MINISTRY OF WATER AND ENVIRONMENT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED CWERO RGC WATER SUPPLY AND SANITATION SYSTEMS IN PAICHO SUB-COUNTY, ASWA COUNTY, GULU DISTRICT

FINAL REPORT

SUBMITTED BY:

Ministry of Water and Environment

PREPARED BY:

Alliance Consultants Limited

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ESIA TEAM AND DECLARATION

Following is the Environmental and Social Impact Assessment (ESIA) Team that undertook the ESIA study for the proposed Cwero Water Supply and Sanitation System located in Paicho Sub-County, Gulu District. The assessment was done 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).* It was carried out on behalf of Alliance Consultants Limited that was contracted by the Ministry of Water and Environment. We the undersigned declare that we have no business, financial, other interest in the Ministry of Water and Environment's proposed Cwero Water Supply and Sanitation System.

Name	Position	Signature /Date
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The above worked together with the following Experts:

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Mr. Dennis Bataringaya (MA)	Sociologist
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LIST OF ACRONYMS

AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
APHA	American Public Health Association
BMP	Best Management Plan
BOQs	Bills of Quantities
CDO	Community Development Officer
CESMP	Contractors Environmental and Social Management Plan
CGV	Chief Government Valuer
DHI	District Health Inspector
DN	Norminal Diameter
DWD	Directorate of Water Development
DWRM	Directorate of Water Resources Management
EPB	Environmental Project Brief
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
GDLG	Gulu District Local Government
GO	Grievance Officer
GoU	Government of Uganda
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HIV	Human Immunodeficiency Virus
ISO	International Standard Organisation
ISS	Integrated Safeguards Systsem
IUCN	International Union for Conservation of Nature
LC	Local Council
MEMD	Ministry of Energy and Mineral Development
MGLSD	Ministry of Gender, Labour & Social Development
MoLHUD	Ministry of Lands, Housing and Urban Development
MWE	Ministry of Water and Environment
NDPIII	Third National Development Plan
NEA	National Environment Act
NEMA	National Environment Management Authority
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
OP	Operational Policy
OS	Operational Safeguard
PAP	Project Affected Persons
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RGC	Rural Growth Center
SEP	Stakeholder Engagement Plan

TDS	Total Dissolved Solids
UNRA	Uganda National Roads Authority
WASH	Water Sanitation and Hygiene
WMP	Waste Management Plan

EXECUTIVE SUMMARY

Project Overview and Objectives

According to the Water and Environment Sector Performance Report, 2019, 44.3% and 10.9% of the population depend on boreholes and piped water respectively to access clean water in rural areas. In small towns and rural growth centers, only 55.9% of the population had access to improved water sources by 2019.

The Government of Uganda (GoU), through the Ministry of Water and Environment (MWE) has embarked on improving safe water supply and sanitation coverage in rural areas, small towns and rural growth centers. Gulu District is one of the areas, currently having limited access to safe water and sanitation services. As a result, the MWE together with Gulu District Local Government (GDLG) are proposing establishment of the Cwero Water Supply and Sanitation Systems, in line with the third National Development Plan (NDP III), and the Uganda's Vision 2040.

The overall aim of the project is to establish a mini piped water supply and sanitation system in Cwero Rural Growth Center (RGC), in, Paicho Sub-County, Gulu District. The proposed project is will abstract 573 m^3/day in the ultimate year (2042), and will have the following major components:

- intake; 4 boreholes
- pumping station
- pumping mains of 1.7 km, 2.973 km, 2.2 km and 3 km for the reservoir from the 4 boreholes
- reservoir with a capacity of 158 m^3
- distribution network of 15.676 km
- one 6-stance water borne toilet

The total cost of the project is estimated at Two Billion Three Hundred Forty-two Million One Hundred Fifty-one Thousand Nine Hundred Sixteen Uganda Shillings (2,342,151,916), inclusive of taxes.

The objective of this study was to undertake an Environmental and Social Impact Assessment for the proposed project, in accordance with the National Environment Act, 2019, the National Environment (Environmental and Social Assessment) Regulations, 2020 and the African Development Bank (AfDB) Integrated Safeguards System (ISS)

The specific objectives were to:

I. Survey of all the identified sites including preparing a map/sketch of each site showing important existing features in the surrounding areas in relation to the sites,
II. Assessment of baseline environmental conditions for monitoring future project components,
III. Evaluation of the relevant policy and legal framework pertaining the proposed project.
IV. Consultation with the relevant stakeholders and incorporate their comments into impact identification and mitigation,
V. Identification of all potential impacts and propose feasible mitigation impacts
VI. Preparation of an Environmental and Social Management and Monitoring Plan (ESMP) for the implementation of the proposed project. The ESMMP should outline: i) potential environmental and social impacts resulting from project activities; ii) proposed mitigation measures; iii) monitoring indicators; iv) responsibilities for implementation of the mitigation measures; v) responsibilities for monitoring the implementation of the mitigation measures

Approach and Methods to Environmental and Social Impact Assessment

The ESIA for the proposed Cwero water supply and sanitation system was undertaken through a mixed methods approach to ensure a comprehensive assessment. These included:

- Review of existing literature relevant to the project
- Community and stakeholder consultations
- Flora assessment
- Fauna assessment
- Water quality assessment
- Noise level assessment

Description of the Project Area

Cwero RGC is located in Kal Alii Parish and partly Pagik parish, Paicho Sub-county, Gulu District. The district lies in the Northern Region of the country, bordering with Amuru District in the west, Omoro District in the South, Pader District in the East and Lamwo District in the North East. Paicho Sub-country where the proposed project will be implemented is located about 30 km from Gulu City along Kitgum road, 368 km from Kampala via Gulu City by road. The project area is in Paicho Sub-county with eight villages of; Ajanyi, Bokeber, Dwere, Bura in Pagik Parish and Lakwela, Lalworo, Laminto, Te Olam in Kal alii Parish.

The proposed boreholes to be installed with solar power are located in Dwere Village (N02.962272^{o} E032.550945^{o} and N02.949967^{o} E032.536818^{o}) and Ajanyi Village (Cwero HC III borehole – N02.922366^{o} E032.514037^{o}, and Cwero P/School borehole – N02.919504^{o} E032.509662^{o}), borehole DWD 17805 located in Dwere village at N02.962272^{o} E032.550945^{o}. The proposed reservoir is to be located in Ajanyi Village at N02.931475^{o} E032.529085^{o}.

The vegetation at and around the proposed locations of the project components is characteristic of agricultural, post agricultural and semi-urban landscapes, dominated by grasses, shrubs, weeds, crops and a few trees. The abstraction and reservoir sites are already converted into agricultural and settlement land use. The transmission lines follow existing roads and will be restricted within the road reserves. Generally, all the project affected sites are already modified and not representative of the natural conditions. There are no sensitive ecosystems such as forests and wetlands which will be impacted by the project activities.

The main source of water in the project area is groundwater, obtained through hand pump boreholes. Nevertheless, the boreholes are not enough, where communities reported travelling long distances, or waiting for long times at boreholes to access water.

Policy, Legal and Institutional Framework

There is an established policy, legal and institutional framework for environmental management in Uganda. The National Environmental Act (NEA Nr. 5) of 2019 provides for Environmental and Social Impact Assessment for projects which have significant adverse impacts on the environment. According to the NEA (2019), the proposed project is listed under Schedule 4 (Projects for which Project Briefs are required) and under Category 4, "Utilisation of water resources and water supply", Part (b) "Abstraction or utilization of ground water of less than 1,000 m^3 per day." Further, according the funder's (African Development Bank; AfDB) Integrated Safeguards System (ISS), the project is considered as category 2 (medium E&S risks) which requires the preparation of an Environmental and Social Impact Assessment ESIA. Some of thepolices, laws and institutions that will guide the project implementation:

a) Policy Framework

- The National Water Policy, 1999
- The National Gender Policy, 1997
- The National Land Policy (2013)
- The National Land-Use Policy (2007)
- The Environment and Social Safeguards Policy (2018)

The African Development Bank (AfDB) Operational Safeguard (OS) policies such as OS 1: Environmental and social assessment, OS 2: Involuntary resettlement, land acquisition, population displacement and compensation, OS 3: Biodiversity and ecosystem services, OS 4: Pollution prevention and control, hazardous materials and resource efficiency and OS 5: Labour conditions, health and safety will be important.

b) Legal Framework

- The Constitution of the Republic of Uganda; 1995; amended as at 15th February 2006, Government of Uganda.
- The National Environment no. 5 2019
- The Water Act, Cap 152 and The Water Resources Regulations, 1998
- The Land Act, Cap 227
- The National Environment (Environmental and Social Assessment) Regulations, 2020
- National Environment (Conduct and Certificate of Environment Practitioners Regulations (2003)
- The National Environment (Waste Management) Regulations (2020)
- The National Environment (Noise Standards and Control) Regulations, 2003.

c) Institutional Framework

- Ministry of Water and Environment (MWE)
- National Environmental Management Authority (NEMA)
- Ministry of Gender, Labour & Social Development (MGLSD)
- Ministry of Lands, Housing and Urban Development (MoLHUD)
- Gulu District Local Administration Structures

Potential Environmental and Social Impacts

The proposed project is associated with several positive impacts. These include:

- Employment opportunities and income
- Acquisition/improvement of skills
- Reduction of poverty and improved livelihoods of the local people
- Improvement in public health
- Achievement universal primary education
- Promotion of gender equality and empowerment of women and the girl child

However, the proposed project will also be associated with adverse impacts which must be mitigated.

The following adverse impacts have been identified:

IMPACT	Overall Significance
Pre-construction and Construction Phase	
Loss of land and property	Moderate (9)
Disruption of traffic flow	Minor (2)
Loss of vegetation	Minor (4)
Introduction of plant invasive species	Minor (2)
Disruption of social order	Minor (4)
Noise from construction machinery	Major (12)
Solid waste generation	Moderate (9)
Occupational health and safety issues	Minor (4)
Community health and safety issues	Moderate (9)
Increased susceptibility to soil erosion	Minor (4)
Air pollution and climate change	Major (12)
Theft of construction materials	Major (12)
Operation and Maintenance Phase	
Soil pollution	Minor (2)
Occupational safety and health issues	Minor (2)
Generation of hazardous wastes	Moderate (9)
Incapacity to operate and maintain the project components by local people	Moderate (9)
Unaffordability of water charges	Moderate (9)
Air pollution	Major (12)
Spread of sanitation and water borne diseases	Moderate (9)
Vandalization / theft project equipment	Moderate (9)
Decommissioning Phase	
Disruption of water supply	Moderate (9)
Disruption of traffic flow	Moderate (9)
Disruption of social order	Minor (4)
Noise pollution	Major (12)
Solid waste generation	Moderate (9)
Occupational health and safety issues	Moderate (6)
Public health and safety issues	Moderate (9)
Increased susceptibility to Soil erosion	Moderate (6)
Air pollution and climate change	Major (12)

Stakeholder Consultations

Stakeholder engagement constituted an important part of the ESIA process, in light of the Project's commitment to adhering to national requirements, as well as a best practice approach to public consultation, that is, an approach that encourages open and transparent dialogue, with as broad a range of stakeholder groups as possible. Consultation meetings were held with relevant stakeholders, including community members in the project area. Generally, the stakeholders welcome the project, and they hope it will help improve their standards of living. A summary of the key findings from the stakeholder consultations is presented as follows:

Stakeholders	Concerns/Views	Response
District Environment Officer (DEO)	• As a district, we welcome the project. • The developer and contractor should engage the local communities to achieve project acceptance. • The district personnel should be involved too in the implementation of the project. • Mitigation measures should be clearly followed when the project commences. • If there is need for compensation, the developer	• Noted • The project Develop recognizes the importance of stakeholder engagement for the sustainability of the project. It is the reason for this consultation. Stakeholder engagement will be a continuous process throughout the project implementation

Stakeholders	Concerns/Views	Response
	should compensate the affected people before project commencement.	• Mitigation measures for all identified adverse impacts have been proposed, and the Contactor and Developer will be required to implement them. You are among the key parties who will be involved in the monitoring of the implementation of the ESMMP • All affected project affected persons whose property is to affected should be compensated prior to start of construction activities
District Water Officer (DWO)	• The project is welcome to the district even though its construction phase has delayed for some time. • There is a water crisis in Cwero area and the business centre does not have adequate water to run some of the businesses such as small restaurants, accommodation areas etc. • The existing water sources especially boreholes do not yield enough water hence the need to drill a new well with a higher yield to supplement the project. • The project should be able to supply the nearby institutions such as health centers and private schools.	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area • The project proposes to use a combination of boreholes to meet the water demand • Both domestic and institutional water demands were considered in the water demand assessment, and included the project design
Community members: Bokeber village	• The project should ensure that almost every community member benefits from the supply of safe water. • The project is welcome to the area and there is hope it will be supported by the entire community. • The contractor should ensure that jobs are given to the local people so that they can earn some money. • The water demand is so high because the 2 boreholes serve very many communities including Pagik P7 Primary School. • Other sources like wells and springs are used to support the overwhelmed boreholes especially during the dry season. • The school (Pagik P7 Primary School) plans to fence off its land hence there will be limited access to the borehole at the school. • The community is willing to pay for the fees charged by the operator.	• The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at existing boreholes. The project will ensure that as many people as possible have access to water through both house connections and public standpipes • Jobs will be available for the local people during both construction and operation. The Contractor and Developer have been encouraged to give priority for employment to the local people to enhance the project benefits
Community members: Dwere village, Paicho S/C	• The contractor should ensure that jobs are given to the local people so that they can earn some money. • The village is too big and it has only one functioning borehole. • People collect water from unprotected wells most especially when the borehole is broken. • The borehole water quality is not good. Most times, the water is smelly and has rusty particles of the pipes that were installed. • The developer should ensure that water a management committee is put in place so that the project can be sustainable.	• Jobs will be available for the local people during both construction and operation. The Contractor and Developer have been encouraged to give priority for employment to the local people to enhance the project benefits • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at existing boreholes. The project will ensure that as many people as possible have access to water through both house connections and public standpipes • A water management committee to ensure the sustainable operation of the

Stakeholders	Concerns/Views	Response
		project is recommended.
Enrolled Nurse, Cwero Health Centre III	• The project will supply clean water to the facility especially in the laboratory and maternity ward that use a lot of water. • The existing borehole is used by many people especially on market days. • Due to its closeness to the access road, it is usually spoilt by people who come to use it. • The proposed project will minimize cases of waterborne diseases that have been reported at the health facility.	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at existing boreholes. The project will ensure that as many people as possible have access to water through household and institutional connections, and public standpipes
Teacher, Cwero Primary School	• The project is welcome to the area as it will provide clean and safe water. • The existing borehole at the school is used by very many people such as pupils, teachers and other community members. • The location of the borehole next to the Gulu-Kitgum road exposes it to vandalism and this is expensive for the school during maintenance. • The project should connect a tap in the school compound to reduce on the risk of pupils being knocked by speeding vehicles while fetching water.	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of knocking children along access roads as they look for water from distant boreholes. The project will ensure that as many people as possible have access to water through household and institutional connections, and public standpipes

Environmental and Social Management and Monitoring Plan

The environmental and social management and monitoring plan **(**ESMMP) has been provided to guide the implementation for this the project. The ESMMP provides for:

- Integration of Safeguards into Procurement Process (Contracts)
- Contractor Management Plans and Method Statements
- Required Approvals, Permits and Licenses
- Monitoring and Reporting Arrangements
- Enforcement of Compliance

Further, a grievance redress mechanism (GRM) has been provided. The aim and purpose of this system is to make the grievance handling procedures accessible, prompt and affordable to the project affected persons (PAPs) given the generally low values of some of the properties to be affected; and also provide an alternative to the costly and time-consuming formal courts procedures for handling grievances and disputes. The GRM seeks to establish mechanisms for raising complaints related to compensation for loss of land and other livelihood properties and assets and having such complaints resolved as amicably as possible through acceptable and binding corrective actions.

The total cost of implementing the ESMMP is estimated at Uganda Shillings Two Hundred Forty Nine Million Seven Hundred Thousand only (UGX 249,700,000), as reflected in the ESMMP matrix as follows:

