

- Changes in the water quality and quantity.
- Compliance with the conditions set out on the water abstraction permit.
- Compliance with the conditions on the issued Certificate of Approval from NEMA.

9.7 Environmental and Social Monitoring Plan

A monitoring process will be established to check/assess the implementation progress and effectiveness of the mitigation measures suggested and the resulting effects of the proposed project on the environment. The process will begin during site preparations, construction stage and continue throughout the operation phase. It also includes regular reviews of the impacts that cannot be adequately assessed before the beginning of the project, or which arise unexpectedly. In such cases, appropriate new actions to mitigate any adverse effects will be undertaken.

The recommendations will provide a basis for tracking progress of the proposed project activities with regard to sound environmental practice and mitigation measures. This will be done with the support of supplementary documents such as specific architectural and engineering plans and designs for civil and mechanical works to be undertaken on the site.

Environmental Management and Monitoring Plan is presented below under Table 29.

Table 33: Environmental Management and Monitoring Activities and Criteria

Ref. No	Affected Environment	Objective to Address Impact	Monitoring Activity	Project Phase	Responsibility	Frequency	Mitigation Cost (UGX)
M1.	Ground water Resources	To minimise on the Local impact of lowering water table levels, due to abstraction of groundwater for the system	Hydrological study of boreholes to determine water table depths, borehole yields and local use of groundwater	Design	Consultant	Monthly	-
M2.	Ground water quality	To minimise on the impact of ground water pollution	Avoid prospecting in areas that are prone to flooding, waste disposal sites and pit latrines	Design	Consultant	Monthly	-
M3.	Soils	To minimise on the Soil erosion/damage due to survey activities and vehicle tracks.	Use right angle intersections & use bunding and avoid seasonally marshy areas & floodplains	Design	Consultant	Daily	-
M4.	Flora & Fauna	To prevent disturbance or loss of endangered plant species or communities due to survey activities	Minimize vegetation clearance and protect water & soils from pollution	Design	Consultant	Daily	-
M5.	Land acquisition	The land-take would be permanent where the water intakes, office block, pump stations and reservoirs would be constructed and temporary along the pipeline network	Liaise with LDLG, local authorities in Barr Sub County together with communities for land agreement to be used for the different water system facilities and Compensate (where possible) to land owners as project affected persons	Construction	Client/MWE/ WSDf-N	Daily	-
M6.	Loss of vegetation cover and top soil	To minimize on the loss of vegetation cover and top soils along the project sites	Landscaping and re-vegetation after construction and fencing off all the sites.	Construction	Contractor	Daily	17,250,000
M7.	Increase susceptibility to soil erosion	To reduce on incidences of soil erosion at project sites	Hoarding off project sites to intercept any eroded material and any soil material and proper landscaping and vegetation restoration. Use of	Construction	Contractor	Daily	16,900,000

			proper techniques for trenching and shoring				
M8.	Increased siltation of aquatic habitats	To reduce on the impact of siltation in the nearby seasonal aquatic habitats	Draining sites adequately and directing surface run off appropriately to avoid water logging of adjacent area	Construction	Contractor	Daily	8,600,000
M9.	Incidences of diseases	To prevent cases of potential disease risks within the project area	Liaising with the District and Sub County CDO to mobilise communities during the recruitment process to reduce on influx of people who are unskilled. Educating and sensitising the workforce on communicable diseases such as cholera, STDs and HIV/AIDS and provision of Condoms to the workforce.	Construction	Contractor	Daily	12,000,000
M10.	Air Quality	To minimise dust nuisance and exhaust pollution	Provision of adequate and appropriate personal protective equipment (PPE).	Construction	Site Supervisor	Daily	14,720,000
M11.	Construction Material Sourcing	To regulate and control the impact in the points of sourcing materials.	Liaise with local authorities to only source materials from legally registered suppliers	Construction	Site Supervisor	Daily	-
M12.	Noise Levels	To minimise noise disturbance to neighbours	Measurements of noise levels using a noise meter.	Construction	Site Supervisor	Daily	5,790,000
M13.	Surface Water	To avoid water pollution & disruption	Discharge of any waste onto the environment should meet Regulation requirements.	Construction	Site Supervisor	Daily	10,000,000
M14.	Ground Water	To prevent contamination & over abstraction of water	Maintain abstraction records & check for gaps or cracks around the opening of the borehole.	Operation	Client/ Operator	Daily	75,320,000
M15.	Occupation Safety & Health	To ensure Health and Safety at the site / Premises	Inspect all equipment to ensure that they are in good working condition.	Construction	Site Supervisor	Monthly	6,500,000
		To prevent injury to workers and other personnel.	Barrier tape and warning signs will be used, install safety signage, fence off the area.	Construction	Site Supervisor	Weekly	8,670,000