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Positive Impacts						
Employment opportunities and income	▪ Prepare a labour force management plan ▪ Preference for employment opportunities should be given to the local people where they have the required skills (for skilled labour activities). Otherwise, all activities which do not require skills such as casual activities should be given to the locals ▪ All laborers should be given contracts specifying their roles and responsibilities and remunerations ▪ The use of appropriate labour-intensive methods for some of the construction activities (for example excavation for pipelines) should be undertaken to enable as many local people (including women) as possible get jobs ▪ Priority for sourcing materials for construction and other services such as food and accommodation should be given to local suppliers ▪ Ensure that children are not employed on the project	-Labour force management plan in place -Details of the project staff, including origin, age	5 million (for the labour force management plan)	Contractor MWE	CDO	Monthly
Acquisition/improvement of skills	▪ Foreign companies (if contracted) should be required to have a joint venture with local companies to build their capacity. ▪ Contracts terms for construction works for the project's construction and O&M phase should emphasize knowledge transfer and the project developer should monitor and ensure that the objectives are met. ▪ O&M manual and standard operating procedures must be handed over to the operator	-Details of the Contractor, including country of registration -Details of the Contracts agreement -Presence of the O&M manual	0	Contractor MWE	CDO DWO	Once, before start of construction works
Reduction of poverty and improved livelihoods of the local people	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Improvement in public health	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area	-Records of water abstraction and supply -Records of water quality assessment	1 million (for community sensitization)	MWE	DWO CDO	Quarterly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Provide as many public stand pipes as possible where poor people can obtain water ▪ Sensitize communities on the dangers of using unsafe water sources	-Number of households connected, and number public stand pipes -Minutes of community sensitization				
Achievement universal primary education	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Promotion of gender equality and empowerment of women and the girl child	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Negative Impacts						
Pre-construction and Construction Phase						
Loss of land and property	▪ Prepare and implement a RAP ▪ All privately owned land to host project components should be duly compensated prior start of construction activities ▪ All property should be valued and duly compensated prior to start of construction works ▪ For property like crops, where possible, owners should be informed early about the project work plan and allowed to harvest them prior to start of construction ▪ Prepare a stakeholder engagement plan and ensure that stakeholder engagement is a continuous process throughout the project implementation	-RAP in place -Agreements of land sale -Compensation agreement	-50 million for a RAP -Cost of land and other property to depend on the actual value	Developer	CDO	Once, to be cleared before start of construction
Disruption of traffic flow	▪ Prepare and implement traffic management plan	-Traffic management plan in place	5 Million	Contractor	CDO	Weekly
	▪ Liaise with the local traffic authority to manage traffic at busy crossings e.g., markets, schools, churches	-Records of agreed work plans with traffic police	1 Million	Contractor	CDO Traffic police Department, Gulu	Weekly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Loss of vegetation and soil cover	▪ Prepare a vegetation restoration plan	-A vegetation restoration plan in place	10 million	Contractor	DEO NEMA	Once, before start of construction activities
	▪ Restrict clearance to only areas to be constructed.	-Presence of bare soils	Part of the Contract	Contractor	DEO NEMA	Weekly
	▪ Landscaping and re-vegetation after construction especially around the water source and reservoir	-Presence of gullies due to soil erosion.	3 Million	Contractor	DEO NEMA	Weekly
	▪ Restrict alignment of the transmission route along road reserves	-Layout of the transmission line	Part of the Contract	Contractor	DWO /DEO	Monthly
Introduction of invasive plant species	▪ All Construction machinery should be cleaned prior to their transport to and assembly at the project sites	-Records of machinery cleaning	1 Million	Contractor	DEO NEMA	Once, before start of construction activities
Disruption of social order	▪ Prioritize employment of local people where they have the required skills	-Record of project staff and their area of origin	Part of the Contract	Contractor	CDO	Weekly
	▪ Sensitize all workers to ensure awareness of and sensitivity to the local cultures, traditions and lifestyles	-Record of sensitization sessions	2.5 Million	Contractor	CDO	Monthly
Noise from construction machinery	▪ Schedule noise-intensive work for the least noise-sensitive time of the day (work between 8 am and 5 pm)	-Work schedule -Complaints about noise;	0	Contractor	DEO	Weekly
	▪ Provision of PPE to project workers	-PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Regular noise assessments	-Noise assessment reports	1 Million	Contractor	DEO	Monthly
	▪ Sprinkle water to dusty grounds during the dry seasons	-Records of water sprinkling	3 Million	Contractor	DEO	Weekly
	▪ Cover earth materials with tarpaulin during transportation to minimise their falling off trucks;	-Presence of tarpaulins for covering loose material	1 Million	Contractor	DEO	Weekly
Solid waste generation	▪ Prepare a waste management plan	-A waste management plan in place	6 million	Contractor	DEO	Once, before start of construction activities
	▪ Use the excavated material for backfilling.	-Heaps of waste & excavated material on site -Areas backfilled	Part of the Contract	Contractor	DEO	Monthly
	▪ Provide waste bins for proper storage.	-Waste bins within the project area.	0.2 Million	Contractor	DEO	Monthly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Contract a waste management company where waste volumes are large	-Contract agreement with a waste management company	4 Million	Contractor	DEO	Monthly
	▪ Provide temporary eco-san toilets on site during site works	-Eco-san toilet on site	Part of the construction contract	Contractor	DEO	Monthly
Occupational health and safety issues	▪ Prepare an occupational Health and safety plan	-An occupational health and safety plan in place	6 Million	Contractor	CDO DEO DHI	Once, before start of construction works
	▪ Provide workers with PPE and sensitise them on basic safety precautions.	-PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Provision of a first aid kit	-First aid kit	Part of the Contract	Contractor	DEO	Monthly
Community health and safety issues	▪ Prepare a community health and safety plan	-A community health and safety plan in place	6.5 Million	Contractor	CDO DEO DHI	Once, before start of construction works
	▪ Cordon off all dangerous areas along public roads	-Marks of dangerous places	3 Million	Contractor	CDO DEO	Weekly
	▪ Project vehicles transport material along community roads should not exceed 40 km/h.	-Records of sensitization of project drivers on speed limits -Speed limit signs on roads	2 Million	Contractor	DEO	Monthly
	▪ Schedule of construction works along community access roads should be communicated to public at least a week prior to start of construction works	-Proof of communication of work schedule with communities -Number accidents recorded	1 Million	Contractor	DEO	Bi-monthly
	▪ Prepare and implement an HIV/AIDS management plan	-An HIV/AIDS management plan	10 Million	Contractor	DCDO	Quarterly
Increased susceptibility to soil erosion	▪ Prepare an erosion control plan	-An erosion control plan in place	4 Million	Contractor	DEO NEMA	Once, prior to start of construction activities
	▪ Immediately dispose of any excavated soil to avoid loose soil being washed away by storm water.	-Presence of erosion gullies within the site premises	1 Million	Contractor	DEO NEMA	Weekly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Provide an erosion barrier around stockpiles of excavated soils	-Presence of erosion barriers	5 million	Contractor	DEO NEMA	Weekly
	▪ Plant bands of grass on erosion prone surfaces.	-Presence of plant bands	4 Million	Contractor	DEO NEMA	Quarterly
Air pollution and climate change	▪ Vehicles transporting construction material along community access roads should move as lower speeds, not exceeding 40 km/hr	-Speed limit signages along access roads	5 Million	Contractor	DEO CDO NEMA	Weekly
	▪ All lose material like sand, cement, murram, soil should be covered with a tarpaulin during transportation	-Trucks covered	1 Million	Contractor	DEO NEMA	Weekly
	▪ Excavated soil stored at the site should be covered with a tarpaulin	-Soils covered	1 Million	Contractor	DEO NEMA	Weekly
	▪ Water should be sprinkled on dusty ground where other measures cannot appropriately minimize dust emission	-Records of water sprinkling	2 Million	Contractor	DEO NEMA	Weekly
	▪ Repair and maintain construction equipment following the manufacturer's specifications, including on fuelling	-Records of vehicle repair and maintenance	8 Million	Contractor	DEO NEMA	Quarterly
	▪ Offset emitted carbon dioxide during construction activities by planting local trees at all devastated sites	-Records of trees planted	6 Million	Contractor	DEO NEMA	Annually
Theft of construction materials	-Verification of project employees should be done by the local authorities.	-Records of employee verification exercise	1 Million	CDO	CDO	Prior to the start of construction activities -Any time staff are required
	Security guards should be hired to provide security at the construction sites.	-Presence of security guards	6 Million	CDO	CDO	-Weekly
Operation and Maintenance Phase						
Water Pollution	▪ Ensuring that storage containers are checked regularly for leakage	-Records of chemical leakage/ spillage	0.3 Million	Developer / Operator	DEO	Quarterly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Occupational Health and Safety	▪ Prepare an occupational health and safety plan	-Same as in the construction phase	Same as in the construction phase	Same as in the construction phase	Same as in the construction phase	Same as in the construction phase
	▪ Workers should be given appropriate PPE when handling chemical	-Workers using PPE	Part of the Contract	Developer / Operator	DEO CDO	Quarterly
	▪ Regular trainings on the operations of the water system	-Records of training on operation systems	3 Million	Developer / Operator	DWO	Quarterly
	▪ Installation of firefighting equipment at the abstraction point	-Presence of firefighting equipment	5 Million	Developer / Operator	DEO DWO	Quarterly
	▪ A well-equipped first aid kit should be availed to project workers.	-Presence of a first aid kit. -Records of injuries	Part of the Contract	Developer / Operator	DEO CDO	Quarterly
Generation of hazardous wastes	▪ Maintenance of the solar power system should be undertaken by a licensed firm	-License certificate of the hired maintenance firm	5 Million	Developer / Operator	DEO DWO	Prior to start of operation, and annually thereafter
	▪ Waste batteries and solar panels should be taken back to the supplier, who should handle it appropriately as hazardous waste. This should be agreed in the solar power supply contract	-Solar power supply contract -Records of delivery of waste solar batteries and panels to the supplier	As per the supply contract	Developer / Operator	DEO DWO	Annually
	▪ Where such agreement is not reached, the Developer (MWE) should hire a licensed firm for handling hazardous waste	-Contract agreement with the waste handling firm -Records of waste solar batteries and panels handled	5 Million	Developer / Operator	DEO DWO	Prior to start of operation, and annually thereafter
Incapacity to operate and maintain the project components by local people	▪ Train local community members in the operation and maintenance of the water supply infrastructure	-Number of trained community members in operation and maintenance of the piped water supply system	6 Million	Developer/ Operator	DWO	Quarterly
	▪ Prepare a quality management plan	▪ A quality Management plan in place	7 Million	Contractor Operator	DWO CDO DEO	Quarterly
Unaffordability of the water charges	▪ Levy charges in consideration of the income levels of the area. Charges for poor people should be just enough to cover the operational costs	▪ Records of water charges ▪ Complaints from the public	0	Developer / Operator	DWO CDO	Quarterly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Provide many public standard pipes where poor people can obtain water cheaply	▪ Number of public stand pipes	Part of the Contract	Developer / Operator	DWO CDO	Twice a year
Air pollution	▪ Sensitize communities on the use of public toilets, and the need for better sanitation	-Records of community sensitization	2 Million	Developer / Operator	DWO CDO	Once, after completion of construction
	▪ Provide sufficient ventilation on the public toilet	-Building drawings	Part of the Contract	Developer / Operator	DWO CDO	Once, prior to, and once after construction
Spread of sanitation and water borne diseases	▪ Ensure regular supply of sufficient water for flushing and washing hands by providing a reservoir tank at the toilet	-Presence of a reservoir tank at the toilet	Part of the Contract	Developer / Operator	DWO CDO DEO	
Vandalization / theft project equipment	▪ Sensitize community members about the importance of the project	-Records of community sensitization	2 Million	Developer / Operator	DWO CDO DEO	Once, prior to, and once after construction
	▪ Hire a security guard to provide 24-hour security at sensitive components such as the abstraction/pumping station	-Presence of security guards	To depend on the local security labour cost	Developer / Operator	DWO CDO DEO	Quarterly
	▪ Fence off major project components such as abstraction and reservoir sites	-Fenced project site	Part of the construction Contract	Developer / Operator	DWO CDO DEO	Twice a year
Decommissioning Phase						
Disruption of water supply	▪ Inform the communities in the affected areas well in advance about the decommissioning activities ▪ Provide alternative source of water	▪ Records of sensitization meeting about project decommissioning ▪ Presence alternative water sources	3.5 million for sensitization meetings	Operator Decommissioning Contractor	DWO CDO DEO	Quarterly, within the last two years of decommissioning
Traffic disruption	▪ Same as for the construction phase	▪ Same as for the construction phase	1000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Disruption of social order	▪ Same as for the construction phase	▪ Same as for the construction phase	2500000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Noise pollution	▪ Same as for the construction phase	▪ Same as for the construction phase	5000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Solid waste generation	▪ Same as for the construction phase ▪ Further, hazardous wastes associated with solar batteries and panels should be handled and disposed of by a licensed firm for handling such wastes	▪ Same as for the construction phase ▪ Agreement with a licensed hazardous waste management firm	4200000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Occupational health and safety issues	▪ Same as for the construction phase	▪ Same as for the construction phase	-	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Public health and safety issues	▪ Same as for the construction phase	▪ Same as for the construction phase	6000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Increased susceptibility to Soil erosion	▪ Same as for the construction phase	▪ Same as for the construction phase	10000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Air pollution and climate change	▪ Same as for the construction phase	▪ Same as for the construction phase	23000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Total			**249,700,000**			

Further, the following other costs should be clear in the BoQs during the bidding process.

Item	Indicative Costs
Grievance Redress Mechanism	22,000,000
Stakeholder Engagement	25,000,000
Environment and Social Audit	30,000,000
Capacity Building and Trainings	20,000,000
Sub-total	**97,000,000**
Grand Total, including ESMMP (UGX 249,700,000)	**346,700,000**

Conclusion and Recommendations

a) Conclusions

This environmental and social impact assessment for the Cwero water supply and sanitation system has examined the project need, its compatibility with the surroundings, socio-economic benefits and the adverse social and environmental impacts. Enhancement measures have been proposed for the positive impacts, while mitigation measures to avoid, reduce and minimise the adverse impacts were also suggested, either as part of the design, or as measures to be implemented. Good practice measures were also identified in order to minimize the impact of the proposed development further. The proponent has agreed to these mitigation measures and they are, therefore, expressed as commitments.

Overall, the negative impacts of this project as rated by this study are largely insignificant; however, adequate mitigation measures have been proposed to address them. When mitigation actions and environmental and social monitoring plans are implemented, the project would have minimal residual environmental effects. Hence the project can be implemented in a sustainable way.

b) Recommendations

This study therefore makes the following recommendations:

- Many times, Project Contractors do not comply with the recommendations given in the project environmental report. This is tantamount to violation of the law with possible halting of the whole project by the relevant authorities, including NEMA. A copy of this report would be availed to the Project Contractor, and advised to get acquainted with the impacts, their mitigation measures, the ESMMP and the plans that should be developed from therein.
- The project ought to be approved for implementation by the relevant authorities to enable fulfilment of the project main objective of improving access to safe water in the area

1 INTRODUCTION

1.1 Project Background

According to the Water and Environment Sector Performance Report, 2019, 44.3% and 10.9% of the population depend on boreholes and piped water respectively to access clean water in rural areas. In small towns and rural growth centers, only 55.9% of the population had access to improved water sources by 2019.

Gulu is one of the districts in Uganda where population in the small town is increasing, yet with inadequate water supply to both urban areas and rural growth centers (RGC). The gap between the total population and the population with access to safe water is increasing significantly annually thus, creating high water demands. Therefore, extending safe water and sanitation services to the unserved population in the district can be a great stimulus to the district's productivity, and improvement to the quality of life.

The Government of Uganda (GoU) has embarked on improving safe water and sanitation coverage and supply across the entire country. The Water and Environment Sector Development Plan of Uganda prioritizes the construction of piped water supply systems in RGC to replace the currently overstretched hand-pumped borehole service technology. Consequently, the GoU, through the Directorate of Water Development of the MWE and Gulu District Local Government, plans to develop of a water and sanitation system in Cwero RGC in Paicho Sub-County, Gulu District. The proposed project shall ensure sustainable access to safe water and sanitation; and reduce walking distances to access water, thereby saving time for the education of the children in Cwero RGC.

The proposed system is to contribute to a larger project aiming to develop Cwero RGC into a big business hub that will serve the neighbouring districts of Pader, Lamwo and Omoro in Acholi Sub Region of Northern Uganda. At the same time, it will fully harmonize with Uganda's Joint Water and Environment Sector Support Programme and all relevant national sector policies and development plans. The specific outcome of the water supply and sanitation system will ensure sustainable access to safe water and improvement of water sanitation and hygiene (WASH) services, which are critical for health and socio-economic development of the project area. This will contribute to creating a more stable socio-economic environment and hence boost commercial development of the town and surrounding areas; and greatly contribute to the overall objective of the National Development plan and Vision 2040.

In recognition of the need for sustainable development, and in compliance with the National Environment Act of 2019 and regulations there under, and the African Development Bank's Integrated Safeguards System (ISS), the MWE initiated an Environmental and Social Impact Assessment (ESIA) process for the proposed project to identify and assess potentially negative and positive environmental and social impacts associated with the project and devise mitigation measures to avoid, minimize or mitigate

the negative environmental and social impacts while enhancing the positive impacts or benefits of the project.

From the initial environmental project screening that was undertaken, the proposed project was identified as one among those that require a Project Brief as per Section 112 of the National Environment Act, 2019. The proposed project is listed under Schedule 4 (Projects for which Project Briefs are required) of the National Environment Act, 2019 under Category 4, "Utilisation of water resources and water supply", Part (b) "Abstraction or utilisation of ground water of less than 1,000 m^3 per day." Further, according the funder's (African Development Bank; AfDB) Integrated Safeguards System (ISS), the project is considered as category 2 (medium E&S risks) which requires the preparation of an ESIA.

This report presents the findings of the Environmental and Social Impact Assessment that was conducted for the proposed project.

1.2 Project Objectives

1.2.1 Project Development Objectives

The overall objective of the project is to establish Water Supply and Sanitation System in Paicho Sub-County, Gulu District. The specific outcome of the water supply and sanitation system will ensure sustainable access to safe water and improve of water sanitation and hygiene (WASH) services, which are critical for health and socio-economic development of the project area.

1.2.2 Objectives of the Environmental and Social Impact Assessment

This report covers all the contents of an Environmental and Social Impact Assessment report by way of a Project Brief as required under Schedule 2 of the National Environment (Environmental and Social Assessment) Regulations, 2020.

The main objectives of this Environmental Social Impact Assessment include the following:

a) Survey of all the identified sites including preparing a map/sketch of each site showing important existing features in the surrounding areas in relation to the sites,
b) Assessment of baseline environmental conditions for monitoring future project components,
c) Evaluation of the relevant policy and legal framework pertaining the proposed project.
d) Consultation with the relevant stakeholders and incorporate their comments into impact identification and mitigation,
e) Identification of all potential impacts and propose feasible mitigation impacts
f) Preparation of an Environmental and Social Management and Monitoring Plan (ESMMP) for the implementation of the proposed project. The ESMMP outlined:
    i) potential environmental and social impacts resulting from project activities;

ii) proposed mitigation measures;
iii) monitoring indicators;
iv) responsibilities for implementation of the mitigation measures;
v) responsibilities for monitoring the implementation of the mitigation measures

The purpose of this report is to provide NEMA and the Lead Agency with sufficient and relevant information on the proposed project that can allow them establish whether or not the project is likely to have significant impact on the environment, and thus determine the basis for approval.

1.3 Justification of the Proposed Project

1.3.1 Demand for Better Water Supply and Sanitation Services

The project area has some of the existing water sources that are either non-functional or inadequate to meet the demand of rapidly growing population. The common water resources in the project area are the surface and ground water resources, which are less sufficient in the provision of safe water to large populations that are spread over distant places. A socio-economic survey of the project area showed that only 55.0% had access to safe drinking water.

Water supply for year 2022 was estimated at 6,486 m^3/day and projected to increase to 12,426 m^3/day in 2042 when the population of project area increases from 14,557 to 27,888 individuals respectively. The survey result indicated 33.3% of the respondents reported that the availing water sources is unreliable.

Human waste consists of two basic elements — excreta and sullage. Excreta has a high solid content and is highly infected with pathogenic organisms. Sullage comprises of wastewater from kitchens, baths, wash tubs, etc. and has a lower pathogenic content. Discharge of both excreta and sullage into environment can contribute to pollution of surface water and ground water sources; hence require satisfactory treatment and disposal.

The impact of inadequate safe water supply and sanitation service falls primarily on the poor. Every year, thousands of Uganda's poor citizens die from preventable diseases caused by inadequate / unsafe water supply services. Hundreds of thousands suffer from regular bouts of diarrhoea or parasitic worm infections as a result of unsafe water and/or poor sanitation practices that ruin their lives; women and children are the main victims. Further, poor sanitation (also associated with inadequate water supply) costs Uganda 389 billion Ugandan Shillings each year, equivalent to US$177 million, according to a desk study carried out by The Water and Sanitation Program (WSP). This sum is the equivalent of US$ 5.50 per person in Uganda per year or 1.1% of the National GDP. The costs of poor sanitation are inequitably distributed with the highest economic burden falling disproportionately on the poorest. For the poorest therefore, poverty is a double-edged sword; not only are poor people more likely to have poor sanitation, but also, they have

to pay proportionately more for the negative effects it has. The project therefore, will contribute to sustainable access to safe water and improve WASH services, which are critical for health and socio-economic development and ultimately contribute to the overall objective of the National Development plan and Vision 2040.

1.3.2 Consistency of the Project with National Priorities / Plans

The main factor motivating the implementation of the proposed project is the increasing demand for safe water supplies in the local communities in Gulu District and Uganda at large. Hence, the project addresses the national priority of increasing access to safe water by making efficient use of the available sources. This, in addition to the country's firm commitment to eradicate poverty, the project is firmly embedded within the country's national priorities. The NDPIII highlights pollution as the major problem with water resources caused by bacterial and chemical contamination of both ground and surface water resource. This has led to inadequate sanitation facilities, unsafe disposal of municipal and industrial waste in urban and rural areas. In response, the GoU, through the MWE has set a target of increasing safe water supply from 70% to 85% in rural areas and 74% to 100% in urban areas (NDPIII). This is also in line with the Vision 2040 target of having 100% of the population having safe water supply. The proposed project will contribute towards the extension of clean water to 12,447 people by 2029.

1.4 Details of the Developer and Investment Cost

1.4.1 Details of the Developer

Project Title:	**Proposed Cwero Water Supply and Sanitation System in Paicho Sub-County, Gulu District**
Developer:	Ministry of Water and Environment / Gulu District Local Government
Address:	Plot 21/28 Port Bell Road, Luzira, P.O. Box 20026 Kampala, Uganda
Address:	Plot 21/28 Port Bell Road, Luzira, P.O. Box 20026 Kampala, Uganda
Contact Person:	**Name:** Eng. Olweny Lamu **Designation:** Assistant Commissioner Research and Development **Mobile:** +256-772-453-395 **Email:** llolweny@yahoo.co.uk

1.4.2 Investment Cost

The total cost of the project based on the design assumptions and the preliminary engineering design, and is estimated at Two Billion Three Hundred Forty-two Million One Hundred Fifty-one Thousand Nine Hundred Sixteen Uganda Shillings (2,342,151,916), inclusive of taxes. The detailed cost for each of the proposed project infrastructure are indicated in Annex I.

1.5 Study Methodology

The study was undertaken by NEMA Certified Environmental Practitioners in accordance with the National Environment (Environmental and Social Assessment) Regulations, 2020, and other relevant legislation of Uganda. The AfDB's Integrated Safeguards System (ISS) was also considered during this environmental and social impact assessment.

The Consultants undertook the task of preparing an environmental and social impact assessment for the proposed project by clearly defining the assignment into a number of discrete activities. These activities facilitated development of a workable framework for the speedy and timely execution of the assignment. They included but were not limited to the following:

1.5.1 Environmental Screening

This is the stage at which the project was identified as among those that require an environmental and social impact assessment by way of Project Brief as per Section 112 of the NEA, 2019. The proposed project falls under Schedule 4 of the National Environment Act, 2019. The proposed project is listed in Category 4 - Utilization of water resources and water supply (b) Abstraction or utilization of groundwater of less than 1000 m^3/day. The project will have an output of 573 m^3/day at the ultimate year of 2042. Further, according the funder's (African Development Bank; AfDB) Integrated Safeguards System (ISS), the project is considered as category 2 (medium E&S risks) which requires the preparation of an ESIA.