M16.	Public health	To prevent spread of diseases	Creation of awareness, provision of waste bins and health care.	Construction	Site Supervisor	Quarterly	8,500,000
M17.	Water quality and Pollution	To improve on the water quality from the water source (Boreholes)	Covering and sealing of the boreholes so that dirt, water, sand and other debris cannot fall in. The borehole should have concrete aprons around their bases to prevent dirty water seeping back into the hole.	Operation	Operator/ WSDF-N	Monthly	9,000,000
M18.	Water quantity and yield	To improve on the water quality from the water source (Boreholes)	Prepare a water source protection plan for implementation	Operation	Operator/ WSDF-N	Monthly	Being Prepared
M19.	Water quantity and yield	To maintain the water levels and yield during abstraction	Maintain abstraction records & check for gaps or cracks around the opening of the boreholes Prepare Water source catchment Plans for the motorized boreholes	Operation		Daily	10,400,000
M20.	Water supply system failure	To reduce on the chances of the system failure during operation	Putting in place a water user committee to oversee the operations of the water system. Fencing off the areas like water abstraction points, pump houses, water storage reservoir tanks and other water supply structures like community Kiosks to mitigate trespass and sabotage	Operation	Client/ Operator	Daily	15,400,000
M21.	Water pollution due to cutting of pipes	To minimise on the chances of vandalism and theft of the water facilities parts	Hiring of security guards to monitor and guard the water supply system facilities. Sensitization and awareness about the dangers of vandalizing the water supply system facilities	Operation	Client/ Operator	Daily	32,450,000

Note:

External Monitor can be a lead Agency and or Authorities like NEMA, DNRO/DEO/DWO or a NEMA Certified Consultant whom the developer and Contractor will contact on matters arising like noise, biodiversity, air and water quality monitoring. Lead Agencies will make their own arrangements on inspections on site to ensure compliance with set guidelines and standards.

CONCLUSION AND RECOMMENDATIONS

Barr RGC Piped Water System is being proposed by the Ministry of Water and Environment/WSDF-N for Barr Sub County in Lira district. This is envisaged to bring an end to water stress and overreliance on a few low yielding boreholes within the project area of Barr Rural Growth Centre and neighbouring community. It is also envisaged that, the area experiences scarcity of safe clean water and high growing population. Further still, the project will also address the focal area of access to clean water as stipulated under the Uganda Vision 2040 and the National Development Plan III. The project also contributes towards achieving SDG (*specifically SDG 6 on clean water and sanitation*). Several beneficial impacts envisaged will include:

- Improved quality of water supplied to communities.
- Improved quality of water supplied to communities.
- Provision of employment opportunities during construction and operation phases.
- Improved health and sanitation due to improved water quality and quantity.
- Improved local economies and induced development especially sourcing of raw materials for construction activities and tree seedling growing business boost during operation phase.
- Small scale irrigation farming especially in vegetables and flowers since most household heads are involved in subsistence agriculture.
- An increase in revenue for the sub counties from water project collections.
- Initiate the move away from the status quo of rural women and children's perpetual carrying of water on their heads from unprotected and distant point water source and allow them to engage in income generating activities and to improve the image of the woman and children.
- Improved image of the Sub County and parishes in terms of providing good services to its people hence more funding from potential funders.

However, the ESIA findings indicate that direct impacts will be fairly compassionate and limited to the project area where construction works will be undertaken. Direct negative impacts will include:

- Soil erosion during construction phase.
- Destruction of vegetation and crops during construction phase.
- Increased noise nuisance during construction phase by workers and equipment.
- Improper disposal of cut out spoil and other construction wastes.
- Other concerns include occupational safety hazards, and HIV/AIDS risk associated with construction labour.

No resettlement issues are anticipated however; a resettlement action plan (RAP) can be prepared to address all compensation issues that are anticipated and an environment and social management plan (ESMP) has been presented in this ESIA report to ensure positive impacts are enhanced while negative impacts are avoided and or mitigated.

During this ESIA study, comprehensive stakeholder consultations were conducted with relevant stakeholders and MWE/WSDF-N will liaise with them to ensure effective implementation of the proposed mitigation measures for the anticipated negative impacts as indicated in the EMMP. MWE/WSDF-N should work closely with the local leaders and Local Government to ensure smooth implementation of the EMMP and if impacts not contemplated during this ESIA arise, the management of WSDF-N should immediately address them in consultation with NEMA. If any other structures/ expansion not described in this report takes place, it will be considered separate and an ESIA Report/Project brief will be prepared by WSDF-N or the Contractor and submitted to NEMA for approval before implementation.