1.5.2 Field Visits and Inspections

Field visits and inspections were carried out by the study/Assessment Team so as to get acquainted with the project activities in the study area, and also map out sampling sites. The areas that were visited include Ajanyi, Bokeber, Dwere, Bura villages, Pagik Parish; and Lakwela, Lalworo, Laminto, Te Olam villages, Kal Alii Parish, Paicho Sub-County, Gulu District, including the proposed water sources (boreholes) and the reservoir location as well as the corridors for the transmission lines.

1.5.3 Literature Review

Key documents pertinent to the study were reviewed and these include;

a) The Engineering Design report for Cwero Water Supply and Sanitation System;
b) The Feasibility report for Cwero Water Supply and Sanitation System;
c) The relevant development and environmental legislation of Uganda;
d) International, regional, provincial or communal environmental related guidelines;
e) AfDB Integrated Safeguards System; including Operational Safeguard (OS) Policies;
f) Third Uganda National Development Plan (NDPIII);
g) Uganda Vision 2040;
h) Water and Environment Sector Development Plan 2015/16-2019/20.
i) Gulu District Physical Development Plan 2022-2040

1.5.4 Community and Stakeholder Consultations

The success of a project depends on its acceptability by the members of the public and other stakeholders who it's intended to benefit. As a result, stakeholder consultations formed a very important part of this assessment (Plate 1).

The objectives of the consultation were to:

- provide information about the project and its potential impacts or benefits to those interested in or affected by the project, and solicit their opinions in this regard;
- provide opportunities to stakeholders to discuss their opinions and concerns;
- manage expectations and misconceptions regarding the project; and
- inform the process of assessing significance of impacts and developing appropriate mitigation measures.

The aim of this consultation was to enable affected parties and other stakeholders present their views and concerns that would contribute to the formulation and refinement of the project design.

Plate 1: Stakeholder Consultation in Bokeber Village. Taken by the Sociologist, March 2023

The Assessment Team consulted the relevant project stakeholders. Mobilization of all social groups including men, women, youth, water user committee members, local leaders, and other community opinion leaders in the project area. Necessary consultation tools and aides, such as area maps indicating the project design, location of project components and project information briefs were displayed and shared during community consultations and other stakeholder consultative meetings.

A two-level stakeholder consultative procedure was adopted. At the first level were community members who live along the proposed alignment of the water transmission/ distribution lines and in close proximity to the areas proposed for other project components. These consultations took place at the village level through participatory community dialogues. The second level was carried out at Paicho Sub-County headquarters and district stakeholder at Gulu District headquarters.

The identification of stakeholders was based on the different activities involved in the project, the sectors the project lies in and the administrative locations of project components. The main considerations in the stakeholder group selection process were:

- Those involved in project preparation;
- Those whose activities coincide or overlap with those proposed by the project (such as relevant local government authorities, non-governmental organisations); and
- Those who may be directly affected by the project (The local population in the project area).

The key stakeholders that were identified include project host community members and area residents, the area local authorities like the village LC1 chairperson, the District Water Officer, District Environment Officer among others.

To ensure in-depth explorations and insights into the feelings and thoughts of the various interest groups, a purely qualitative approach was employed during the consultation. These were conducted through meetings with representatives from relevant local authorities and the project host community members and area residents.

The consultation process consisted of the following activities:

i. Socio-Economic Household Survey (SEHS),
ii. Focus Group Discussions (FGDs),
iii. Key Informant Interviews (KIIs).

Stakeholder's views and concerns were taken into consideration during impact identification and proposing of mitigation measures. Stakeholders' views are presented in Section Five (5) of this report.

1.5.5 Flora Assessment

It is important to understand the vegetation of the project area as this will play an important role in re-vegetation of places that will be excavated/laid bare during the project activities. It will be necessary that sites are restored to as much as practically possible to conditions they were in before project activities. During the field visits, flora species at the sites for water abstraction and reservoir, and along the transmission lines were observed and identified. Flora species which could not be identified in the field were picked, kept in properly labelled plant press and transported to the Makerere University Herbarium for identification.

1.5.6 Fauna Assessment

Fauna assessment involved a survey of birds in the project area, using Timed Species Counts (TSCs) (Freeman et al., 2003). This method generates estimates of relative abundance by scoring 6 for species recorded in the first ten minutes, down to one for the last ten minutes of a one-hour count. The argument is that the common species are

recorded in most counts, usually with a score of six, whilst rare species only score an occasional one. In addition, for a series of counts, the commonest species are recorded most times and usually with a high score.

Transect walks were made with the help of local guides, recording all species in order of their being encountered, by either site or sound. Birds were identified with the help of a pair of binoculars and field guide was referred to where there was doubt about identification (Stevenson and Fanshawe, 2002). An analysis of birds of conservation concern was conducted based on various categories as listed below.

Global, Regional and National Red-listed species

The bird lists were classified globally based on the Red-listed (IUCN, 2019) and nationally/ regionally based on Wildlife Conservation Society (WCS, 2016). These categories are indicated as:

a. CR Critical (Globally or Regionally or Nationally)
b. EN Endangered (Globally or Regionally or Nationally)
c. VU Vulnerable (Globally or Regionally or Nationally)
d. NT Near-threatened (Globally or Regionally or Nationally)
e. RR Regional Responsibility (Globally or Regionally or Nationally)

1.5.7 Water Quality Measurements and Analysis

The physico-chemical quality of water from the proposed abstraction boreholes was analyzed following procedures certified by the International Organization of Standardization – ISO and standard methods for examination of water and wastewater according to APHA/AWWA/WEF (2020). The results of water quality analysis are presented in Section 3.4.1.

1.5.8 Noise measurements

Baseline noise measurements in the project area were carried out at various locations using a Benetech GM1356 digital sound level meter with a range of 30—130 dB (Plate 2). The noise results were compared to permissible limits (Table 1), according to the National Environment (Noise standards and Control) Regulations, 2003. The results of noise measurement are presented in section 3.3.

Table 1: Maximum Permissible Noise Levels for Construction sites

Noise at Receptor	Maximum noise level permitted in dB (A)	
	Day*	Night*
Residential	60	40
Commercial	75	50
Industrial	85	65
*Day is 6.00 a.m -10.00 p.m. and Night 10.00 p.m. - 6.00 a.m.		

Plate 2: Noise level meter used for noise assessment. Taken by the Environmentalist, March 2023

1.6 Structure of the Report

The structure of this report is in conformity with NEMA guidelines and the different sections are outlined below:

An executive summary providing a brief overview of the proposed project and its anticipated positive and negative impacts among others.

Chapter 1: Background information on the project, project objectives, methodology and report structure.

Chapter 2: A review of policies, laws, regulations and standards in relation to the development of the proposed project.

Chapter 3: Site baseline bio-physical and sociological information, area infrastructure and activities.

Chapter 4: Description of the proposed project components, preparation, construction and operations phase activities.

Chapter 5: Public consultations and disclosure, mentioning stakeholder concerns and measures to address them.

Chapter 6: An analysis of alternatives, including the Project alternative, No Project option and comparison of the two options.

Chapter 7: Evaluation of the identified environmental and social impacts and recommendation of appropriate mitigation measures for all significant negative environmental impacts predicted.

Chapter 8: An Environmental, Social Management and Monitoring Plan for addressing negative impacts and assessing effectiveness of mitigation measures, scheduling monitoring frequency and assigning responsibility.

Chapter 9: Grievance Redress Mechanism

Chapter 10: Conclusions and recommendations arising from the ESIA.

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 Introduction

The water and sanitation sector in Uganda has evolved over the past 10 -15 years through several reforms and national instruments all geared towards increasing efficiency in implementation and effectiveness in delivery of services to the unserved. This continuous change process has enabled appropriate adaptation of sector policies and strategies to be incorporated into emerging national and international development agenda including the country's National Development Plan (NDP), Uganda Vision 2040 and also aligned towards the achievement of the United Nations Sustainable Development Goals (SDGs). This section provides an overview of national and international policies, laws and regulations/standards relevant to the proposed project as well as the national institutions responsible for water and environmental protection and conservation as well as health, safety and social safeguards.

2.2 Policies Relevant to the Proposed Project

The policies relevant to the proposed Cwero RGC Water Supply and Sanitation System are presented in Table 2.

Table 2: Policies relevant to Cwero water supply and sanitation system

Policy Title	Policy Goal	Relevance to Cwero Water Supply and Sanitation System
The National Environment Management Policy for Uganda (2014)	The overall policy goal is to ensure sustainable development which maintains and promotes environmental quality and resource productivity for socio-economic transformation. The policy sets out in one of its key objectives to integrate, in a participatory manner, environmental concerns in all development policies, plans, activities and budgets at national, district and local levels.	Environment and Social Impact Assessment (ESIA) by way of a Project brief has been conducted for the proposed the Construction of Cwero water supply and Sanitation system (this Report). If the proposed impact mitigation measures are put in place, the project will promote economic and social development in a sustainable way. These have been developed in consultation with different stakeholders of the proposed project.
The National Water Policy, 1999	To promote an integrated approach to manage the water resources in ways that are sustainable and most beneficial to the people of Uganda	The proposed project seeks to increase on the amount of safe water supply in Cwero RGC in Gulu District.
The National Gender Policy, 1997	Provides a framework and mandate for all stakeholders to address the gender imbalances within their respective sectors.	The gender policy recommends that integration of gender issues in national policies and projects will improve national welfare, contribute towards sustainable development, and improve the work of government ministries. The project will consider gender aspects during the different phases of its implementation.

Policy Title	Policy Goal	Relevance to Cwero Water Supply and Sanitation System
The National Health Policy (1999)	To prevent transmission of diseases through Primary Health Care (PHC) including Sanitation and Hygiene.	The proposed project will help to improve the sanitation through improved provision and access to safe water to the communities.
The National Land Policy (2013)	The Policy was developed to ensure efficient, equitable and optimal utilisation and management of Uganda's land resources for poverty reduction, wealth creation and overall socio-economic development.	Some project infrastructure like transmission lines, reservoirs and boreholes, toilets will be located on people's and public land. Unless where the land is given freely by the community, affected land should be compensated following provision of Uganda's Land laws
The National Land-Use Policy (2007)	The Policy has an overall goal of achieving sustainable and equitable socio-economic development through optimal land management and utilization in Uganda	The project components are of a small scale and will not compromise the existing land use plan
The National Employment Policy for Uganda (2011)	The overall goal is to promote productive and decent employment for all women and men in conditions of freedom, equity, security and human dignity	The proposed Cwero Water Supply and Sanitation System will employ many people who will include casual and technical personnel, including those from the affected community.
The Environment and Social Safeguards Policy (2018)	The Policy was formulated to ensure that environmental and social concerns are integrated in all stages of project development and all levels including national, district and local levels, with full participation of the people as means of minimizing environmental and social impacts	The proposed project has developed an EBP (this report) in line with the principles outlined in the Policy.

2.3 Legal Framework Relevant to the Proposed Project

The Ugandan laws and regulations, and the African Development Bank (AfDB) Operational Safeguard (OS) Policies applicable the proposed project are presented in Tables 3 and 4, respectively.

Table 3: Ugandan laws and regulations relevant to the Proposed Cwero Water Supply and Sanitation System

Legal Framework	Provision(s)	Proposed actions/comments
The Constitution of the Republic of Uganda; 1995; amended as at 15th 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. Chapter 15, Article 237, Clauses (1) (2) (a) & (b) gives the Government the powers as guided by the Parliament to	The developer observes the Constitutional provisions. This is why the developer commissioned the ESIA process prior to implementation of the project. The waterworks, as well as distribution to neighbouring areas will be done while following mitigation measures. All land acquisitions will

Legal Framework	Provision(s)	Proposed actions/comments
	acquire land anywhere within the country and place it to the best use to benefit the citizens of the country, where deemed necessary.	adhere to provisions of the 1995 National Constitution.
The National Environment no. 5 2019	Section 112 (1), requires a developer of a project to submit an acceptable ESIA report in accordance with the guidelines in the Fourth Schedule of this Act.	An ESIA has been conducted for proposed Project so that it promotes economic and social development in a sustainable way.
The Water Act, Cap 152 and The Water Resources Regulations, 1998	Under section 18 (2), a person wishing to construct any works or take and use water may apply to the Director of Water Development Directorate in a prescribed form for a permit to do so. Under Section 31 (1) of the Act, a person commits an offence who, unless authorized under this Part of the Act, causes or allows wastes to come in contact with, or be discharged into water or allows water to be polluted	The developer will ensure that waste generated during project implementation does not negatively impact water resources in the project area.
The Land Act, Cap 227	Section 42 states that Government or Local Government may acquire land in accordance with the provisions of Article 26 and clause 237 of the constitution. Section 74 (i) states that where it is necessary to execute public works on any land (for example construction of road), an authorized undertaker shall enter into mutual agreement with occupier or owner of the land in accordance with this act, and where no agreement is reached, the Minister may; compulsorily acquire land in accordance with Section 43 of the Act.	All the required land for the proposed project will be acquired in accordance with this Act.
The Occupational Safety and Health Act, 2006	The Act aims at ensuring the existence of safety and health at all work places and work environment.	The project shall adhere to occupational safety and health rules according to the mitigation measures suggested in this report.
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.	The developer shall ensure that all contractors and sub-contractors provide personal protective equipment (PPE) to employees to minimize accidents and injuries.

Legal Framework	Provision(s)	Proposed actions/comments
		Additionally, compensation will be paid to those affected.
The Town and Country Planning Act, 2014	The Town and Country Planning Act govern land use and land planning in urban and rural areas.	The developer shall use established guidelines for planning schemes, to acquire land as well as safeguarding the natural environment.
The Public Health Act Cap 281	Section 7 provides local authorities with administrative powers to take all lawful, necessary and reasonably practicable measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any Infectious, communicable or preventable disease, to safeguard and promote the public health.	The developer/ Contractor shall provide for adequate sanitary facilities, proper solid and liquid waste management and provide and operate first Aid services especially in public places; and shall ensure that such facilities are available in all other privately allocated and developed areas requiring such to possess them. Anybody falling sick and needing services beyond the first Aid shall be referred to the nearest health centre. The developer /Contractor will implement HIV/AIDS prevention and control plan as part of the mitigation measures.
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 functions of the Municipal Councils include: land surveying and administration, physical planning, environmental protection (forests and wetlands, streams and so forth and ensuring proper sanitation	The developer shall work closely with Gulu District and Paicho Sub-county officials, including other lower local government leaders in carrying out activities related to the project for example monitoring the implementation of the Environment and Social Management and Monitoring Plan (ESMMP) for the project.
The National Environment (Environmental and Social Assessment) Regulations, 2020	Regulation 12(1) requires the developer of a project under section 113 of the Act and set out in Schedule 5 of the Act to undertake scoping and an environmental and social impact study in accordance with these Regulations. Regulation 16(1) requires the developer to carry out consultations	The study has been conducted in line to the provisions of the Regulations. Various stakeholders in the project area were consulted to find out their views on the proposed project.

Legal Framework	Provision(s)	Proposed actions/comments
	with relevant stakeholders, communities likely to be affected by the project and the public while undertaking the environmental and social impact study.	
The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000	Regulation 12(1) prohibits any person from carrying out an activity in a wetland without a permit issued by the Executive Director of NEMA. Under regulation 34(1), a developer desiring to conduct a project which may have significant impact on a wetland (for example dredging), river bank or lake shore, shall be required to carry out an environmental impact assessment in accordance with sections 20, 21, and 22 of the NES.	The proposed project activities shall not be carried out in or near any wetland.
The National Environment (Conduct and Certificate of Environment Practitioners Regulations (2003)	Regulation 176 (1) states that no person shall conduct an EIA or carry out any activity relating to the conduct of an environmental impact study, or environmental audit as provided under the Act, unless the person has been duly certified and registered in accordance with the regulations	The Consultants who carried out this assessment are certified practitioners by NEMA.
The National Environment (Waste Management) Regulations (2020)	Regulations outline the requirements for the management of hazardous and non-hazardous waste including transport, storage, treatment, and disposal and licensing of waste contractors. Regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health.	The Project Developer should be aware of regulation requirements and legal standards when designing waste storage facilitates, avoiding inappropriate handling and disposal of waste.
The Water (Waste Discharge) Regulations, 1998	The water (Waste Discharge) Regulations of 1998, are aimed at regulating the effluent or discharge of wastes on to land or into water. Under regulation 5(1), a waste discharge permit is required for a person who owns a facility which discharges or will discharge effluent or waste into the aquatic environment or on land. The	In case of any waste discharged, a waste discharge permit shall be acquired from the relevant authorities.

Legal Framework	Provision(s)	Proposed actions/comments
	alum sludge and backwash water from the water treatment works will have to be discharged responsibly.	
The National Environment (Control of Smoking in Public Places) Regulations, 2004.	Section 3 entitles every person to a healthy environment, free from second-hand smoke. It further obliges all persons to safeguard the health of non-smokers. Sections 4 & 5 prohibit smoking in public places.	The developer/Contractor shall enforce a no-smoking ban in all public work places during construction and operation phases of the project and will ensure that there are clear signs indicating that smoking is restricted and prohibited in such areas.
The National Environment (Noise Standards and Control) Regulations, 2003.	Regulations 6 & 7 (II) sets permissible noise levels, Part III (Regulations 8, 9, 10 & 11) calls for the control and mitigation of noise; Regulation 9 specifically prohibits the generation of noise by place and time. Part IV instructs for a license for noise in excess of permissible levels.	Contractor and developer must enforce noise standards and working hours at the site allocated for development, both during the construction stage, as well as during operation and maintenance.
National Air Quality Standards, 2006 (Draft)	The Standards provides for permissible limits air quality parameters such as carbon dioxide, Nitrogen oxides, Sulphur oxides, Volatile Organic Compounds and particulates	The Developer and Contractor must implement and enforce mitigation measures for air pollution during the entire lifecycle of the project

Table 4: AfDB Operational Safeguard (OS) Policies

Operational Safeguard/Performance Standard	Key issue	Relevance/Applicability
OS 1: Environmental and social assessment	Mainstream environmental and social considerations, including those related to climate change vulnerability 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.	An environmental and Social Impact Assessment (ESIA) has been conducted for this project (this Report) where potential impacts have been identified and mitigation measures proposed. This will ensure that the project is implemented in a sustainable way.
OS 2: Involuntary resettlement, land acquisition, population displacement and compensation	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/ treatment site, reservoir sites and some areas along the proposed pipeline route will be compensated prior to start of construction works.

Operational Safeguard/Performance Standard	Key issue	Relevance/Applicability
OS 3: Biodiversity and ecosystem services	Identify and implement o 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	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 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	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 to enable workers express their complaints, among others.

2.4 Institutional Framework

2.4.1 Ministry of Water and Environment

Ministry of Water and Environment (MWE) is responsible for ensuring sound environmental management that in turn ensures that there is sufficient water for domestic, agricultural and industrial uses. MWE has the responsibility for setting national policies and standards, managing and regulating water resources and determining priorities for water development and management.

2.4.1.1 The Directorate of Water Resources Management

The Directorate of Water Resources Management (DWRM) is part of the Ministry of Water and Environment and is responsible for developing and maintaining national water laws, policies and regulations; managing, monitoring and regulation of water resources through issuing water use, abstraction and wastewater discharge permits; Integrated Water Resources Management (IWRM) activities; coordinating Uganda's participation in joint management of transboundary waters resources and peaceful cooperation with Nile Basin riparian countries.

2.4.1.2 The Directorate of Water Development

The Directorate of Water Development (DWD) under MWE is the lead agency responsible for coordinating and regulating all water supply and sanitation activities. It provides technical support services and capacity development to local governments and other water resources service providers. DWD comprises three Departments; Rural Water Supply and Sanitation; Urban Water Supply and Sanitation and Water for Production.

2.4.2 National Environment Management Authority

The National Environment Management Authority (NEMA) is a semi-autonomous institution, established under the National Environment Act, Cap. 153, in 1995, as the principal agency in Uganda, charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in the country. This agency spearheads the development of environmental policies, laws, regulations, standards and guidelines; and guides Government on sound environmental management in Uganda. Air quality, effluent and noise standards issued by NEMA are key to project implementation.