The following mitigation measures should be considered as conditions of approval as they are regarded as being essential in so far as rendering potentially significant impacts acceptable. Implement the EMMP for all provided project phases with special attention being given on:

- Undertake Annual Environmental Audits and submit reports to NEMA.
- Maintaining good house-keeping through the duration of the construction phase.
- Screening unsightly aspects from public view including excavations (where practical), construction material storage areas, waste storage areas and ablutions.

- Erect fencing around construction sites to act as screens minimizing the effect of wind in generating dust emissions.
- The re-vegetation of all areas of natural vegetation with indigenous species that have been disturbed as a result of construction activities and maintain the 200m buffer zone.
- Designation of construction materials and fuel storage areas.
- Effective control of waste and containment of storm water especially during rainy season.
- Implement dust suppression measures (use of water) when appropriate.
- Train workers on issues of HIV/AIDS and child labour should not be permitted.
- Adhere to Occupational Health and Safety Act, 2006 provisions e.g. monitoring noise levels and provision of protective equipment to staff.
- At least 75 % (subject to availability) local labour from Lira district should be used and 95% (subject to availability and skills levels) local contractors should be used.
- The Developer (WSDF-N) monitors compliance together with stakeholder wide monitoring group comprising technical staff from local government institutions.
- Fencing is recommended in order to prevent contamination of the water source and for security of hydraulic structures and installations for the pumpstation.
- Prepare a water source protection plan for the catchment area of the water sources.

Therefore, the proposed Barr RGC Water Supply System is environmentally and socially feasible for implementation provided the recommended mitigation and monitoring measures are implemented, and the proposed implementation arrangements are upheld.

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ANNEXES

Annex I: Approved Terms of Reference for ESIA by NEMA



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA/4.5

23rd September, 2022

The Branch Manager,
Water and Sanitation Development Facility-North,
Ministry of Water and Environment,
Plot No.14/16 Maruzi Road,
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Fax: 256-414-257521 / 232680
E-mail: info@nemaug.org
Website: www.nemaug.org

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE CONSTRUCTION OF BARR RGC PIPED WATER SUPPLY SYSTEM IN BARR SUBCOUNTY, LIRA DISTRICT

This is in reference to the Terms of Reference (TOR) for carrying out the Environmental and Social Impact Assessment (ESIA) for Barr Piped Water Supply and Sanitation Systems, which was submitted to this Authority, on **23rd August, 2022**, for review and consideration. This Authority has finalized the review and grants formal **APPROVAL** of the said TOR.

Please note that the approval of the TORs **DOES NOT grant permission to start** implementing any of the proposed project activities. This is not a Certificate of approval.

In addition to the scope of work provided in the TOR, you are advised to consider the key aspects below during the conduct of the Environmental and social impact study and the preparation of the ESIA report for the Barr Piped Water Supply and Sanitation Systems:

- i. I identify and map all utilities and public infrastructures with in the project area that may be impacted by te project activities and study the area physical plans. Clearly describe the measures that will be implemented to minimize potential impacts on the public infrastructures including the Lira- Abim road and ensure the project is aligned to the physical plans of the area.

- ii. Provide information on the alternatives considered for the project location, design, technology, among others and justification for selections of the preferred options.
- iii. Include in the ESIA, a hydrological investigation report in regard to the potential impacts of the piped water supply system on underground water resources within the proposed project area, incorporate in the EIS mitigation actions to address such impacts
- iv. Provide in the report accurate sets of geographic coordinates(UTM) for the different project infrastructures.
- v. Provide information on the land ownership and land acquisition processes that will be implemented to ensure that land required for the project is acquired in accordance with government laws on land acquisition and append details to the ESIA report.
- vi. Indicate the actual investment cost of the project in line with regulation 18(1) and schedule 5(3f) of the National Environment (Environment and Social Assessment) Regulations, SI 143/2020
- vii. Provide evidence of payments of the 30% ESIA fees as required under regulation 49 (2) of the National Environment (Environmental and Social Assessment) Regulations, 2020.

Note that, only registered environmental practitioner including the team leader should be contracted to carry out the ESIA for the proposed project.

This is therefore to recommend that you carry out the EIA study for the proposed Barr Water Supply and Sanitation System, incorporating the guidance provided above.

We look forward to your cooperation and receipt of copies of the ESIA report for further consideration.




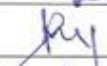




Waiswa Ayazika Anold
FOR: EXECUTIVE DIRECTOR

Annex II: Records of Stakeholder Consultations

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR BARR WATER SUPPLY AND SANITATION SYSTEM IN LIRA DISTRICT.

Date: 26/7/2022 DISTRICT: LIRA DLG

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	OBIA GEORGE	SAS/Sec	0774 190680	
2.	Alunga Peter	Giso Barr sk	0782578328	
3.	ONUNGUAT ALFRED	Lc1 ADJUT A.	0786817910	
4.	ALWENDO MOLLY	CDO Barr	0774267825	
5.	AKAA THOMAS	C/p Lc1	0772514964	
6.	Det Jimmy Charles	Det DLG	0794148450	
7.				
8.				
9.				
10.				







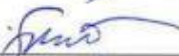
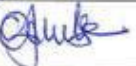
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STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: **CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR BARR RGC WATER SUPPLY AND SANITATION SYSTEM IN LIRA DISTRICT.**

Date: 04/10/2022





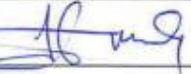

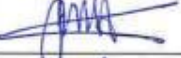



DISTRICT: LIRA

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	OPOLLO ALEX	CEO RRC RC	0782966098	
2.	OWALO GEORGETY	WALLET -B.	0786 207341	
3.	WAKUMA ELIZABETH	WALLET A.		
4.	OWBO DENISH	ABOLET A	0791280473	
5.	KIA AGNES	ABOLET A	0787001134	
6.	OJOK MORIEN	ITR	07841731770	
7.	APIO DORCUS	ABOLET A	-	##
8.	AYOO ANNA	ABOLET A	0784958143	
9.	OWO GEORGE	ABOLET	0772810663	
10.	OJAM ISAAC	ABOLET A	0784914332	

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR BARR RGC WATER SUPPLY AND SANITATION SYSTEM IN LIRA DISTRICT.








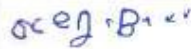


Date: 04.10.2022, DISTRICT: ... LIRA

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	DROMA RESTUTOR	ABOLET B	0778744883	
2.	Ogwak Bonny	ABOLET "B"	0773334778	
3.	Okoch Geoffrey Henry	ABOLET B	0778510208	
4.	AGUMA FELIX	ABOLET (B)	0772438225	
5.	EBONY JOHN	ABOLET (B)	0782417436	
6.	AJUGI LILLY	ABOLET IB	0760233763	
7.	OKELO JUEL	A FARMER	0780445418	
8.	Fuyel Kenneth	A Farmer	0772773374	
9.	ROSE ALUNGA	ABOLET "B"	0784343767	
10.	OGKAL BONNY	ABOLET: B	0773217415	

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR BARR RGC WATER SUPPLY AND SANITATION SYSTEM IN LIRA DISTRICT.

Date: 04/10/2022, DISTRICT: LIRA

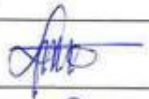








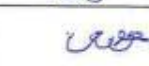
NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	ALUWO FLORENCE	VIP ITEL Subcity	0779079188	
2.	Ocen Patrick	ABOLEI 'B'	—	
3.	Ayugi Chrestan	ABOLEI 'B'	—	
4.	Ocen MOSES	ABOLEI . A.	0778163756	
5.	Eunice BEBONG	ABOLEI . A.	0773745303	
6.	LILEY AALUMA	ABOLEI . A.	—	
7.	SUSAN ELONGE	ABOLEI . B.	0781993500	
8.	OCENG BENON	ABOLEI . A	—	
9.	Eunice Awira	ABOLEI . B .	0780797992	
10.	ADUK JANET	ABOLEI B	—	

STAKEHOLDER CONSULTATION AND ENGAGEMENT

NAME OF THE PROJECT: CONSULTANCY SERVICES FOR ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) AND WATER SOURCE PROTECTION PLAN FOR BARR RGC WATER SUPPLY AND SANITATION SYSTEM IN LIRA DISTRICT.

Date: 04/10/2022

DISTRICT: LIRA

NO.	NAMES	DESIGNATION	CONTACT	SIGNATURE
1.	Ogwang Denis	Lira Abolere	0772943425	
2.	Aguma MORISH	ABOLET (B)	0779828935	
3.	OMYANGA ALFRED	LIRA Abolere A.	0786817910	
4.	MIDDO EBONG	ABOLET (B)	0784393666	
5.	Alunga Peter	GISO Barr AC	0782578328	
6.	JENITER OKELLO	ABOLET .A	—	
7.	SOPHIA AGUMA	ABOLET - A	—	
8.	HARETH OCEMG	ABOLET - A	—	
9.	SARAH OLEE	ABOLET A	0775298772	
10.	FIOW NEK	ABOLET A	—	

Annex III: Land Ownership Documents for the Infrastructure

Telephone: 0774190680

Your Ref,

Our Ref, 213/2



BARR SUB-COUNTY LOCAL GOVERNMENT

OFFICE OF THE SUB-COUNTY CHIEF

P.O. BOX 49 LIRA

DATE: 4th October, 2022

The Branch Manager,
Water and Sanitation Development Facility-
North.