2.4.3 Ministry of Gender Labour & Social Development

This ministry promotes issues of social protection, gender equality, equity, human rights, culture, decent work conditions and empowerment for different groups such as women, children, the unemployed youth, internally displaced persons, the older persons and persons with disabilities. The Ministry works with institutional structures at district levels including probation offices, community development offices, and labour offices.

The Department of Occupational safety and health of this ministry administers and enforces the Occupational Safety and Health Act, No.9, 2006, the Laws of Uganda and its subsidiary Legislation. Mandated to Evaluate and Control the Physical, Chemical, Physiological, Social and Technical factors that affect persons at Work and the Working Environment. As such it is a requirement for the project to obtain a Workplace registration certificate and certificates of examination of lifting equipment from this department during the contractor mobilisation phase. Additionally, it is mandatory to report fatal accidents and any lost time injuries of three days or more to this department.

2.4.4 Local Administration Structures

The proposed Cwero water supply and sanitation system falls within jurisdiction of Gulu District. Technical District personnel directly involved on the project include the District Water Officer, Natural Resources Officer, District Health Officer and the Environment Officer.

3 ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE CONDITIONS

3.1 Project Location and its Environs

Cwero RGC is located in Kal Alii Parish and partly Pagik parish, Paicho Sub-county, Gulu District. The district lies in the Northern Region of the country, bordering with Amuru District in the west, Omoro in the South, Pader in the East and Lamwo District in the North East. Paicho Sub-country where the proposed project will be implemented is located about 30 km from Gulu City along Kitgum road, 368 km from Kampala via Gulu City by road. The project area is in Paicho Sub-county with eight villages of; Ajanyi, Bokeber, Dwere, Bura in Pagik Parish and Lakwela, Lalworo, Laminto, Te Olam in Kal alii Parish (Figure 1).

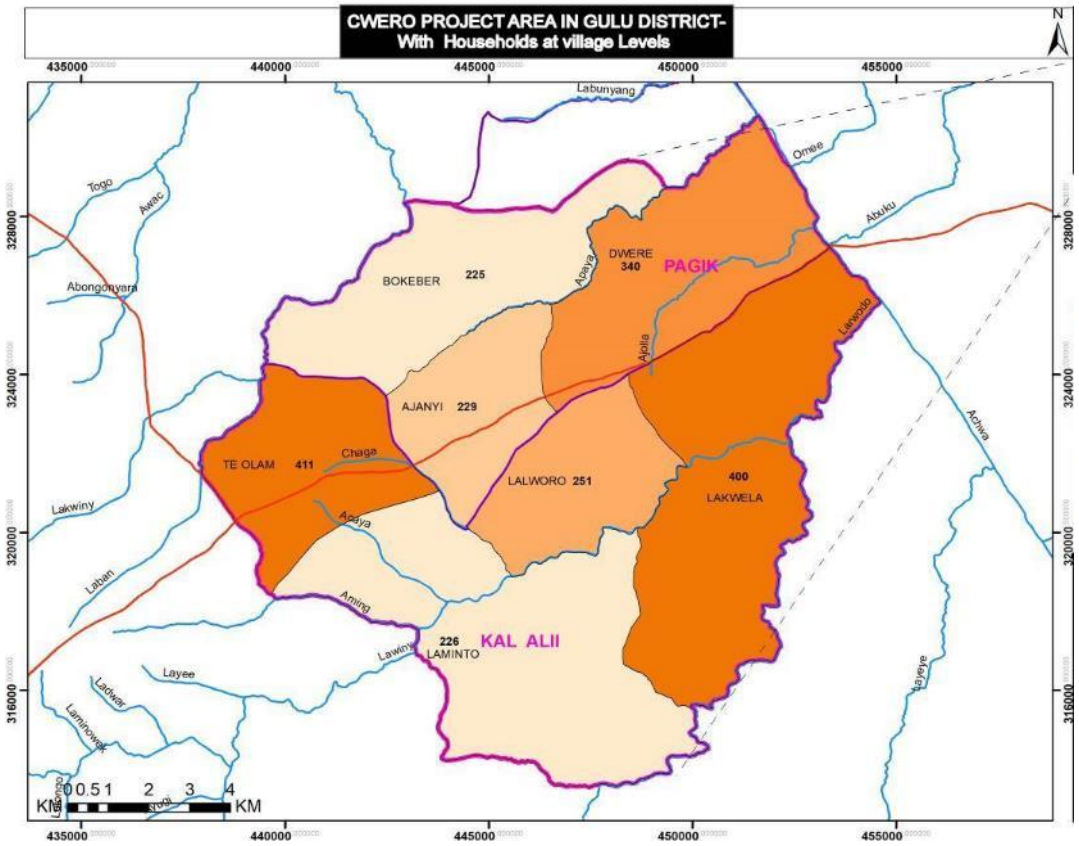


Figure 1: The map of villages in the project area

The proposed boreholes to be installed with solar power are located in Dwere Village (N02.962272° E032.550945° and N02.949967° E032.536818°) and Ajanyi Village (Cwero HC III borehole – N02.922366° E032.514037°, and Cwero P/School borehole – N02.919504° E032.509662°), borehole DWD 17805 located in Dwere village at N02.962272° E032.550945°. The proposed reservoir is to located in Ajanyi Village at N02.931475° E032.529085° as indicated in Figure 2.

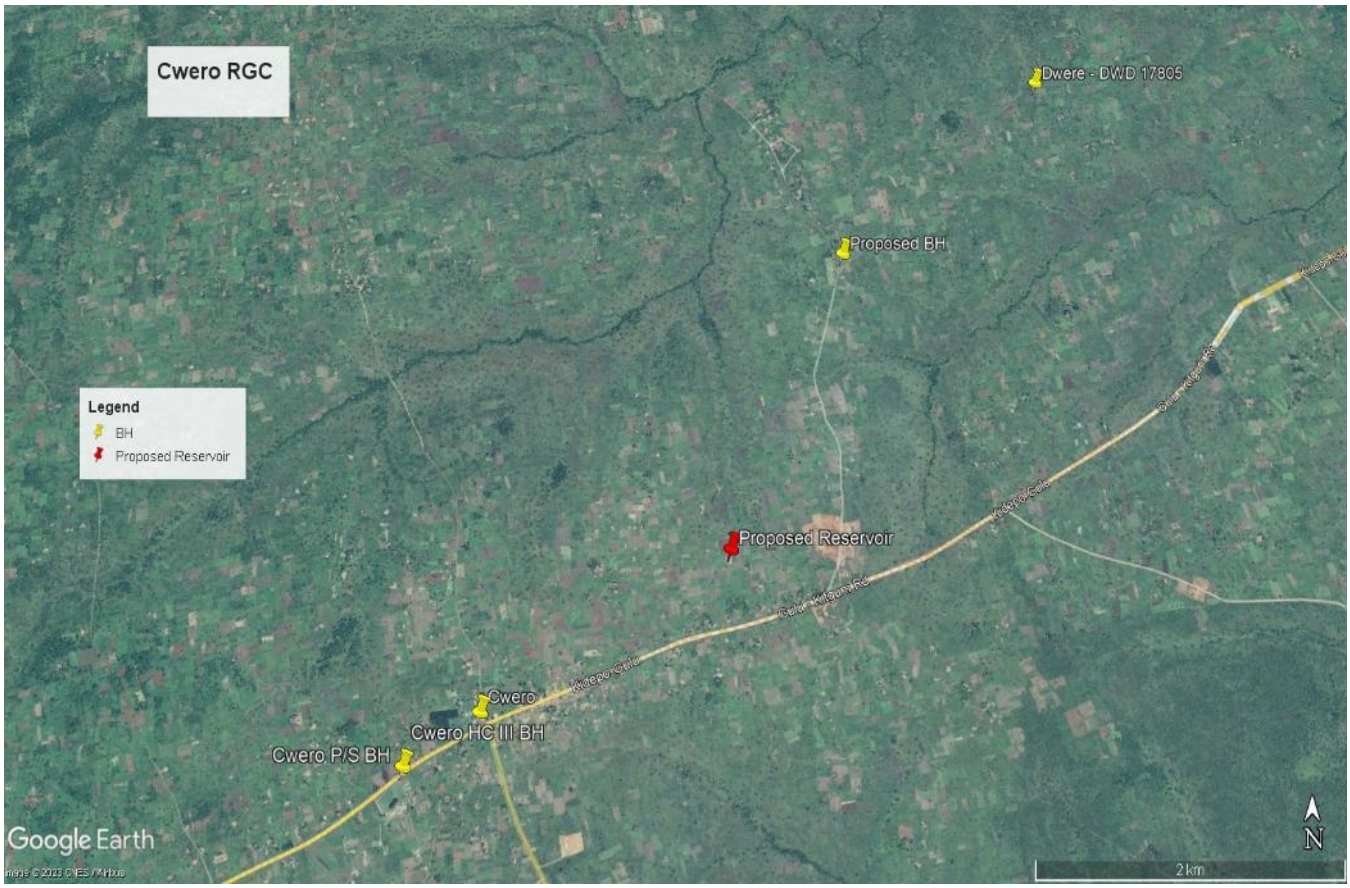


Figure 2: Google Earth Map of the Abstraction Points

3.2 Biophysical Environment

3.2.1 Geology and Soils

Gulu District is in the northern region and the geology is underlain by Precambrian rocks that have been exhaustively mapped and stratigraphically correlated. The Archaean Gneissic-Granulitic of the area coined by Schlüter (1997) is complex and comprises of high-grade metamorphic facies rocks.

The soil of Gulu consists of ferruginous soil with a high percentage of sandy soils and therefore susceptible to erosion. Due to its sandy nature, the soil has low water retention capacity and high rate of water infiltration. The soils are usually deep with little differentiation into clearly defined zones and possess fine granular structure, others moulded into large, weak coherent clods that are very porous.

3.2.2 Climate

Climate is humidity and greatly influenced by the N.E monsoon that sweeps by a wind that traverses Somalia, through Abyssinian massif and Kenya highlands and the hills of Karamoja. The water vapour content of this wind is consequently low that results into relative humidity ranging from 66% to 83% at 0600GMT in the morning, then reduces much in the afternoon to approximately 35%-57% at 1200GMT. Consequently, in a rainy season, the chances of early morning rainfall are greater than the late after afternoon.

The temporal distribution of the rainfall in the area gives rise to two distinct wet and dry seasons. The rainfall is characterized as bimodal rainfall ranging from 1000-1500 mm that comes during short and long monthly periods beginning March to May and August to December with peaks in April and November respectively. The wet seasons are separated by two dry seasons which sets in from late early December to early March; and from late June to early August.

The temperature is generally hot with mean daily minimum and maximum of 18°C and 28˚C, respectively. The coldest day of the year is July 14, with an average low of 18°C and high of 27°C. Its extreme highest temperatures are in the month of February when it records approximately 35^{o}C. The hot season for Gulu lasts for 2.3 months, from January 17 to March 26, with an average daily high temperature above 34°C. Hence, there are relatively high rates of evaporation in the dry seasons.

3.2.3 Hydrogeology and Drainage

The district comprises of up and down wrapping of underground rocks accompanied by faulting, shearing and jointing. This has influenced the drainage pattern to form a dendrite drainage pattern. Many rivers and streams are held responsible for the formation of this drainage pattern flowing towards the lower gradient. The major surface water reserves include those flowing into the River Nile such as rivers: Aswa, Unyama, and Tochi. The catchment has a total area of 31,500 km^2 (Figure 3).

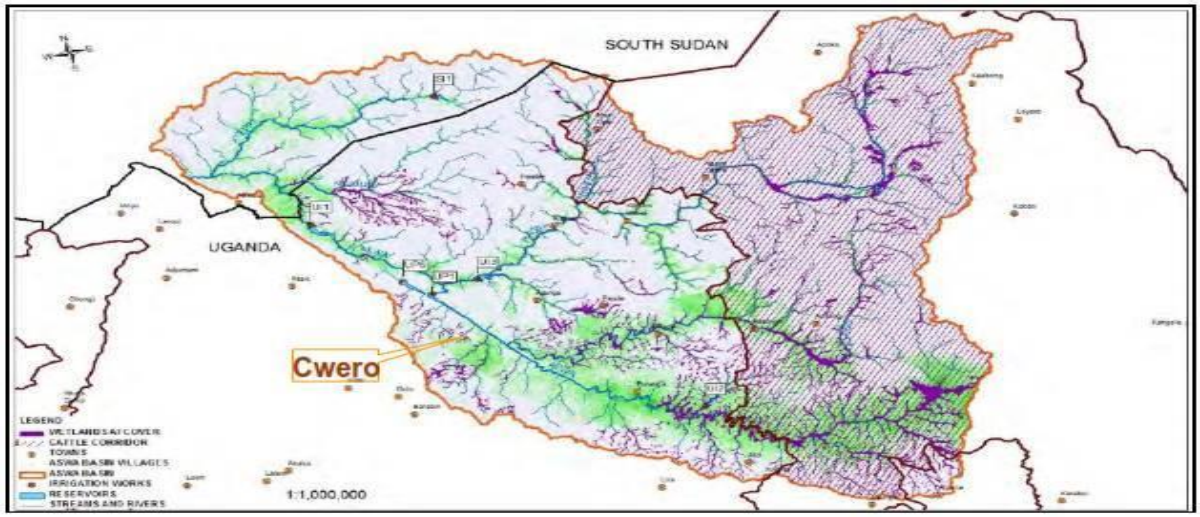


Figure 3: Aswa Catchment Area

The groundwater in the Basement formations encountered in the area generally occurs in the weathered rock, or overburden (regolith), and in the fractured rock. The weathered rock may have a good transmissivity and storage abilities to provide some yield; however, generally, the better aquifers are found in the contact zone between the overburden and the fresh rock. This zone is mechanically disintegrated with less secondary clay minerals resulting in a higher transmissivity. Ultimately, the highest yielding aquifers is expected in the fractured bedrock. This was indicated by the number of boreholes which have been drilled to harvest water for domestic supply.

The district boreholes are usually drilled into the fractured bedrock where the permeability is rather high and where the storage can be provided by the overburden. Large and deep, fractured aquifers may be recharged through a connected system of fractured zones. The recharge of shallow aquifers, found in the overburden or in a fractured upper part of the bedrock is generally dependent on the size of the catchment area and the lithological character of the overburden.

3.2.4 Topography

Generally, Gulu district topography ranges between 1000-1200 meters above sea level. The topography varies greatly; with elevation of the areas within 3km from the Gulu town raises moderately within a maximum elevation change of 85 meters and an average elevation above sea level of 1,098 meters. The elevation within 16 kilometres contains predominantly modest variations (211 meters); while the elevation of the area within 80 kilometres varies significantly (758 meters).

3.2.5 Flora

The vegetation of Gulu District follows the existing rainfall and relief pattern. The surviving original vegetation where there are remnants of communities are found within the parkland and savannah vegetation, predominated by grasses and deciduous trees. The area that is influenced by human activity has less dense trees scattered between dense tall grasses in valleys and where human influence is less; and sparser in the flat, hilly and where human activity is greatly intense. The vegetation species identified at the proposed project sites are as follows:

Abstraction Borehole DWD 17805 – Dwere Village (N02.962272^{o}, E032. 550945^{o})
The project site consisted of regenerating vegetation surrounded by settlements with vegetation cover dominated by gardens and bushed fallows. The species identified include:

Food Crops: *Cajanus cajan, Sorghum bicolor, Zea mays*

Grasses: *Heteropogon contortus, Hyparrhenia rufa, Brachiaria decumbens*, *Panicum maximum, Imperata cylindrica, Cynodon dactylon,* and *Chloris gayana.*

Trees: *Acacia seiberina, Grewia mollis, Ficus sycomorus, Terminalia brownii, Tamarindus indica, Vitellaria paradoxa, Albizia zygia, Albizia coriaria.*

Weeds: *Ageratum conyzoides, Galisonga parviflora, Asystasia gangetica, Phyllanthus amarus, Conyza floribunda, Cyathula prostrata, Momordica foetida, Achyranthes aspera*, *Abutilon guineense*, *Ipomoea hederifolia*

Herbs: *Crassocephalum crepidioides, Tridax procumbens, Euphorbia bicolor, Euphorbia heterphylla, Senna sp, Gomphrena celosioide, Synedrella nodiflora*, *Triumfetta rhomboidea*, *Desmodium adscendens, Sida acuta*

Vitellaria paradoxa (Shea nut) is mainly culturally and of economic value to the natives. Its nuts are used to extract oil (Shea butter) used for making cosmetics, soap and food. A view of the vegetation chacteristics at this site is presented in Plate 3.

Plate 3: Vegetation around Borehole DWD 17805 Dwere Village. Taken by the Botanist, March 2023

Proposed site for borehole drilling - Dwere

The project site consisted of regenerating vegetation surrounded by settlements with vegetation cover dominated by gardens and bushed fallows (Plate 4). The species identified include:

Food Crops: *Sorghum bicolor*

Grasses: *Hyparrhenia rufa, Panicum maximum, Cynodon dactylon, Digitaria velutina, Imperata cylindrica,*

Trees: *Pinus carribea, Terminalia brownii, Combretum mole, Borassus aethiopum, Mangifera indica*

Herbs: *Tridax procumbens, Euphorbia bicolor, Oxygonum sinuatum, Ocimum basilicum, Bidens pilosa.*

Plate 4: Vegetation at the proposed site for borehole drilling in Dwere village. Taken by the Botanist, March 2023

Cwero Health Centre III Abstraction Point

Built area with vegetation less of indigenous tree species, mainly grass species managed by slashing.

Grasses: *Bracharia decumbens, Digitaria exilis, Paspalum scrobi, Chloris gayana*

Trees: *Mangifera indica*

Cwero P/School Abstraction Point

This is a built area where the vegetation characteristics has been heavily modified, generally dominated by trees, and with a few indigenous tree species and ornamental shrubs (Plate 5).

Grasses: *Bracharia decumbens, Digitaria exilis, Cynodon dactylon, Panicum maximum, Themeda triandra, Paspalum scrobi,*

Shrubs*:* *Solanum aculeastrum*

Trees: *Azadirachta indica, Eucalyptus sp, Ficus sp.*

Plate 5: Vegetation at Cwero P/School. Taken by the Botanist, March 2023

Proposed Reservoir Site

This site is characterized by regenerating vegetation. The species identified include:

Food Crops: *Sorghum bicolor*

Grasses: *Hyparrhenia rufa, Panicum maximum, Cynodon dactylon, Digitaria velutina, Imperata cylindrica*

Trees: *Terminalia brownii, Combretum mole, Borassus aethiopum, Mangifera indica, Pinus carribea*

Herbs: *Bidens pilosa, Tridax procumbens, Euphorbia bicolor, Ocimum basilicum.*

Transmission Lines

The vegetation along the transmission lines, which will mainly move along road reserves, is characteristic of savanna grasslands, comprising mainly of fire-resistant tree species, integrated with farmland under fallow (Plate 6). The specific vegetation species identified include:

Food Crops: *Sorghum bicolor, Zea mays*

Grasses: *Bracharia decumbens, Hyparrhenia rufa, Imperata cylindrica, Panicum maximum, Cynodon dactylon, Digitaria velutina,*

Trees: *Zizyphus abyssinica, Vitex doniana, Grewia mollis, Erythrina abyssinica, Mangifera indica, Vitellaria paradoxa, Combretum mole.*

Herbs: *Tridax procumbens, Euphorbia bicolor, Oxygonum sinuatum, Ocimum basilicum, Bidens pilosa.*

Shrubs: *Gossypium hirsutum*

Plate 6: Vegetation along the transmission lines

3.2.6 Fauna

A total of fifty-three (53) bird species were recorded from the proposed project abstraction and reservoir sites. The most abundant species were Common Bulbul (*Pycnonotus barbatus*), Red-Billed Firefinch *(Lagonosticta senegala)* and Common Swift (*Apus apus*). These species were recorded within the first 20 minutes of the count. There were variations in number of species recorded across sites, with the highest number being recorded around abstraction site DWD 17805 in Dwere village, followed by the site for the proposed borehole to be drilled in Dwere village, whereas the lowest was recorded at the Cwero HC III borehole (Figure 4).