**RE: AVAILABILITY OF LAND FOR THE PROPOSED WATER SUPPLY AND
SANITATION FACILITY FOR BARR RURAL GROWTH CENTRE.**

I take the opportunity to write to you in relation to the above subject.

As part of the requirements needed by the ministry of water and sanitation Development facility, Barr Sub-county hereby commit to provide the required land for the proposed water supply and sanitation facility project. The land provided will be able to accommodate water office blocks, water reservoir (Tank) and water source area (Boreholes) as required.

Thank you for your cooperation and considering Barr Sub-county for this project.

Yours sincerely,

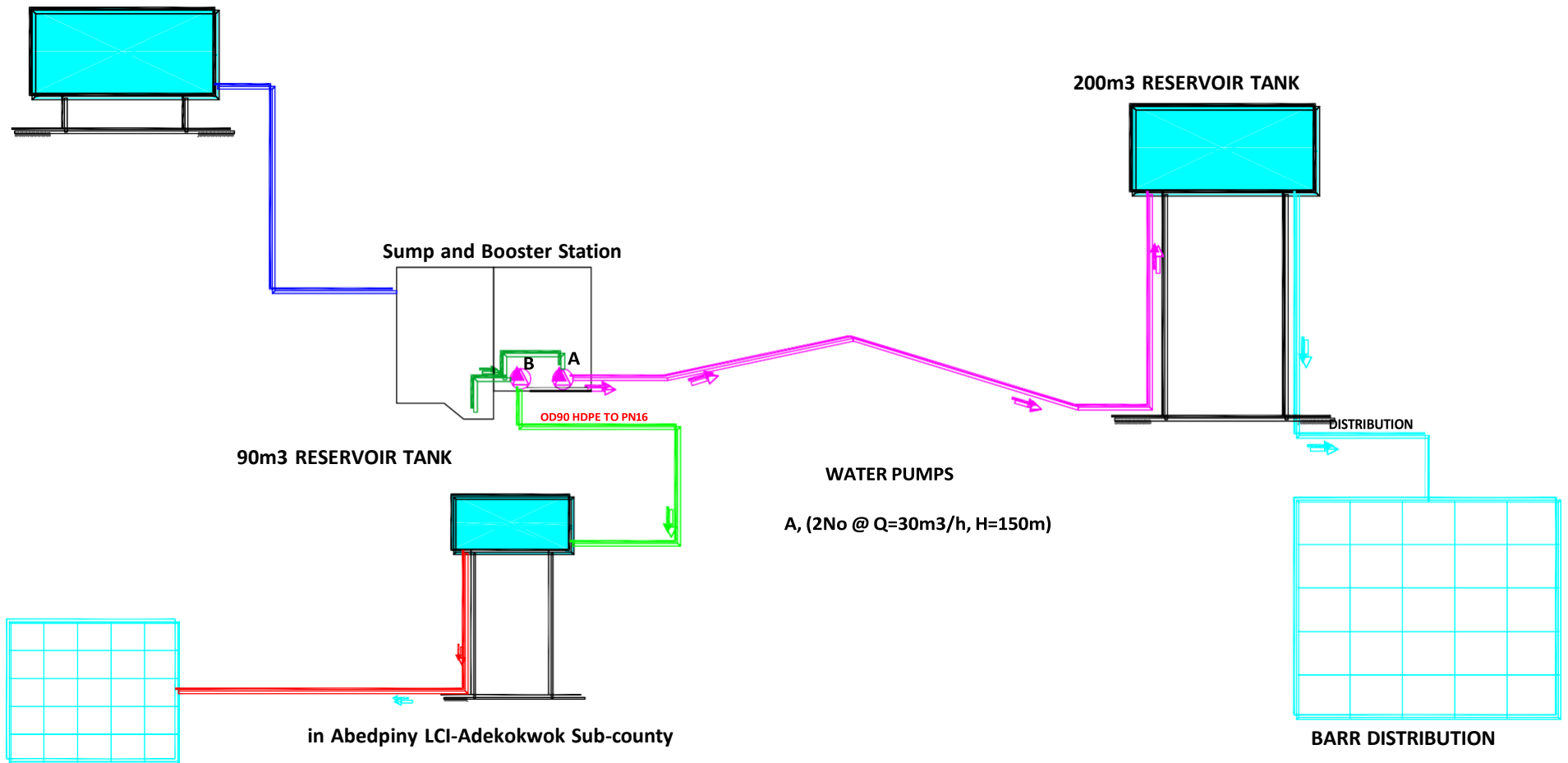

Obia George
Senior Assistant Secretary
Barr Sub-County.