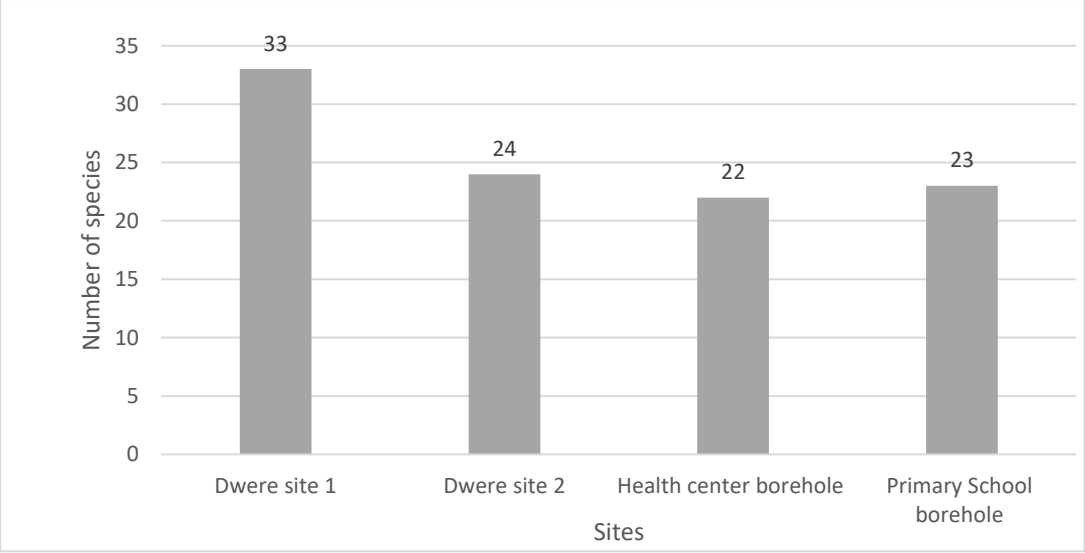


Figure 4: Number of species recorded along the project proposed areas

The bird community sampled supports species of various ecological categories such as tree species, grassland species, Aerial feeders and water birds. Figure 5 shows that majority of the species were forest edge species (f), followed by grassland species and forest generalists. Other than grassland specialists, other specialists were not recorded during this survey.

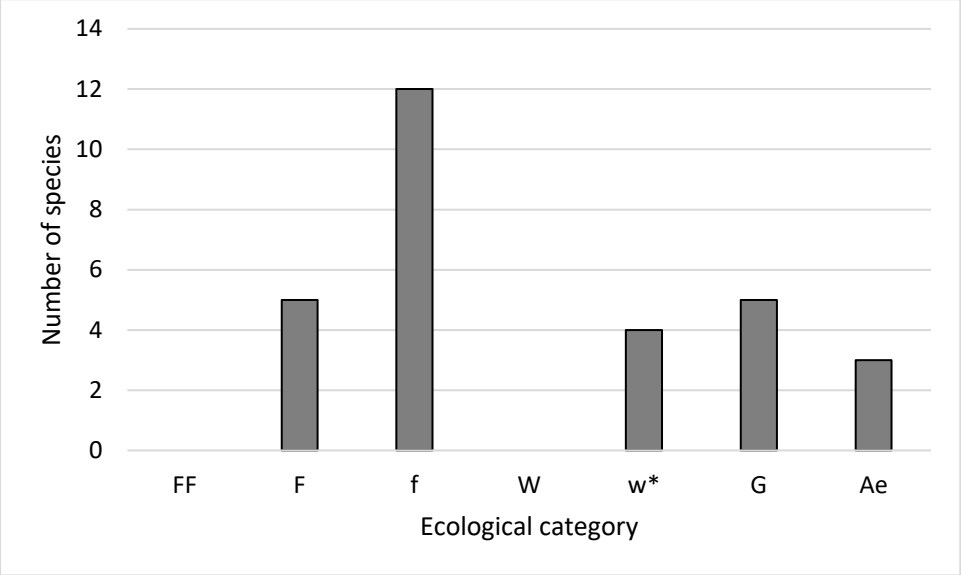


Figure 5: Number of species recorded in various ecological categories

Forest species

No forest interior species (FF) were recorded during the assessment. Forest interior species occur only in primary natural forests and there were no forested areas in the study areas. The five forest generalists (F) are listed in Table 5. F species are less specialized and can be found in small forest patches and degraded forests. Among them, Lizard Buzzard was the most abundant, followed by Ross's Turaco. All the recorded species under this category are not listed as species of global or regional or national conservation concern.

Table 5: Forest generalists (F) species recorded across sites

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation Status	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
66	Africa Green-Pigeon (*Treron calvus*)	F	LC				
69	Blue-Spotted Wood Dove (*Turtur afer*)	F	LC				
132	Ross's Turaco (*Musophaga rossae*)	F	LC				
308	Long-Crested Eagle (*Lophaetus occipitalis*)	F	LC				
319	Lizard Buzzard (*Kaupifalco monogrammicus*)	F	LC				

Water birds

No water specialist species (W) were recorded during the assessment. Water specialists occur only in wetlands, open-water areas and ponds. However, there were four water non-specialist species recorded (Table 6). Both the Hadada Ibis and Marabou Stork were recorded in all the four survey sites. Waterfowl are important for human wellbeing and to the environment in many ways for example; they can maintain the diversity of other organisms, control pests, be effective bio-indicators of ecological conditions, and act as sentinels of potential disease outbreaks. They also provide important provisioning (meat, feathers, eggs, etc.) and cultural services to many indigenous communities.

Table 6: List of non-specialist water birds (w*) recorded

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
161	Marabou Stork (*Leptoptilos crumeniferus*)	w*	LC				
171	Hamerkop (*Scopus umbrette)*	w*	LC				
183	Black-Headed Heron (*Ardea melanocephala)*	W*	LC				
196	Hadada Ibis (*Bostrychia hagedash)*	w*	LC				

Grassland Species

Five grassland species (G) were recorded (Table 7), with Black-Shouldered Kite (*Elanus caeruleus)* being the most abundant. The highest number of these species was recorded in Dwere site 1 and none around the Cwero HC III borehole. Two of the grassland species are migratory in nature i.e. Yellow wagtail (*Motacilla flava)* and Abdims Stork (*Ciconia abdimii*). Grassland species are of conservation concern due to bush burning and overgrazing.

Table 7: The grassland species recorded along the proposed water system project area

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
165	Abdim's Stork (*Ciconia abdimii*)	G	AM				
182	Cattle Egret (*Bubulcus ibis*)	G					
286	Black-Shouldered Kite (*Elanus caeruleus*)	G					
728	Yellow-Throated Longclaw (*Macronyx croceus*)	G					

732	Yellow Wagtail (*Motacilla flava*)	w*G	PM				

Aerial Feeders

Three aerial feeders (Ae) were recorded (Table 8). These species are insectivores, therefore are expected in big numbers in areas with a high abundance of insects. Among three species, two (2) are Palearctic migrants (Barn Swallow and Common Swift). Aerial feeders are of concern owing to the way they respond to deteriorating air quality in their environment.

Table 8: Aerial feeders recorded in various in various areas

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
91	African Palm Swift (*Cypsiurus parvus*)	Ae					
100	Common Swift (*Apus apus*)	Ae	PM				
880	Barn Swallow (*Hirundo rustica*)	w*Ae	PM				

Migrants

There were eleven (11) migrant species recorded (Table 9). These included seven (7) Palearctic and three (3) Afro-tropical migrants. Black Kite belongs to both categories. Common Swift was the most abundant, followed by Yellow Wagtail. Migratory birds provide ecosystem benefits that include pest control, pollination of plants and serve as food sources for other wildlife. They are also as a source of recreation for millions of bird watchers and enthusiasts.

Table 9: Palearctic Migrants (PM) and Afrotropical Migrants (AM) across sites

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
100	Common Swift (*Apus apus*)	Ae	PM				
165	Abdim's Stork (*Ciconia abdimii*)	G	AM				
337	Black Kite (*Milvus migrans*)	pA	PM				
341	Common Buzzard (*Buteo buteo)*	P	PM				
732	Yellow Wagtail (*Motacilla flava)*	w*G	PM				
880	Barn Swallow (*Hirundo rustica*)	w*Ae	PM				
886	Common Sand Martin (*Riparia riparia*)	W	PM				
965	Violet-Backed Starling (*Cinnyricinclus leucogaster*)	f*	AM				

2016 No	COMMON NAME (Scientific Name)	Ecology	Conservation	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
1021	Northern Wheatear (*Oenanthe oenanthe*)	P	PM				
1025	Isabelline Wheatear (*Oenanthe isabellina*)	P	PM				

Species of Conservation Concern

All bird species recorded were assessed globally (IUCN, 2023), nationally (MTWA, 2018), and regionally (Bennun and Njoroge, 1996). All the recorded species are not listed globally or nationally as threatened. However, there was one species (Spot-flanked Barbet) which is considered important at a regional scale. Red-list data is used by many groups such as governments, developers and conservation organization to support conservation actions and priorities. Natural resource planners also rely on red-list data to better understand their environment and how impacts be minimized.

Critical Sites

None of the sites qualify as critical as far as birds are concerned (Table 10). In fact, we did not record any endangered and restricted range species. The habitat its self does not qualify as a unique ecosystem and these sites have not contributed to any key evolutionary processes.

Table 10: Critical habitat matrix generated across the project areas

IFC Critical habitat Criteria	DWD 17805	Proposed BH to be drilled	Cwero HC III BH	Cwero P/S BH
Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species	1	1	1	1
Criterion 2: Endemic or restricted-range species	1	1	1	1
Criterion 3: Migratory or congregatory species	2	1	1	1
Criterion 4: Highly threatened and/or unique ecosystems	1	1	1	1
Criterion 5: Key evolutionary processes	1	1	1	1
Total Ranks	**6**	**5**	**5**	**5**

3.3 Noise Level

The noise levels recorded at the different sites in the project area is presented in Table 11. The results showed that baseline noise levels are within the permissible standards for residential and commercial areas.

Table 11: Results of Noise Measurements

Site Description	**Coordinates**	**Noise level (dB (A))**	**Major Sources**
Dwere Borehole (DWD 17805)	N02.962272 E032.550945	43.4-48.3	Wind, People talking
Proposed site for drilling new borehole	N02.949967 E032.536818	57.8-64.1	Moving motor bikes, people talking

Homes near the proposed site for new borehole	N02.950494 E032.536928	47.9-56.2	People talking
Cwero H/C III Borehole	N02.922366 E032.514037	62.3-68.0	Moving vehicles
Maternity Ward area	N02.922608 E032.514172	57.7-62.1	Moving vehicles, people talking
Cwero P/School Borehole	N02.919504 E032.509662	63.1-72.7	Moving vehicles
Cwero P/School Classroom block	N02.918340 E032.509751	49.1-56.2	People talking
Staff quarters at Cwero P/School	N02.919123 E032.510055	53.9-58.6	Moving vehicles, people talking
Proposed reservoir area	N02.931475 E032.529085	43.6-50.2	Wind, People talking

3.4 Existing Water Supply Situation

Presently, the major sources of water in Cwero RGC are boreholes fitted with hand pumps, springs and River Aswa (Plate 7). The boreholes are owned by the communities or institutions such as schools and health centres. The water is obtained from the boreholes by community members free of charge. However, communities contribute fees in a case a borehole is damaged, to facilitate repair or maintenance.

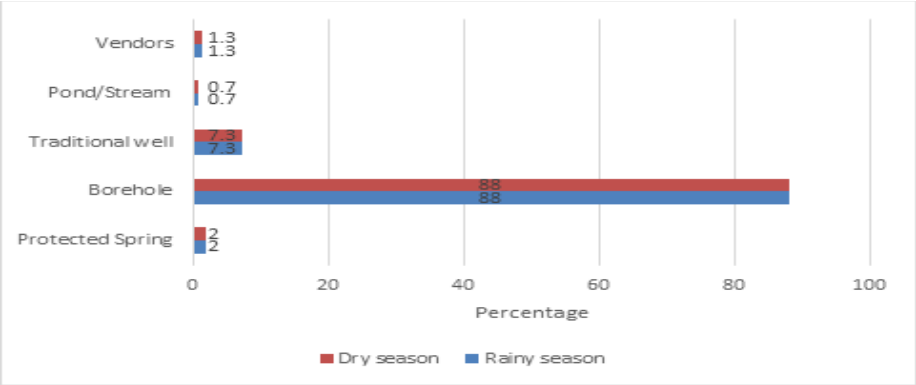
River Aswa

Spring in Dwere Village

BH Located at Cwero HC III

Plate 7: Existing water sources in the project area. Taken by the Water Resources Specialist, March 2023

A socio-economic survey conducted in the project area showed that majority of the households (88% in the rain season and 88% in the dry season) reported fetching water from a borehole (Figure 6). 84% respondents reported they treat their drinking water compared to 5% who reported drinking untreated water.



Source: Survey data June, 2020

Figure 6: Distribution of Respondents by Major Sources of Water

3.4.1 Water Quality

The water samples obtained from the boreholes sampled portray satisfactory physio-chemical characteristics as shown in Table 12. With this water quality, minimal treatment would be necessary. There are no water treatment works that require conventional treatment of water for consumption.

Table 12: Water quality analysis results

Parameter	Unit	Cwero HC III BH	Cwero P/S BH	National Standards for portable water
pH	-	7.1	7.0	6.8-8.5
Electrical Conductivity (EC)	µm	382	383	1000
Apparent Color	PtCo	0	0	15
Turbidity	NTU	1	1	5.0
Total dissolved solids (TDS)	mg/l	180	181	700
Total suspended Solids (TSS)	mg/l	0	0	0
Total Alkalinity	mg/l	200	200	500
Total Hardness	mg/l	350	347	500
Magnesium	mg/l	26	25	50
Sodium	mg/l	10	11	200
Chlorides	mg/l	20	19	250
Fluoride	mg/l	0.28	0.28	1.0
Total iron	mg/l	0.01	0.01	<0.3
Total phosphorus	mg/l	1.0	1.0	-

Total nitrogen	mg/l	1.75	1.76	-

3.5 Socio-Economic Profile

3.5.1 Administrative Arrangement

Gulu District is made up of Aswa County and the Gulu City, covering a total area of 3,452.1km^2 (1,332.9 sq mi). The district headquarters are located in Gulu City. The project area is located in Paicho Sub County, Aswa County. The overall administration of this sub-county is headed by the Local Council Chairperson –III. The Administrative structure of the project area covers 2 Parishes of Pagik and Kal Alii (Table 13).

Table 13: Administrative structure of project area-Paicho Sub-county

Sub-County	Parish	Village	UBOS HHs
PAICHO	PAGIK	Ajanyi	
		Bokeber	225
		Bura	162
		Dwere	340
	KAL ALII	Lakwela	400
		lalworo	251
		Laminto	226
		Te Olam	411
Source: UBOS NHPC 2014, Gulu District			

3.5.2 Population

3.5.2.1 Current population, growth rate and projections

From the recent 2014 National Population and Housing Census, Paicho sub-county where Cwero RGC project area is situated has a population of 11,220 people (Table 14).

Table 14: Domestic Population- 2014 (UBOS Households)

Sub County	Parish/Ward	Village	UBOS HHs	HH size	Popn 2014
PAICHO	PAGIK	Ajanyi	229	5.0	1,145
		Bokeber	225	5.0	1,125
		Dwere	340	5.0	1,700
		Bura	162	5.0	810
	KAL ALII	Lakwela	400	5.0	2,000
		Lalworo	251	5.0	1,255
		Laminto	226	5.0	1,130
		Te Olam	411	5.0	2,055
TOTAL PROJECT AREA			**2,244**	**5.0**	**11,220**
Source: UBOS - Gulu District, Census 2014					

Based on The Uganda Population and Housing Census, 2014, the annual population growth rate of Gulu district is at 3.3% per annum. The population of the area is projected to reach 27,888 by 2042 (Table 15).

Table 15: Summary of Total Population Projections

S/County	Parish	Village	Total Population					
			2020	2022	2027	2032	2037	2042
PAICHO	PAGIK	Ajanyi	1,392	1,486	1,748	2,057	2,420	2,847
		Bokeber	1,367	1,459	1,717	2,020	2,377	2,796
		Dwere	2,066	2,205	2,594	3,052	3,590	4,223
		Bura	985	1,052	1,238	1,457	1,714	2,017
		Parish Total	**5,810**	**6,202**	**7,297**	**8,586**	**10,101**	**11,883**
	KAL ALII	Lakwela	2,431	2,595	3,053	3,592	4,226	4,971
		Lalworo	1,525	1,628	1,915	2,253	2,651	3,119
		Laminto	1,374	1,467	1,726	2,031	2,389	2,811
		Te Olam	2,497	2,665	3,135	3,688	4,339	5,104
		Parish Total	**7,827**	**8,355**	**9,829**	**11,564**	**13,605**	**16,005**
Cwero Water Supply Project Total			**13,637**	**14,557**	**17,126**	**20,150**	**23,706**	**27,888**
Source: UBOS and Project Estimates								

3.5.3 Access to Infrastructure

3.5.3.1 Access to electricity

The town centre in Cwero is connected to the national electricity grid which is the main source of power in the area and around the project area (Plate 8). However, other energy sources being used by the local residents of Cwero include; simple solar systems, fuel for lighting, firewood and charcoal for cooking.

HEP in the Project Area

Solar Panels at Cwero HC III

Plate 8: Power Supply in the Project Area. Taken by the Sociologist, March 2023

3.5.3.2 Communication

The project area is connected to the National hydro-electricity power grid that serve the major mobile telephone operators (MTN and Airtel) that have services within the project area (Plate 9). The project area receives both analog and digital television signals via Free air and DSTV channel 140 and UBC TV. There is relatively good and various FM radios like Mega FM, Karibu FM, Rupiny FM, Radio Pacis which are accessed through radio device and app-enabled mobile phones. They serve as main channel for entertainment, making announcements and regular news bulletins.

Plate 9: Communication System - Masts in the project area. Taken by the Sociologist, March 2023

3.5.3.3 Road network

The area lies along the Gulu-Kitgum Highway 30 km from Gulu City (Plate 10). The high way is tarmacked and others are the roads connecting Paicho Sub-county to other sub-counties in the district are an unpaved murrum roads.

Plate 10: Access road to Cwero RGC via Gulu-Kitgum Highway. . Taken by the Sociologist, March 2023

The existing feeder road follows mostly gentle slopes. The condition of the murrum feeder roads in the project area is good/bad during the dry/ wet seasons respectively.

3.5.4 Education Level

Education is important because it contributes to improved living conditions not only for the individual household but for the society as a whole. Reproductive behavior, the use of contraception, health habits, school attendance of household members and habits relating to hygiene and nutrition are all influenced by education.

The findings of the household survey showed that 37.0% of the respondents in project area attained secondary level of education, 44.0% attained primary level of education, 5.0% attained post-secondary, 5,0% went up to tertiary level and 9.0% never went to school (Figure 7).

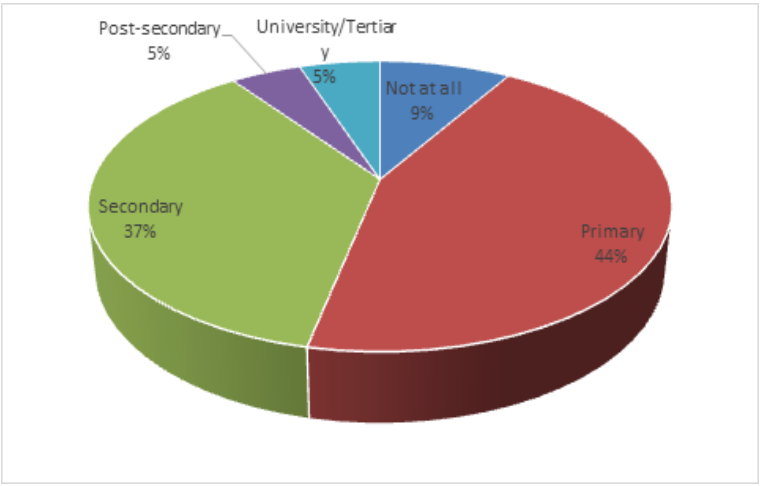
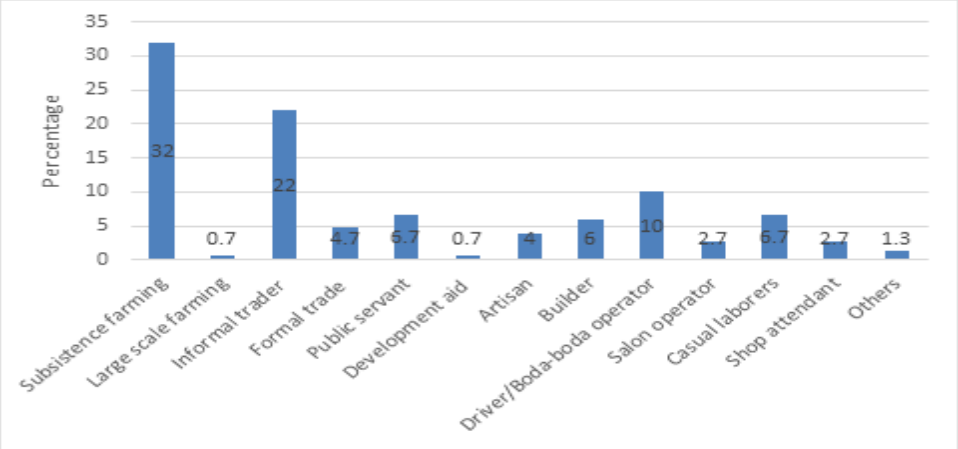


Figure 7: Education Level

3.5.5 Economic Activities

Survey results in (Figure 8) indicate that, a significant size of the household heads in Cwero are engaged in subsistence farming (32%), 22% informal traders and 10% drivers/boda boda operators. The salaries and wages in some of these sectors are still a

long way from the much-desired living wage. The implications of the above employment pattern are that households could have limited earnings and have to consider contributing for the project activities from among numerous spending centers.



Source: Survey data June, 2020

Figure 8: Distribution of Household Heads by Occupation

4 PROJECT DESCRIPTION

4.1 Introduction

The proposed project comprises of: water abstraction system, transmission mains, reservoir, distribution mains and water supply points. The detailed description of the project components is in the following sections:

4.2 Water Source

The water supply system for Cwero RGC will be based on ground water. Water will be pumped from the boreholes to a storage reservoir. Distribution from the reservoir tanks to the consumers will be by gravity. The piped water supply scheme will be supplied by four deep borehole wells of which three were drilled by Gulu District Local Government. The wells include; Cwero H.C III (N02.922366^{o} E032.514037^{o}) and Cwero PS (N02.919504^{o} E032.509662^{o}) in Ajanyi village, DWD 17805 (N02.962272^{o} E032.550945^{o}), and the proposed borehole to be drilled (N02.949967^{o} E032.536818^{o}) located in Dwere village, Pagik Parish, Paicho Sub-county, as shown in Plate 11.

Cwero P/S Borehole

Drilled DWD 17805

Cwero HC III Borehole

Plate 11: Abstraction points for the proposed project. . Taken by the Water Resources Specialist, March 2023

The current limiting yield capacities of these boreholes are 2.5 m^3/hr for Cwero HCIII, 2.8 m^3/hr for Cwero P/S, and 3.6 m^3/hr for DWD 17805; which implies that the current total design pumping rate of 26.9 m^3/hr can only supply about 215 m^3/day when using solar-PV technology alone for an eight (8) hr a day. After which the remaining 12hrs HEP will take over. It is thus evident that, the three water sources are not adequate to supply water that meets the 573 m^3/d demand. At existing status, a shortfall of 27 m^3/hr is realized when using the 16hr pumping regime. The characteristics of the boreholes are summarized in Table 16.

Table 16: The characteristics of the proposed boreholes

Borehole Number	**Cwero HC III**	**Cwero P/S**	**DWD 17085**	**To be Drilled**
Supply Area Demand (m^3/day)	573.1	573.1	573.1	27.0
Test Pump Yield (m^3/hr)	2.50	2.8	3.6	26.9
Borehole Yield to be Used (m^3/hr)	2.5	2.8	3.6	26.9
Hours of Pumping (hr)	8.0	8.0	8.0	8.0
Efficiency Pump (%)	60.0%	60.0%	60.0%	60.0%
Efficiency Motor (%)	80.0%	80.0%	80.0%	80.0%
	20	22	29	215

If a new borehole (s) is drilled in Cwero RGC with a minimum yield of 26.9m^3/hr yield over a 16-hour pumping regime, a combined borehole yield of 35.8 m^3/hr would satisfy the ultimate year (2042) demand of 573 m^3/day (Table 17).

Table 17: Available Ground Water Supply in Cwero Project Area

Borehole No.	Location	Well Status	Borehole Yield (m^3/hr)	Pumping Duration (hrs)	Groundwater Supply (m^3/day)	Groundwater Supply Vs. Maximum Day Demand					
						2020	2022	2027	2032	2037	2042
						Water Demand (m^3/day) per Year					
						280	299	352	414	487	573
Supply Vs Demand											
Cwero HC	Ajanyi	Existing	2.5	8	20.0	7%	7%	6%	5%	4%	3%
Cwero PS	Ajanyi	Existing	2.8	8	22.4	8%	7%	6%	5%	5%	4%
DWD 17805	Dwere	Existing	3.6	8	28.8	10%	10 %	8%	7%	6%	5%
Total for All Available Wells (3No.)			8.9	8	71.2	25%	24 %	20 %	17 %	15 %	12 %
Supply Shortfall (m^3/day)						*-209*	*-228*	*-281*	*-343*	*-416*	*-502*
Supply Shortfall (m^3/hr)						*-26.1*	*-28.5*	*-35.1*	*-42.9*	*-52.0*	*-62.7*
Alternative Pumping Duration											
Cwero HC	Ajanyi	Existing	2.5	16	40.0	14%	13%	11%	10%	8%	7%
Cwero PS	Ajanyi	Existing	2.8	16	44.8	16%	15%	13%	11%	9%	8%
DWD 17805	Dwere	Existing	3.6	16	57.6	21%	19%	16%	14%	12%	10%
To be Drilled	Cwero RGC	New	26.9	16	430.4	154 %	144 %	122 %	104 %	88%	75%
Total for All Wells (4No.)			35.8	16	572.8	204 %	191 %	163 %	138 %	118 %	100 %
Supply Excess (m^3/day)						*292*	*274*	*221*	*159*	*86*	*0*

Supply Excess (m^3/hr)	*18.3*	*17.1*	*13.8*	*9.9*	*5.4*	*0.0*
Source: Project Estimates						

4.3 Water Pump

The water pump to be used at Cwero water supply scheme shall use 4No. submersible pumps installed in 4 borehole pumping houses that serve as the water supply mains to the storage reservoir. The pump house will contain the associated pipework, fittings and electrical switch gear. The borehole pumps and the main sizing is summarised in Table 18.

Table 18: Raw water pump details

Borehole Number	Cwero HC III	Cwero P/S	DWD 17805	To be Drilled
Supply Area Demand (m^3/day)	573.1	573.1	573.1	27.0
Test Pump Yield (m^3/hr)	2.50	2.8	3.6	26.9
Borehole Yield to be Used (m^3/hr)	2.5	2.8	3.6	26.9
Hours of Pumping (hr)	8.0	8.0	8.0	8.0
Efficiency Pump (%)	60.0%	60.0%	60.0%	60.0%
Efficiency Motor (%)	80.0%	80.0%	80.0%	80.0%
Total Daily Delivery (m^3/day)	20	22	29	215
Pumping Main Section No. 01 (From Pump Installation Point to Ground Level at Borehole)				
Ground Level at Borehole (m AMSL)	1007.900	1009.850	1000.680	1000.680
Pump Installation Depth in Borehole (m BGL)	74.000	70.000	25.000	75.000
Cwh	140	140	140	140
Pipe Details	OD40 HDPE PN16	OD40 HDPE PN16	OD40 HDPE PN20	OD110 HDPEPN16
Pipe Diameter ND (mm)	32.60	32.60	31.00	90.00
Pipe Diameter ND (m)	0.033	0.033	0.031	0.090
Flow in Pipe (m^3/hr)	2.500	2.800	3.600	26.900
Flow in Pipe (m^3/s)	0.001	0.001	0.001	0.007
Velocity (m/s)	0.83	0.93	1.32	1.17
Length of Pipe Section No. 01 (m)	**74.00**	**70.00**	**25.00**	**75.00**
Friction Loss (m)	2.07	2.41	1.75	1.21
Fittings losses - 10% (m)	0.21	0.24	0.18	0.12
Total Headloss in Section 01 (m)	**2**	**3**	**2**	**1**
Pumping Main Section No. 02 (From Ground Level at Borehole to Reservoir)				
Inlet Level at Reservoir (m amsl)	1032.990	1032.990	1032.990	1032.990
Ground Level at Borehole (m AMSL)	1007.900	1009.850	1000.680	1000.680
Static Lift (m)	**25.090**	**23.140**	**32.310**	**32.310**
Cwh	140	140	140	140
Pipe Details	**OD40 HDPE PN10**	**OD40 HDPE PN10**	**OD40 HDPE PN10**	**OD110 uPVC PN10**
Pipe Diameter ND (mm)	35.20	35.20	35.20	99.40
Pipe Diameter ND (m)	0.035	0.035	0.035	0.099
Flow through pipe section 02 (m^3/hr)	2.500	2.800	3.600	26.900
Flow through pipe section 02 (m^3/s)	0.001	0.001	0.001	0.007
Velocity (m/s)	0.71	0.80	1.03	0.96
Chainage at Reservoir	2+200	1+700	2+973	3+000
Chainage at Borehole	0+000	0+000	0+000	0+000
Length of Pipe Section No. 02 (m)	**2,200.00**	**1,700.00**	**2,972.85**	**3,000.00**
Friction Loss (m)	42.33	40.35	112.37	29.94
Fittings losses - 10% (m)	4.23	4.03	11.24	2.99

Borehole Number	Cwero HC III	Cwero P/S	DWD 17805	To be Drilled
Total Headloss in Section 02 (m)	**47**	**44**	**124**	**33**
Total Pumping Head from Borehole to Reservoir				
Total Static Head from Borehole Installation Point to Reservoir	99	93	57	107
Total Headloss from Borehole Installation Point to Reservoir	49	47	126	34
Total Pumping Head from Borehole to Reservoir	**148**	**140**	**183**	**142**
Summary of the Design				
Total Length of Transmission				
OD40 HDPE PN20 (m)			25	
OD40 HDPE PN16 (m)	74	70		
OD110 uPVC PN16 (m)				75
OD40 HDPE PN10 (m)	2200	1700	2973	
OD110 uPVC PN10 (m)				3000
Capacity of pump in each borehole				
Head (m)	148	140	183	142
Flow (m^3/hr)	2.5	2.8	3.6	26.9
Power (kW)	**2.1**	**2.2**	**3.7**	**21.6**
Source: Project estimates.				

The boreholes pumps will supply water in the transmission mains at: Flow of 3.6 m^3/hr at 183 m head (DWD 17805), Flow of 2.8 m^3/hr at 140 m head (Cwero PS) and Flow of 2.5 m^3/hr at 148 m head (Cwero HC III). The new well will have a flow of 27 m^3/hr at 142 m head.

4.4 Transmission Pipe System

The water pumping main shall start from the pump house and flow though riser pipe of OD40 HDPE PN20, 25 m long (DWD 17805); OD40 HDPE PN16, 74 m & 70 m long (Cwero HC III & Cwero PS, respectively); and pumping main of OD40 HDPE PN10, 2,973 m, 2,200 m & 1,700 m (DWD 17805, Cwero HC III & Cwero PS respectively) long up to the storage reservoir. The well to be drilled will have a flow of 27 m^3/hr at 142 m head, through a riser main of OD110mm HDPE PN16 of 75 m length and a pumping main of OD110uPVC PN10 of 3 km long up to the storage reservoir.

4.5 Water Storage Reservoir

The required storage capacity computed as 28% of the maximum day demand is therefore 1158 m^3. This new tank represents a storage capacity of 28% in the ultimate year maximum day demand with its storage capacity at various stages of the design period reflected in Table 19.

Table 19: Reservoir storage capacity

Item	Cwero RGC Storage					
	2020	2022	2027	2032	2037	2042
MD Demand- m^3/day	280	299	352	414	487	573
Storage Capacity (m^3)	158	158	158	158	158	158
Hours of Storage	14	13	11	9	8	7

Storage Capacity (%)	56%	53%	45%	38%	32%	28%
Source: Project Estimates						

The reservoir tank will be erected on a 15 m high steel tower, due to the topography of the project area and the low pressures experienced in the distribution network around the tank and in the far reaches of the network. The reservoir tank will be made of square cold pressed steel panels of length 1.22 m provided with inlet, overflow, outlet, and drain pipe work. The reservoir will be fitted with; internal ladder of galvanised steel, level indicator mounted on the wall, vented roofed tank, and galvanised steel, lockable roofed level access cover at least 100 mm above the finished level of the roof. The roof vents are similarly set out and fitted with vermin proofing and mosquito proofing fabric. The overall internal dimensions (Length x Width x Depth) of the reservoir IS 7.32m X 6.10m X 3.66 m (158 m^3). The pipe work (rated PN6) of the reservoir shall be in Epoxy Coated Steel Pipe work with inlet DN 100, 32; outlet DN 150; overflow DN 150, and drain DN 100.

4.5.1 Reservoir Site Works

The site works for all the reservoirs will consist of the following:

a) The general earthworks;
b) The site pipe work;
c) The site drainage;
d) Fencing and miscellaneous works.

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

4.6 Array Power Output

The boreholes will be connected to the pumps powered by solar power mains. The power requirement includes the supply and installation of 143 No. mono crystalline PV Solar panels rated at 280 pW 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 a length of 3 km including the supply and installation of a 50kVA oil filled transformer (Table 20).

Table 20: Pumps and Power Requirements

Location	Head (m)	Flow (m^3/ hr)	Power (kW)	Qty	Required Motor Size KW	Available Motor (kW)	Total power (KVA)	Transformer (KVA)	UETCL Power Extension (Km)	Solar Panels No. (1x280pW)	Solar Panels area (m^2)
Cwero HC III	148	2.5	2	1	2.4	3.0	3.75			12	7.27
Cwero P/S	140	2.8	2	1	2.6	3.0	3.75			12	7.27
DWD 17805	183	3.6	4	1	4.3	5.0	6.25			20	12.12
Well to be Drilled	142	26.9	22	1	24.9	25.0	31.25	50.0	3.00	99	60.00
Source: Project Estimates											

4.7 Distribution Network

The distribution network shall be of length 15.676 km (Table 21). The downstream of the distribution systems reservoirs modelled using EPANET 2.0, considering peak hour factor of 2.0, indicates the flow velocities lower than 0.6m/s in some of the pipe sections that will be considered to achieve the recommended residual pressures caused by the flat topography.

The network designed caters for the areas with defined access roads and possibility of future extension in the project area. Consequently, the smallest size of pipe OD 50 HDPE will be used and pipes less than OD50, will be laid as Network intensification lines. The pipe work intensification will be required to increase the densification of the distribution networks to increase the customer base, and allow a neater layout of the service connection pipes as consumers' demand increases in the project area.

Table 21: Distribution mains

Pipe Details	**Length (m)**
OD160 uPVC PN6	12
OD110 uPVC PN6	393
OD90 HDPE PN6	2,120
OD63 HDPE PN6	2,332
OD50 HDPE PN6	10,818
Total	**15,676**
Source: Project Estimates	

Note: Large diameter (>250 mm ND); Medium size diameter (110 – 250 mm ND) – uPVC; Small size diameter (< 90 mm OD) – HDPE

4.8 Design Summary of Cwero RGC Water Supply Network

The design summary for the proposed Cwero water supply system is presented in Table 22.

Table 22: Design Summary of the Cwero Water Supply and Sanitation System

Features	**Description**
Total Population	27,888 (Future year 2042 population)
Water Demand	573 m^3/day (Future year 2042 demand)
Water Source borehole	Borehole at 35.8m^3/hr
Water Pump	Qmax=15.6 m^3/hr, H=190 m, 13kW, 29 Amps, 415 V/50 Hz
Pumping Main to Reservoir	OD40 HDPE PN10, at length of 2,973 m OD40 HDPE PN10, at length of 2,200 m OD40 HDPE PN10, at length of 1,700 m OD110uPVC PN10 at length of 3,000 m
Storage Reservoir	158 m^3 cold pressed steel tank elevated at 15meters
Distribution Mains	OD160 uPVC PN6 at length of 12 m OD110 uPVC PN6 at length of 393 m OD90 HDPE PN6 at length of 2120 m OD63 HDPE PN6 at length of 2332 m OD50 HDPE PN6 at length of 10,818 m
Waterborne Toilet	To be proposed by district officials

4.9 Sanitation System

From the socio-economic and household surveys, 95.3% of the households sampled in the RGC uses private pit latrines. The types of toilet facilities used by the households and their usage are as follows;

a) Public pit latrine 4.7%
b) Private pit latrine 95.3%

The proposed sanitation facility in Cwero RGC is a 1No. 6 stance water borne VIP toilet that will be constructed in a location that will be proposed by the officials during construction. The VIP toilet is sectioned into two to serve both male and female, and the facility will be complete with 3No. Single Stances, 1No. Urinal for the male section; and hand washing facility (Figure 9).

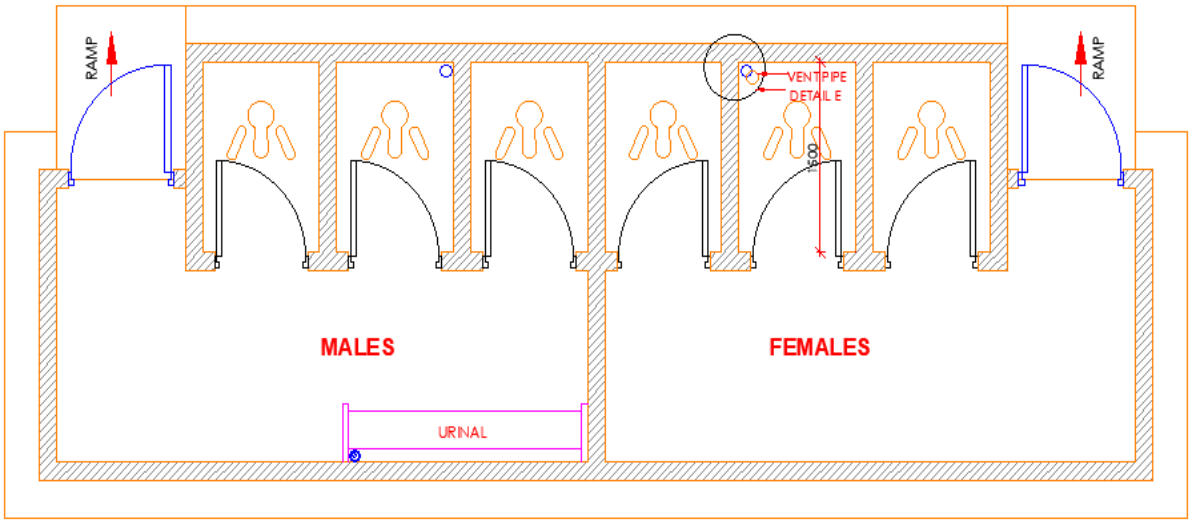


Figure 9: Layout of Proposed VIP Toilet

The toilets are designed to hold a year's sludge after which they will be de-sludged. The sludge will be disposed of according to the Ministry of Water and Environment (National Faecal Sludge Assessment for Small Towns, 2013). The wastewater from the toilets will be transported over 30 km to waste water treatment plant in Gulu City.

5 PUBLIC CONSULTATION AND INVOLVEMENT

5.1 Introduction

This section presents details of the stakeholder consultations that were undertaken for the project. It contains the stakeholders that were consulted and the key issues and concerns that were identified during the consultation.

5.2 Concerns /Views of the Stakeholder

The Concerns/ views of the consulted stakeholders are presented in Table 23, and their details are presented in Annex II. Generally, the stakeholders consulted welcome the project because of the foreseen benefits that the communities and institutions would accrue from the project. These majorly include addressing water supply shortages, long distances to the existing water sources as well as inadequate water sources compared to the increasing populations. Further, the number of communities sharing the few available sources with domestic animals will reduce.