Cc: Chief Administrative Officer – Lira
Cc: Chairman LC III- Barr
Cc: GISO – Barr
Cc: File

5/10/2022

Annex IV: General Layout and Layouts of the Transmission and Distribution System



Annex V: Chance Finds Procedure on Physical Cultural Resources Management

The Physical Cultural Resources Policy (PCRs) i.e. OP 4.11 should be triggered because of the excavation works that may encounter PCRs. To meet the requirements of this policy, a Chance Finds Procedure has been developed to indicate a real risk of causing undesirable adverse environmental and social effects on the physical and intangible cultural resources, and that more substantial planning may be required to adequately avoid, mitigate or manage potential effects. Chance find procedures will be used as follows:

- i. Stop the construction activities in the area of the chance find;
- ii. Delineate the discovered site or area;
- iii. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities and the Directorate of Museums and Monuments (DMM) take over;
- iv. Notify the site / supervisory Engineer who in turn will notify the responsible local authorities and the Directorate of Museums and Monuments under the Ministry of Tourism, Wildlife and Antiquities (within 24 hours or less);
- v. The Directorate of Museums and Monuments would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Directorate of Museums and Monuments (within 24 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- vi. Decisions on how to handle the finding shall be taken by the Directorate of Museums and Monuments. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
- vii. Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the DMM;
- viii. Construction work could resume only after permission is given from the responsible local authorities and the Directorate of Museums and Monuments concerning safeguard of the heritage;
- ix. These procedures must be referred to as standard provisions in construction contracts, when applicable. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered are observed;
- x. Construction work will resume only after authorization is given by the responsible local authorities and the National Museum concerning the safeguard of the heritage.
- xi. Relevant findings will be recorded in World Bank Implementation Supervision Reports (ISRs), and Implementation Completion Reports (ICRs) will assess the overall effectiveness of the project's cultural property mitigation, management, and activities, as appropriate.

Annex VI: Grievance Redress Mechanism

There will be a necessity to resolve conflicts swiftly in order to expedite the project's planning and construction phase and for the smooth eventual operational activities. Therefore, a grievance redressing mechanism is essential for the Water Supply System. This procedure will address this need in detail. The objectives of the grievance process as explained in the subsequent chapter of these guidelines will be as follows:

- Provide affected people with avenues for making a complaint or resolving any dispute that may arise;
- Ensure that appropriate and mutually acceptable corrective actions are identified and implemented to address complaints;
- Verify that complaints are satisfied with outcomes of corrective actions;
- Avoid the need to resort to judicial proceedings.

Grievance management is an important step in community engagement. There had been and will be community grievances throughout the project's various development stages. It is expected that all such grievances be amicably resolved if the developer is to abide by the global and country specific Social Safeguard guidelines. In practice, in similar compensation and resettlement activities, many grievances arise from misunderstandings of the Project policy, or result from conflicts between neighbors, which can usually be solved through adequate mediation using customary rules or local administration at the lowest level. Most grievances can be settled with additional explanation efforts and some mediation using customary dispute settlement mechanisms.

The purpose of Grievance management shall be to provide opportunity for the aggrieved parties to resolve issues through arbitration and negotiation based on transparent and fair hearing. It will allow the parties in the dispute to arrive at a win-win solution. Final outcome thus be that the extra judicial systems will work smoothly and that number of disputes seeking interventions at the country judiciary will be made minimal. The functioning a proper grievance management mechanism is a requirement in view of the above. The overall management of grievances is the responsibility of the developer or/and the contractor. The Project, thus, will put in place an amicable, extra-judicial mechanism for managing grievances and disputes based on explanation and mediation by third parties. Procedures relevant to this amicable mechanism are detailed below. It will include three different levels:

- Registration by project of the complaint, grievance or dispute;
- Processing by project of the grievance or dispute until closure is established based on evidence that acceptable action was taken; and
- In the event where the complainant is not satisfied with action taken by project as a result of the complaint, an amicable mediation can be triggered involving a mediation committee independent from the Project.