Table 23: Stakeholders' views/concerns

Stakeholders	Concerns/Views	Response
District Environment Officer (DEO)	• As a district, we welcome the project. • The developer and contractor should engage the local communities to achieve project acceptance. • The district personnel should be involved too in the implementation of the project. • Mitigation measures should be clearly followed when the project commences. • If there is need for compensation, the developer should compensate the affected people before project commencement.	• Noted • The project Develop recognizes the importance of stakeholder engagement for the sustainability of the project. It is the reason for this consultation. Stakeholder engagement will be a continuous process throughout the project implementation • Mitigation measures for all identified adverse impacts have been proposed, and the Contactor and Developer will be required to implement them. You are among the key parties who will be involved in the monitoring of the implementation of the ESMMP • All affected project affected persons whose property is to affected should be compensated prior to start of construction activities
District Water Officer (DWO)	• The project is welcome to the district even though its construction phase has delayed for some time. • There is a water crisis in Cwero area and the business centre does not have adequate water to run some of the businesses such as small restaurants, accommodation areas etc. • The existing water sources especially boreholes do not yield enough water hence the need to drill a new well with	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area • The project proposes to use a combination of boreholes to meet the water demand • Both domestic and institutional water demands were considered in the water demand assessment,

	a higher yield to supplement the project. • The project should be able to supply the nearby institutions such as health centers and private schools.	and included the project design
Community members: Bokeber village	• The project should ensure that almost every community member benefits from the supply of safe water. • The project is welcome to the area and there is hope it will be supported by the entire community. • The contractor should ensure that jobs are given to the local people so that they can earn some money. • The water demand is so high because the 2 boreholes serve very many communities including Pagik P7 Primary School. • Other sources like wells and springs are used to support the overwhelmed boreholes especially during the dry season. • The school (Pagik P7 Primary School) plans to fence off its land hence there will be limited access to the borehole at the school. • The community is willing to pay for the fees charged by the operator.	• The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at existing boreholes. The project will ensure that as many people as possible have access to water through both house connections and public standpipes • Jobs will be available for the local people during both construction and operation. The Contractor and Developer have been encouraged to give priority for employment to the local people to enhance the project benefits
Community members: Dwere village, Paicho S/C	• The contractor should ensure that jobs are given to the local people so that they can earn some money. • The village is too big and it has only one functioning borehole. • People collect water from unprotected wells most especially when the borehole is broken. • The borehole water quality is not good. Most times, the water is smelly and has rusty particles of the pipes that were installed. • The developer should ensure that water a management committee is put in place so that the project can be sustainable.	• Jobs will be available for the local people during both construction and operation. The Contractor and Developer have been encouraged to give priority for employment to the local people to enhance the project benefits • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at existing boreholes. The project will ensure that as many people as possible have access to water through both house connections and public standpipes • A water management committee to ensure the sustainable operation of the project is recommended
Enrolled Nurse, Cwero Health Centre III	• The project will supply clean water to the facility especially in the laboratory and maternity ward that use a lot of water. • The existing borehole is used by many people especially on market days. • Due to its closeness to the access road,	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of lining up for long hours at

	it is usually spoilt by people who come to use it. • The proposed project will minimize cases of waterborne diseases that have been reported at the health facility.	existing boreholes. The project will ensure that as many people as possible have access to water through household and institutional connections, and public standpipes
Teacher, Cwero Primary School	• The project is welcome to the area as it will provide clean and safe water. • The existing borehole at the school is used by very many people such as pupils, teachers and other community members. • The location of the borehole next to the Gulu-Kitgum road exposes it to vandalism and this is expensive for the school during maintenance. • The project should connect a tap in the school compound to reduce on the risk of pupils being knocked by speeding vehicles while fetching water.	• Noted • The project seeks to increase access to safe water, and therefore reduce/eliminate the issue of water scarcity in the area, including reducing cases of knocking children along access roads as they look for water from distant boreholes. The project will ensure that as many people as possible have access to water through household and institutional connections, and public standpipes

5.3 General recommendations to enhance sustainability of project

1. The district leaders welcomed the project and pledged total support when the project commences.
2. The district leaders recommend that they and other stakeholders should be involved in design and implementation of the project. Experience shows that the projects that have been implemented without involvement of district leaders and technocrats have failed. Therefore, there is need for close collaboration between project partners, district leaders and other stakeholders at the lower level.
3. The Contractor to operate the plant should have the technical knowhow and be able to employ skilled personnel for efficient operation and maintenance of the project infrastructure.
4. Public stand pipes need to be prioritised in the project to enable the poor and vulnerable persons who cannot afford individual connections to their homesteads
5. The local communities have high expectations for jobs. The Contractor and Developer should prioritise employment of the local people on the project, where they meet the required skills
6. It is recommended that adequate and prompt compensation for PAPs' be implemented before project activity implementation.

6 PROJECT NEEDS AND DISCUSSION OF ALTERNATIVES

6.1 Introduction

Analysis of project alternatives as part of this environmental and social impact assessment considers other practicable strategies that can be taken to minimize or eliminate the negative impacts while enhancing the positive ones. This ensures that the project is implemented with minimal damage to environmental and socio-economic components.

6.2 The Project Need

Extension of a Piped Water Supply and Sanitation System to the proposed project area in Cwero RGC will generally come along with several benefits. These will include; meeting the increased demand for clean and affordable water, provision of job opportunities during the construction and operation phases and reduction on the water borne diseases (e.g., cholera, dysentery) related to using unsafe water among others. The availability of clean, safe and affordable water will also change the economic and healthy wellbeing of people of Cwero RGC, and Gulu District in general.

6.3 The "No- Action" Alternative

Analysis of the "No project option" as an alternative, provides an environmental and socio-economic baseline against which impacts of the proposed action can be compared. This alternative means that the status quo remains and the proposed piped water supply system is not established in the area. The alternative ignores all positive impacts such as creation of employment to both skilled and unskilled labour, and provision of convenient, safe and affordable water that are likely to be realized in the area. The No-Action alternative is clearly not recommended.

6.4 Water Source Alternatives

Two water source options were evaluated; ground water and surface. The main surface water resource in the project area is River Aswa. The water resources assessment established that River Aswa can provide the quantity of water needed for the piped water supply for Cwero RGC. However, the capital, operational and maintenance costs involved in this option considering that the demand is so small are not justifiable to invest in. As a result, the surface water resource alternative was not considered. Therefore, the only available water source for consideration, and which was selected, was the ground water source. This source can generate adequate water to meet the demand for the project area.

6.5 Abstraction Location Alternatives

Four abstraction locations were considered. Three are already existing boreholes and the other is planned to be installed. The selection of these sites was due to:

- A hydrological assessment showed that the water is of adequate yield and quality
- Cost, where by existing boreholes would minimize the cost of drilling new boreholes.
- Sufficient land to enable establishment of the project component, and future expansion if required.
- Closeness to the supply area

6.6 Power Source Alternatives

The power sources considered in the analysis included solar, and hydroelectricity from the national grid. The evaluation of the power source alternative considered the ability of the power source to pump the required water volumes and the investment costs. Solar power source was evaluated as the most feasible power source because it is cheaper and the sunshine the project area is sufficient to support a proposed solar system. However, in future, to meet the increasing demand, higher yielding borehole wells must be sought and developed, which will require high pumping capacity beyond solar. As a result, a hybrid solar-hydropower energy source was recommended. Both the solar and hybrid solar-hydropower energy sources are cheaper.

6.7 Design Considerations

Putting in place a piped water supply system according to approved designs will be a priority as it helps in enhancing the future planning of Cwero RGC and Gulu District at large. Therefore, it will be paramount that the proponent ensures that the facilities especially at the water source have the following in place.

- Well-designed drainage system
- Sufficient walkways within established infrastructure especially at the pumping station
- Consideration of solid waste management and other waste refuse
- Proper landscaping
- Sufficient sanitary facilities for workers
- Well-built and firm reservoir
- Well maintained power supply system for example regular maintenance of the Solar Panels.
- Well maintained water transmission line

6.8 The Action Alternative

This option implies that Gulu District Local Government implements the proposed project as per the proposed project designs and recommendations by different stakeholders. A comprehensive environmental and social impact assessment has been undertaken. Details of the study are the subject of this project brief report. The study has found no significant issues (environmental and socio-economic) to stop the implementation of the project. Mitigation measures for the identified negative impacts of this alternative have been discussed in this report. If they are implemented as proposed, the project will not cause damage to the environment. It is here thus we recommend that this alternative is the most appropriate.

7 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction and Approach to Impact Assessment

This chapter identifies, describes and evaluates significant environmental and social consequences (both positive and negative) of the preconstruction, construction, operation and decommissioning phases of the proposed Cwero Water Supply and Sanitation System. While positive impacts should be enhanced, the proposed mitigation measures should be implemented as suggested to minimize or eliminate the predicted negative environmental and social impacts.

7.1.1 Impact Description Evaluation Methodology

Describing a potential impact involved an appraisal of its characteristics, together with the attributes of the receiving environment. Relevant impact characteristics included whether the impact is:

- Adverse or beneficial;
- Direct or indirect;
- Short, medium, or long-term in duration; and permanent or temporary;
- Affecting a local, regional or global scale; including trans-boundary; and
- Cumulative (such an impact results from the aggregated effect of more than one project occurring at the same time, or the aggregated effect of sequential projects. A cumulative impact is “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions”).

Each of these characteristics is addressed for each impact. Consideration of the above gives a sense of the relative intensity of the impact. The sensitivity of the receiving environment was determined by specialists based on the baseline data collected during the study.

7.1.2 Impact Evaluation

Each impact is evaluated using the criteria listed in Table 24. To provide a relative illustration of impact severity, it is useful to assign numerical or relative descriptors to the impact intensity and receptor sensitivity for each potential impact. Each is assigned a numerical descriptor of 1, 2, 3, or 4, equivalent to very low, low, medium or high. The severity of impact was then indicated by the product of the two numerical descriptors, with severity being described as negligible, minor, moderate or major, as illustrated in Table 25. This is a qualitative method designed to provide a broad ranking of the different impacts of a project. Illustrations of the types of impact that were assigned the different grades of severity are given in Table 26.

Table 24: Classification of impact evaluation

No.	Classification	Description
1	Extent:	Evaluation of the area of occurrence/influence by the impact on the subject environment; whether the impact will occur on site, in a limited area (within 200 m from site); locally (up to 10 km from site); regionally (district wide, nationally or internationally i.e., >10 km from site).
2	Persistence/Duration:	Evaluation of the duration of impact on the subject environment, whether the impact was temporary (<1 year); short term (1 – 5 years); medium term (5 – 10 years); long term (10 – 50 years); and permanent (>50 years).
3	Social Context / Sensitivity or Potential for Stakeholder Conflict:	Assessment of the impacts for sensitive receptors in terms of ecological, social sensitivity and such things as rare and endangered species, unusual and vulnerable environments, architecture, social or cultural setting, major potential for stakeholder conflicts. The sensitivity classification is shown below: ***High sensitivity**:* Entire community displacement, destruction of world heritage and important cultural sites, large scale stakeholder conflict, etc. ***Medium sensitivity**:* Displacement of some households, moderate level of stakeholder concern ***Low sensitivity**:* No displacements, no potential for stakeholder conflict.
4	Regulatory and Legal Compliance:	Evaluation of the impact against Local and International legislative requirements. ***High**:* Prohibition terms for specific activities/emissions. Major breach of regulatory requirements resulting in potential prosecution or significant project approval delays. ***Medium**:* Potential breach of specific regulatory consent limits resulting in non-compliance. ***Low**:* No breach of specific regulatory consent limits anticipated.
5	Overall Impact rating (Severity):	Using a combination of the above criteria, the overall severity of the impact was assigned a rating Severe, Substantial, Moderate, Minor and Negligible. **Note**: These are just guidelines that will constitute professional judgement required in each individual case.

7.1.3 Impact Significance or Severity

The textural description of the descriptors ranging from "Very low" to "High" is presented in Table 25. Impact significance is determined from an impact significance matrix (Table 26) which compares severity of the impact with probability of its occurrence. Impact significance criteria are as follows:

Table 25: Criteria for rating impact intensity and likelihood

Criteria	Rating scales	Score
Intensity (the expected magnitude or size of the impact)	***Very Low***- where the impact affects the environment in such a way that natural, and /or cultural and social functions and processes are negligibly affected and valued, important, sensitive or vulnerable systems or communities are negligibly affected. Therefore, the environmental changes are within the existing limits of natural variations.	1
	Low- where the impact affects the environment in such a way that natural, and/or cultural and social functions and processes are minimally affected and valued, important, sensitive or vulnerable systems or communities are minimally affected. No obvious changes prevail on the natural, and / or cultural/ social functions/ process as a result of project implementation.	2
	Medium - where the affected environment is altered but natural, and/or cultural and social functions and processes continue albeit in a modified way, and valued, important, sensitive or vulnerable systems or communities are moderately affected.	3
	High - where natural and/or cultural or social functions and processes are altered to the extent that they will temporarily or permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. The changes to the natural and/or cultural / social-economic processes and functions are drastic and commonly irreversible.	4
	None – where the impact will not materialize	0
Probability (The likelihood of the impact occurring)	***Low*** – where the possibility of the Impact materializing is very low (<20%)	
	Medium – where there is a good possibility (30%-60% chance) that the impact will occur.	
	High– where it is most likely (60% -100% chance) that the impact will occur.	

Table 26: Determination of Significance or Severity

Impact Significance		Sensitivity			
		1 Very low	2 Low	3 Medium	4 High
Intensity of Impact	1 Very low	1 Negligible	2 Minor	3 Minor	4 Minor
	2 Low	2 Minor	4 Minor	6 Moderate	8 Moderate
	3 Medium	3 Minor	6 Moderate	9 Moderate	12 Major
	4 High	4 Minor	8 Moderate	12 Major	16 Major

- ***Major***: The impact exceeds the accepted limit or standard, or has a large magnitude and occurs to highly valued/sensitive resource/receptors. These denote that the impact is unacceptable and further adequate mitigation measures must be implemented to reduce the significance. More details are provided in Table 27.

- ***Moderate***: The impacts in this region are within accepted limits and standards and are considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical. Adequate mitigation measures make the impact minor or avoidable.
- ***Minor***: Impacts in this region are considered acceptable as their magnitude is sufficiently small and within accepted standards, and/or the receptor is of low sensitivity/value. Adequate mitigation measures make the impact negligible/non-existent.
- ***Negligible***: Impacts in this region are almost not felt.

Table 27: Impact significance assessment criteria and rating scale

Impact Rating	Impact Description
Major	• Highly noticeable, irreparable effect upon the environment • Significant, widespread and permanent loss of resource • 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 expedience of water/air quality and noise guidelines representing threat to human health in long and short term • Causing widespread nuisance both on and off site
Moderate	• Noticeable effects on the environment, 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 returning to normal in the medium term • Elevated contribution to global air pollution problem partly due to preventable releases • Frequent breaches of water/air quality and noise guidelines • Causing localised nuisance both on and off site
Minor	• Noticeable effects on the environment, but returning naturally to original state in the medium term • Slight local degradation of resources but not jeopardising further usage • Disruption/disturbance 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
Negligible	• No noticeable or limited local effect upon the environment, 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 water/air pollutant levels well below guidelines • No reported nuisance effects

Cumulative impacts were also assessed, in view of the valued ecosystem components as follows:

Step 1: the team shall identify the incremental effects of the project on the identified Valued Environmental Components (VECs) within the environs of the sites. The VECs will be selected based on information related to current or anticipated future degraded or stressed conditions, anticipated presence of other human activities that will adversely affect the same VEC.

Step 2: Identify other past, present, and reasonably foreseeable future actions within the space and time boundaries that have been, are, or could contribute to cumulative effects (stresses) on the VECs or their indicators as identified.

Step 3: For the selected VECs, the experts shall compile appropriate information on their indicators, and describe and assess their historical to current conditions where possible. Depending upon the availability of information, the identified trends in the conditions of the VECs and their indicators shall be dp Project to other actions like the upcoming projects in the study area to the selected VECs and their indicators.

Step 5: Assessment of the significance of the cumulative effects on each VEC over the time and the incremental effects (the direct and indirect effects) on specific VECs will also be included.

Step 6: For VECs or their indicators that shall be identified, they will be subjected to negative incremental impacts from the Project and for which, the cumulative effects are significant, develop appropriate action-specific "mitigation measures" for such impacts. The mitigation measures shall mainly be based on those identified in the study.

7.1.4 Development of Enhancement and Mitigation Measures

Enhancement measures for each identified positive impact have been proposed. Similarly, the mitigation measures for each of the negative impacts have been proposed. The Contractor / Developer should ensure that the proposed impact enhancement and mitigation measures are implemented.

7.2 Potential Positive Impacts of the Project

Table 28 summarizes the positive social impacts that are likely to result from the proposed project.

Table 28: Positive Impacts of the Proposed Project

No.	IMPACT	REMARKS
1	Employment opportunities and income	▪ Employment opportunities will be available for numerous disciplines/professions during construction (short-term) and operation and maintenance (long-term) phases. Not only will the skilled be employed but equally unskilled personnel. The possible direct jobs include community workers (casual labour) and semi-skilled such as trenchers, plumbers, masons, painters, carpenters, mechanics, electricians, mixer operators, steel benders, drivers, community educators, porters, cooks, security guards, etc.). ▪ During operation and maintenance, employment opportunities will include cleaners, security guard, system operator among other. ▪ Employment opportunities will also be created during the decommissioning phase, including both casual and skilled laborers like excavators, welders, carpenters, etc
2	Acquisition/improvement of skills	▪ People who have ever worked on similar projects before will improve on their skills. ▪ People who have never worked on such projects will acquire such skills which they would use to seek employment in future. ▪ The Project will provide grassroots management opportunities for the local people to both manage their piped water supply and protect their local environment.
3	Reduction of poverty and improved livelihoods of the local people	▪ Water is a catalyst for socio-economic development e.g., through agro-processing and business. The project will therefore enhance the growth of small-scale industries that depend on safe and adequate water supplies, which will improve the livelihoods of people in the area
4	Improvement in public health	▪ Many stakeholders noted during the consultations that some of the water sources are polluted. People will have access to safe water, which will help reduce the prevalence of water-borne diseases. ▪ Improved water supply will promote good health and reduce healthcare costs thus making overall national savings for investment in other developmental activities.
5	Achievement universal primary education	▪ Access to good water would save time the children spend looking for water from distant places or waiting at boreholes for long durations, hence will use such time for school activities ▪ Clean water will also enable children keep healthy so that they would be able to attend school regularly.
6	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).

7.3 Negative Impacts during the Pre-construction, Construction, Operation and Maintenance and Decommissioning Phases

The potential negative impacts of the proposed Cwero Water Supply and Sanitation Project are summarized in Table 29.