Managing grievances needs a clear and transparent procedure well instituted within the management structure of the project. At minimum, such a procedure should consist of the following steps:

- a) to receive the grievances,
 - b) to acknowledgement the receipt,
 - c) investigation and resolution,
 - d) Closeout and follow-up.
-

i. The need for maintain a Grievance Register

There should be Grievance Register which would record all the grievances, complaints and issues the stakeholders would wish to bring to the attention of the Developer or the Contractor. It should be kept at a place where all will have easy access; preferably this should be placed at the office (allocated for the Grievance Committee (GC)). It should contain the date of the entry, name and contact details of the complainant; nature of grievance, Signature (on one side of the Register) and actions taken to address or reasons the grievance was not acted on, the signature of the GC and Complainant as to how the grievance was closed and date (on the other side of the Register).

ii. Recording of the complaints into the Grievance Register

The following steps are to be followed when the complaints will be received: Receipt of complaint (a verbal

or in written) will be received by the Community Liaison Officer or any other officer (a member of the Grievance committee).

- The complainant can obtain the assistance from a member of the grievance committee or the Site welfare officer to lodge such an entry in to the Grievance Register.
- The Officer Responsible or the GC member, who is at present, will communicate with the complainant in a language acceptable to the complainant.
- Since the site working is carried out in English Language, the Site welfare officer or the member of the Grievance committee may lodge the entry in English language
- After lodging the complaint in the register, the officer recorded such complain shall read to the complainant what is recorded and sign the entry made into the Grievance Register

iii. Formation of a Grievance Committee

In Uganda at the local level, the village leaders and the LC (1) play a key role in managing disputes. The Parish level committees formed for the management of disputes is the lowest level of accepted forms of reconciliation board at which the complainants can have access to for justice if issues will not be resolved at the village level. However, in order to strengthen the village level reconciliation of disputes specially over the issues arising from the project related matters, appointing of a Grievance Committee has been considered a viable option according to the accepted practices. It is expected that grievances depending on the complexity and nature can be resolved either at the site level, at the grievance committee level or at the project developer's top management level or at the judiciary level. It means that if a complainant is not satisfied with the site level solution offered by the site manager or the project's administration manager, the matter can be taken up by the Grievance Committee (GC).

The constituency of the grievance committee and its role is explained in the following section. This GC is to be considered the vital body which prevents any grievances to be heard at higher levels. In parallel and where necessary, the GC holds meetings or other appropriate communication with the complainant, with the aim of reducing any tensions and preventing them from escalating. During closeout, the GC seeks to confirm that its actions have satisfied the complainant. During follow-up, the GC, with the assistance of the Site Construction Manager investigates the causes of grievances, where necessary, to ensure that the grievance does not recur.

The composition of Grievance Committee is depicted below:

- a) Representative from area – 01 Members (preferably from Sub County/)
 - b) Representative of Women – 01 Members
 - c) Representative of the Local Government – 02 Community Development Officers
 - d) Representative from the developer – 01 Member
 - e) Representative from the contractor – 01 Member
-

Members of the Grievance will be provided training on conflict resolution and given more exposure on procedures of managing grievances.

iv. Performance Indicators in respect of the functioning of the Grievance Committee

Key interventions include:

- Setting up of a Functional Grievance Committee;
- Addressing employee's grievances in all project phases.

Annex VII: Geotechnical and Hydrological Investigations Study Report.

Annex VIII: COST VALUATION CERTIFICATE OF THE PROJECT.



MINISTRY OF WATER AND ENVIRONMENT
 WATER AND SANITATION DEVELOPMENT FACILITY - NORTH (WSDP-N)
 CONSTRUCTION OF BARR WATER SUPPLY AND SANITATION SYSTEM

Engineer's Estimate

Grand Summary

Bill No	Description	Investment Costs US\$
GENERAL		
G-1	General Items	149,800,000
G-2	Method Related Charges	33,500,000
G-3	Dayworks	6,944,200
WATER SUPPLY, SANITATION AND EQUIPMENT		
W-1	Borehole Pump Station	62,584,274
W-2	Borehole Pumping Mains	78,155,191
W-3	Sump and Pump Siteworks	98,530,416
W-4	Sump and Pump Works	84,643,013
W-5	Guard and Attendants House	53,018,717
W-6	Transmission Mains	114,048,531
W-7	Storage Reservoir and Site Works	149,032,683
W-8	Distribution Network	314,150,191
W-9	Intensification Network	117,509,932
W-10	Water Office	97,345,903
ME-1	Mechanical & Electrical Works	469,076,548
ME-2	Tools and Equipment	100,144,851
S-1	6 Stance Waterborne Toilet	60,296,351
S-2	6 Stance VIP School Latrine-Boys	50,794,979
S-3	6 Stance VIP School Latrine-Girls	60,909,879
S-4	4 Stance VIP School Latrine-Staff	20,999,992
	Sub-Total 1	2,121,485,651
	Allow for 10% contingency	212,148,565
	Sub-Total 2	2,333,634,216
	Allow for 18% VAT	420,054,159
	GRAND TOTAL	2,753,688,375



Annex IX: 30% PAYMENT PROOF FOR THE REVIEW FEES



Payment Receipt

For General Tax
call our Toll Free
(256) 800117000

Or log on to URA web portal
<https://www.ura.go.ug>

Notice DT-2079

Notice Date : 16/11/2022

**WATER AND SANITATION DEVELOPMENT FACILITY-
NORTH**
WSD,IREDA EAST,
OGENGO,
LIRA CENTRAL,LIRA MUNICIPALITY,
LIRA,LIRA

Notice Number
LI02230030403

TIN :
1001196781

Section A - Payment Information

Sr No	Payment Registration	Tax Head	Reference Number	Date of Payment	Amount
1	2230003867498	NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY -> ENVIRONMENT IMPACT ASSESSMENT -> FEES PAYABLE ON PROJECTS -> Total vale is more than 2.5bn but does not exceed 5bn-EIA Submission	EIS 9662	01/11/2022	619,580.00
Total					619,580.00

Section B - Official MDA Representative

Authorized Signature	Designation of Signatory MDA
Name of Signatory SANTA ATIMANGO	Contact Number 782251694
This receipt has been issued for and on behalf of the Commissioner/Commissioner General	

ANNEX X: RoW ACCESS PERMISSION ALONG THE ROADS

TEL: MWE: +256 414 505 942
WSDF-N: +256 292 705 948
FAX: +256 414505941
Email: info@wse.go.ug
wsdf-n@wse.go.ug
Website: www.wse.go.ug



MINISTRY OF WATER AND ENVIRONMENT
WATER AND SANITATION DEVELOPMENT
FACILITY – NORTH
P. O. BOX 381,
LIRA, UGANDA

In any correspondence on
This subject please quote no. WSDf-N/ADM/028

The Republic of Uganda



22nd February 2023

The Chief Administrative Officer,
Lira District Local Government


CONSTRUCTION OF BARR RURAL GROWTH CENTRE PIPED WATER SUPPLY SYSTEM AND SANITATION FACILITIES IN LIRA DISTRICT

Subject: Access to road reserve

The Government of Uganda through Ministry of Water and Environment initiated a Water and Sanitation Development Facility – North (WSDF-N) as a mechanism for services delivery and funding for water and sanitation facilities in small towns (STs) and Rural Growth Centres (RGCs) in Northern Uganda. The African Development Bank (AfDB) under Water and Sanitation Program III through WSDF-N plans to provide funds to implement Construction of Piped Water Supply System and Sanitation Facilities in Barr RGC in Lira District.

The approved design of the piped water supply system is based on the existing road infrastructure and the future development plan of the area. As such, pipelines and pipe accessories will be laid in the road reserve.

The purpose of this letter therefore is to request for access to the road reserve in Barr RGC for the construction of the piped water supply system.

Eng. C. 
BRANCH MANAGER

Copy: District Engineer, Lira DLG
District Water Officer, Lira DLG

TEL. MWE: +256 414 525 842
WSDF-N: +256 332 725 848
FAX: +256 414505041
Email: info@wsvr.co.ug
wsc@wsvr.co.ug
Website: www.wsvr.co.ug



The Republic of Uganda

MINISTRY OF WATER AND ENVIRONMENT
WATER AND SANITATION DEVELOPMENT
FACILITY – NORTH
P. O. BOX 381,
LIRA, UGANDA

In any correspondence on
This subject please quote no. WSDF-NIAD/02/19



22nd February 2023

The Station Manager,
UNRA Lira Station


CONSTRUCTION OF PIPED WATER SUPPLY SYSTEMS IN BARR RURAL GROWTH CENTRE IN LIRA DISTRICT AND OTWAL RURAL GROWTH CENTRE IN OYAM DISTRICT

Subject: Access to road reserve

The Government of Uganda through Ministry of Water and Environment initiated a Water and Sanitation Development Facility – North (WSDF-N) as a mechanism for services delivery and funding for water and sanitation facilities in small towns (STs) and Rural Growth Centres (RGCs) in Northern Uganda. The African Development Bank (AfDB) under Water and Sanitation Program III through WSDF-N plans to provide funds to implement Construction of Piped Water Supply Systems and Sanitation Facilities in Otwal RGC in Oyam District and Barr RGC in Lira District.

The approved design of the piped water supply systems are based on the existing road infrastructure and the future development plans of the areas. As such, pipelines and pipe accessories will be laid in the road reserve.

The purpose of this letter therefore is to request for access to the road reserve in Otwal RGC and Barr RGC for the construction of piped water supply systems.


Eng. C. Agwai
BRANCH MANAGER

ANNEX XI: NEMA APPROVED TERMS OF REFERENCES