Table 29: Potential negative impacts

IMPACT	REMARKS	Intensity	Sensitivity	Overall Significance
Pre-construction phase and Construction Phase				
Loss of land and property	▪ Land will be required to accommodate project component e.g., at the proposed abstraction and reservoir sites ▪ Other properties such as crops, houses may be destroyed, especially those that may be found at sites for water abstraction, reservoir, along the alignment of the transmission system, along access corridors	3 Medium	3 Medium	9 Moderate
Disruption of traffic	▪ Project construction machinery, including trucks transporting material to the sites may disrupt traffic along public roads	1 Very Low	2 Low	2 Minor
Loss of vegetation	▪ Vegetation clearance to pave way for construction activities	2 Low	2 Low Medium	4 Moderate
Introduction of plant invasive species	▪ Invasive plant species could be introduced by the project machinery from other areas	2 Low	1 Very Low	2 Minor
Disruption of social order	▪ Influx of foreign labour (outside of the project area e.g., from other districts) during construction works may results into disruption of the cultural norms and customs.	2 Low	2 Low	4 Minor
Noise from construction machinery	▪ Noise pollution may arise from construction equipment. This may cause a nuisance to the public and construction staff	4 High	3 Medium	12 Major
Solid waste generation	▪ Solid waste will come especially from excavated material, unused construction material, packaging material, etc ▪ Faecal matter originating from construction staff	3 Medium	3 Medium	9 Moderate
Occupational health and safety issues	▪ Health and safety of workforce due exposure to unsafe site conditions, lack of protective gear etc. ▪ Potential of accidents e.g., falling in deep excavations	2 Low	2 Medium	4 Minor
Community health and safety issues	▪ Health and safety impact such injury due to falling debris from works along public routes, falling in excavated areas along public routes or near public places, accidents from project vehicles transporting material along community access roads, etc ▪ Spread of sexually transmitted diseases such as HIV/AIDS especially from labour force coming from outside the project area ▪ Accidents from construction trucks along public access roads	3 Medium	3 Medium	9 Moderate
Increased susceptibility to soil erosion	▪ Vegetation clearance may expose top soil to erosion during rain and heavy winds events ▪ Excavated soils may also be eroded if not well protected	2 Low	2 Low	4 Minor
Air pollution and climate change	▪ Dust emission from murram access road, uncovered loose construction material or construction waste ▪ Fumes from construction machinery, including greenhouse gases like carbon dioxide	4 High	3 Medium	12 Major

IMPACT	REMARKS	Intensity	Sensitivity	Overall Significance
Theft of construction materials	▪ Construction staff and community members may steal construction material, which can compromise project progress and quality of work	3 Medium	4 High	12 Major
Operation and Maintenance Phase				
Soil pollution	▪ Soil pollution may result from spillage/leakage of water treatment chemicals such as chlorine	2 Low	1 Very Low	2 Minor
Occupational safety and health issues	▪ Health and safety of workforce due exposure to unsafe site conditions, lack of protective gear, e.g., drowning in reservoir tanks	2 Low	2 Low	2 Minor
Generation of hazardous wastes	▪ The solar batteries used on the project will require routine replacements after the lifespan. ▪ Some solar panels may also fail, requiring replacement	3 Medium	3 Medium	9 Moderate
Incapacity to operate and maintain the project components by local people	▪ Local communities may not have adequate capacity to operate and maintain the project components, which may fail the project. It was noted during stakeholder consultations that existing water supply network in some parts of the district is non-functional due to poor operation and maintenance practices	3 Medium	3 Medium	9 Moderate
Unaffordability of water charges	▪ People in the project area current access water free of charge from the existing water sources. Some may fail to pay for water charges, and may continue using unsafe water	3 Medium	3 Medium	9 Moderate
Air pollution	▪ Obnoxious smell may result poor use of the public toilet e.g., due to failure to properly flush	3 Medium	4 High	12 Major
Spread of sanitation and water borne diseases	▪ Poor operation and maintenance of the public toilet e.g., lack of water for flushing and washing hands and failure to empty the septic tank may expose the public to water-borne and sanitation diseases like cholera, diarrhoea, dysentery etc	3 Medium	3 Medium	9 Moderate
Vandalization / theft project equipment	▪ The project equipment may be vandalized or stolen by community members, including solar panels, valves, pipes	3 Medium	3 Medium	9 Moderate
Decommissioning Phase				
Disruption of water supply	▪ The decommissioning of the project may affect water supply to the consumers. This might affect public health (through using unsafe water sources) and person hygiene	3 Medium	3 Medium	9 Moderate
Disruption of traffic flow	▪ Project demolition machinery may disrupt traffic along public roads	3 Medium	3 Medium	9 Moderate
Disruption of social order	▪ Influx of foreign labour (outside of the project area e.g., from other districts) during demolition works may results into disruption of the cultural norms and customs. These may include drug misuse, inappropriate sexual behaviour, vulgar language among others	2 Low	2 Low	4 Minor
Noise pollution	▪ Intermittent noise from demolition equipment and heavy vehicles	4 High	3 Medium	12 Major
Solid waste generation	▪ Solid waste will be generated especially from demolition debris	3 Medium	3 Medium	9 Moderate

IMPACT	REMARKS	Intensity	Sensitivity	Overall Significance
	▪ Faecal matter originating from demolition staff ▪ Solar panels and solar batteries which will be used will also be a sources of hazardous waste			
Occupational health and safety issues	▪ Health and safety of workforce due exposure to unsafe site conditions, lack of protective gear etc. ▪ Potential of accidents e.g., falling in deep excavations	2 Low	3 Medium	6 Moderate
Public health and safety issues	▪ Health and safety impact such injury due to falling debris from works along public routes, falling in excavated areas along public routes, accidents from project vehicles transporting material along community access roads, etc ▪ Spread of sexually transmitted diseases such as HIV/AIDS especially from labour force coming from outside the project area ▪ Accidents from demolition trucks along public access roads	3 Medium	3 Medium	9 Moderate
Increased susceptibility to Soil erosion	▪ Inappropriate demolition practices using heavy equipment and that expose the soil may induce/accelerate soil erosion and siltation of water courses. Contamination may occur as a result of accidental or structural spillage of fuels and lubricant chemicals, as well as from leakage from inadequately protected solid waste storage facilities and sites.	3 Medium	2 Low	6 Moderate
Air pollution and climate change	▪ Emissions from demolition equipment and vehicles, and dust emissions from the grounds. ▪ Fumes from construction machinery, including greenhouse gases like carbon dioxide	4 High	3 Medium	12 Major

7.4 Proposed Enhancement and Mitigation Measures

7.4.1 Proposed Enhancement Measures

The enhancement measures for the identified positive impacts related to this project have been proposed, as presented in Table 30.

Table 30: Proposed impact enhancement measures

No.	IMPACT	REMARKS
1	Employment opportunities and income	▪ Prepare a labour force management plan ▪ Preference for employment opportunities should be given to the local people where they have the required skills (for skilled labour activities). Otherwise, all activities which do not require skills such as casual activities should be given to the locals ▪ The use of appropriate labour-intensive methods for some of the construction activities (for example excavation for pipelines) should be undertaken to enable as many local people (including women) as possible get jobs ▪ All labourers should be given contracts specifying their roles and responsibilities and remunerations

No.	IMPACT	REMARKS
		▪ Priority for sourcing materials for construction and other services such as food and accommodation should be given to local suppliers ▪ Ensure that children are not employed on the project
2	Acquisition/improvement of skills	▪ Foreign companies (if contracted) should be required to have a joint venture with local companies to build their capacity. ▪ Contracts terms for construction works for the project's construction and O&M phase should emphasize knowledge transfer and the project developer should monitor and ensure that the objectives are met. ▪ O&M manual and standard operating procedures must be handed over to the operator
3	Reduction of poverty and improved livelihoods of the local people	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water
4	Improvement in public health	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain it easily ▪ Sensitize communities of the dangers on using unsafe water sources
5	Achievement universal primary education	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain it
6	Promotion of gender equality and empowerment of women and the girl child	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water

7.4.2 Mitigation Measures

The mitigation measures to avoid, reduce or minimize the identified negative impacts have been proposed, as presented in Table 31.

Table 31: Mitigation measures

IMPACT	MITIGATION MEASURE
Pre-construction and Construction phase	
Loss of land and property	▪ Prepare and implement a RAP ▪ All privately owned land to host project components should be duly compensated prior start of construction activities ▪ All property should be valued and duly compensated prior to start of construction works ▪ For property like crops, where possible, owners should be informed early about the project work plan and allowed to harvest them prior to start of construction ▪ Prepare a stakeholder engagement plan and ensure that stakeholder engagement is a continuous process throughout the project implementation
Disruption of traffic flow	▪ Prepare a traffic management plan ▪ Liaise with the local traffic authority to manage traffic at busy crossings e.g., markets, schools, churches
Loss of vegetation and soil cover	▪ Prepare a vegetation restoration plan. The plan should ensure that: ➢ Vegetation clearance is restricted to only areas to be constructed. ➢ Landscaping and re-vegetation are undertaken after construction especially around the water abstraction source and at the reservoir site.
Introduction of invasive plant species	▪ All construction machinery should be cleaned prior to their transport and assembly at the project sites
Disruption of social order	▪ Prioritize employment of local people where they have the required skills ▪ Sensitize all workers to ensure awareness of and sensitivity to the local cultures, traditions and lifestyles
Noise from construction machinery	▪ Schedule noise-intensive work for the least noise-sensitive time of the day (work between 8 am and 5 pm); ▪ Provision of PPE to project workers ▪ Regular noise assessments
Solid waste generation	▪ Prepare a waste management plan. The plan should ensure provide for: ➢ use the excavated material for backfilling. ➢ waste bins for proper waste storage. ➢ a waste collection company to manage waste generated. ➢ temporary eco-san toilet on site during site works
Occupational health and safety issues	▪ Prepare an occupational Health and safety plan. The plan should ensure: ➢ provision of workers with PPE and sensitise them on basic safety precautions. ➢ provision of a first aid kit; ➢ provision of adequate sanitary facilities;
Community health and safety issues	▪ Prepare a community health and safety plan, which should ensure that: ➢ all dangerous areas along public roads are cordoned off ➢ speed limit of project vehicles along community roads do not exceed 40 km/h. ➢ construction works along community access roads are communicated to public at least a week prior to start of the works ▪ Prepare an HIV/AIDS management plan ▪ Prepare a traffic management plan, which should include provision for: ➢ speed reduction humps at crossings of many people, e.g., at a school, market; ➢ reflective signature to direct traffic to designated areas; ➢ informing of local communities and road users in advance, in case access roads have to be closed.
Increased susceptibility to soil erosion	▪ Prepare an erosion control plan. The plan should provide for: ➢ immediate disposal (where possible) of any excavated soil to avoid loose soil being washed away by storm water. ➢ provision of an erosion barrier around stockpiles of excavated soils ➢ planting of bands of grass on erosion prone surfaces.

IMPACT	MITIGATION MEASURE
Air pollution and climate change	▪ Vehicles transporting construction material along community access roads should move as lower speeds, not exceeding 40 km/hr ▪ All lose material like sand, cement, murram, soil should be covered with a tarpaulin during transportation ▪ Excavated soil stored at the site should be covered with a tarpaulin ▪ Water should be sprinkled on dusty ground where other measures cannot appropriately minimize dust emission ▪ Repair and maintain construction equipment following the manufacturer's specifications, including on fuelling ▪ Offset emitted carbon dioxide during construction activities by planting local trees at all devastated sites
Theft of construction materials	▪ Verification of project employees should be done by the local authorities. ▪ Security guards should be hired to provide security at the construction sites.
Operation and Maintenance Phase	
Soil pollution	▪ Ensuring that storage containers are checked regularly for leakage
Occupational safety and health issues	▪ Prepare an occupational Health and safety plan. The plan should ensure that: ➢ employees checking the water reservoir tanks have a harnessing equipment before any activities are carried out; ➢ workers are provided gloves and masks especially those handling chemicals; ➢ trainings on the operations of the water system are regularly conducted; ➢ safety signages are put at the reservoir tank points and abstraction point; ➢ firefighting equipment are installed at the abstraction point; ➢ a well-equipped first aid kit is availed to project workers.
Generation of hazardous wastes	▪ Maintenance of the solar power system should be undertaken by a licensed firm. ▪ Waste batteries and solar panels should be taken back to the supplier, who should handle it appropriately as hazardous waste. This should be agreed in the solar power supply contract ▪ Where such agreement is not reached, the Developer (MWE) should hire a licensed firm for handling hazardous waste ▪ irm, The solar batteries used on the project will require routine replacements after the lifespan. ▪ Some solar panels may also fail, requiring replacement
Incapacity to operate and maintain the project components by local people	▪ Prepare a quality management plan ▪ Train local community members in the operation and maintenance of the water supply infrastructure
Unaffordability of the water charges	▪ Levy charges in consideration of the income levels of the area. Charges for poor people should be just enough to cover the operational costs ▪ Provide many public standard pipes where poor people can obtain water cheaply
Air pollution	▪ Sensitize communities on the use of public toilets, and the need for better sanitation ▪ Provide sufficient ventilation on the public toilet
Spread of sanitation and water borne diseases	▪ Ensure regular supply of sufficient water for flushing and washing hands by providing a reservoir tank at the toilet
Vandalization / theft project equipment	▪ Sensitize community members about the importance of the project ▪ Hire a security guard to provide 24-hour security at sensitive components such as the abstraction/pumping station ▪ Fence off major project components such as abstraction and reservoir sites
Decommission Phase	

IMPACT	MITIGATION MEASURE
Disruption of water supply	▪ Inform the communities in the affected areas well in advance about the decommissioning activities ▪ Provide alternative source of water
Traffic disruption	▪ As for the construction phase
Disruption of social order	▪ As for the construction phase
Noise pollution	▪ As for the construction phase
Solid waste generation	▪ As for the construction phase ▪ Further, hazardous wastes associated with solar batteries and panels should be handled and disposed of by a licensed firm for handling such wastes
Occupational health and safety issues	▪ As for the construction phase
Public health and safety issues	▪ As for the construction phase
Increased susceptibility to Soil erosion	▪ As for the construction phase
Air pollution and climate change	▪ As for the construction phase

7.5 Cumulative Impacts

The proposed project will be implemented in a semi-urban setting where there are other competing land uses. This has a potential of triggering cumulative environmental impacts i.e., impacts both from the project and other activities that are likely to affect the same environmental resources or receptors. The most important valued ecosystem components (VECs) within the project areas likely to be affected are:

(a) Groundwater resources,
(b) Surface water resources,
(c) Flora and fauna

Table 32 gives a summary of the potential cumulative impacts and recommended mitigation measures:

Table 32: Potential cumulative impacts

Ecosystem Component	Other "stressors" (potential sources of cumulative impact)	Potential impact	Description of mitigation measures
Groundwater resources	-Opening up land due to urban development for construction of e.g., residences, industries, access roads -Abstraction of ground water by other projects	-Increased runoff-affecting recharge of local aquifers in the catchment -Reduction of ground water yield	-Carry out community awareness and sensitization regarding environmental conservation in the catchment -All projects intending to abstract groundwater should undertake a groundwater resources assessment -All projects intending to abstract groundwater should seek guidance from Gulu District Local Government
Surface water	-Land use changes which may affect	-Reduction in water volumes/quantity in	-Carry out community awareness and sensitization regarding

Ecosystem Component	Other "stressors" (potential sources of cumulative impact)	Potential impact	Description of mitigation measures
(quality and quantity)	water flow and retention in streams and wetlands -Human wastes from un-sewered settlements, animal waste from livestock, runoff from agricultural fields	surface water bodies like wetlands, which will compromise groundwater recharge -Compromised of water quality of surface and groundwater	environmental conservation in the catchment -Restore converted/rehabilitated degraded wetlands and forests in the catchment -Regularly monitor effluent standards of existing industries and all other effluent discharging entities in the catchment
Flora and fauna	Opening up land due to urban development for construction of *e.g.,* residences, industries, access roads	-Disturbance or loss of terrestrial species and their habitat due to increased development activities -Increased erosion and ensuing sedimentation/siltation of streams	-The MWE should participate in environmental conservation projects in the catchment or where they are non-existent, the MWE should initiate them, including restoring degraded ecosystems

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

8.1 Introduction

The goal of the Environmental and Social Management and Monitoring Plan (ESMMP) is to ensure that environmental and socio-economic issues continue to be fully integrated into the decisions by the project proponent while promoting resource allocation efficiency throughout the lifetime of the project. This section provides a framework for managing and monitoring impacts for the life of the project. It is designed to ensure that the commitments, enhancement and mitigation measures identified, and in any subsequent assessment reports, together with any license approval or similar conditions, are implemented. In executing the project, the project proponents shall take all practicable measures to ensure that the requirements and recommendations of this report are complied with.

It also specifies monitoring actions and specific responsibilities assigned in order to check progress and the resulting effects on the environment during all project phases. Monitoring will begin immediately and will continue through both the construction and operation phases. One important aspect of monitoring will be to assess the effectiveness of the mitigation measures suggested, where they are found lacking, appropriate new actions to mitigate any adverse effects will be undertaken.

Therefore, this is a core tool that the Contractor will use to monitor project implementation and develop a standalone Environmental and Social Implementation Plan (ESIP) or Contractors Environmental and Social Management Plan (CESMP) to guide project implementation. This ESMMP is intended to guide the contractor in the preparation, implementation, monitoring and reporting on the CESMP. The CESMP will need to be regularly reviewed and updated as the project progresses to reflect any changes in project implementation and organization as well as regulatory requirements.

8.2 Integration of Safeguards into Procurement Process (Contracts)

8.2.1 Bidding

During the bidding process, the Contractor will be expected to include a brief methodology of the implementation of the relevant environmental and social safeguards and attach a cost of implementation of these plans in his proposal bid. In addition, the Contractor should provide relevant staff for the implementation of the safeguards including a Social Specialist supported by Community Liaison Officers and an Environment Specialist supported by HSE Officers. Lastly, the contractor must prove prior experience in adequately managing safeguards issues in the road sector.

8.2.2 Bill of Quantities

The bill of quantities BoQs must capture all relevant safeguards aspects. The indicative costs of implementing safeguards extracted from the ESMMP budget should be clearly provided as a provisional sums or billable items in the Bills of Quantities. These should include safeguards staffing, documentation, waste management, HIV/AIDS, grievance redress, gender awareness, site clean-up and landscaping, monthly ESMP reporting

among others. Laxity in the provision and use of personal protective equipment is a risk to the safety of workers. The BoQs should provide a sum for PPE and supervision be done to ensure that all workers undertake works while in full PPE.

8.2.3 Safeguards Clauses

As a best practice, the contracts for the civil works should include clauses on management of environment and social aspects. Sometimes, the clauses are weak and cannot be used to hold the contractors accountable. There is need to strengthen the clauses and to tailor them to the specific project safeguards aspects and management needs.

8.2.4 Procurement of the Contractor

Implementation of mitigation measures during construction is key to managing short- and long-term impacts and risks. As a best practice, the contracts for the civil works should include clauses on management of environment and social aspects. Sometimes, the clauses are weak and cannot be used to hold the contractors accountable. There is need to strengthen the clauses and to tailor them to the specific project safeguards aspects and management needs. The contractual agreement will also include clauses to enforce the implementation of the relevant mitigations. The clauses should be included in technical specifications in all contract documents related to the civil works. Safeguards clauses should be prescriptive and specify: what needs to be done, where it needs to be done, when and how the actions will take place, who is responsible, the monitoring and reporting requirements, and what sanctions or legal recourse are available for work that does not meet the required specifications.

8.2.5 Staffing

It is common for contractors to recruit unqualified safeguards staff or to assign safeguards duties to site foremen or clerks with no prior safeguards experience. Staffing requirements should be spelt out in the contracts. In addition, it may be useful to include the minimum requirements in the contracts for the civil works. Therefore, the MWE, through the supervising consultants must approve the contractor's Environment Officer, Health and Safety Officer and the Sociologist.

8.2.6 ESMP Monitoring and Reporting

Laxity in implementation and reporting on safeguards issues is common amongst contractors largely because they do not take safeguards issues seriously. This can be addressed by requiring contractors to prepare monthly environment and social monitoring reports. These should either be pay items and clearly included in the BoQs or a condition for certification and payment approvals. Contractor safeguards reports are usually characterized by failure to include useful monitoring indicators such as safety statistics (fatalities, minor injuries, near misses, etc.), number of trees cut, and number replanted amongst others. The contractors will require training on safeguards monitoring and reporting. The contractors need to undertake proper recordkeeping of all safeguard activities. The contractors should liaise with District technical offices such as the DEO and DCDO to ensure proper monitoring and timely implementation of project activities.

8.2.7 Project Reporting Commitments

The Contractor will be required to prepare regular reports (monthly, quarterly, and annual) on environmental, social, health and safety performance.

On an annual basis, the Contractor will, under the guidance of the MWE and Gulu District Local Government, engage services of an independent environmental and social compliance auditor to determine the level of the Project's environmental and social performance. The report will provide the information and data required to determine compliance with national legal requirements as well as OPs of the AfDB. The aspects to be reported on will include; grievance management, labour influx, traffic management, community health and safety and security, air quality, erosion and water pollution, waste management, emergency response, HIV/AIDS and gender management, Environmental and social restoration, among others.

8.3 Contractor Management Plans and Method Statements

The Contractor will be required to prepare some standalone safeguards management plans in addition to the Contractor's Environment and Social Management Plan (CESMP). Reference should always be made to the CESMP as the overarching document that contains general Control Statements for various impacts such as air quality, solid waste, and hazardous materials, water quality and ecosystem, noise and vibration control, erosion control, waste excavation and disposal and safety and occupational health. In addition to the Management Plans, the Contractor should prepare Method Statements for specific activities such as excavation works and submit for the Supervision Engineer's review and comments before commencement of works. If the Engineer notifies the Contractor that a specific method statement has failed to provide adequate mitigations, such a statement should be revised and resubmitted until when approved.

8.3.1 Labour Force Management Plan

The Contractor is expected to have a clear plan for recruitment of workers to promote project ownership by the communities. The Contractor should give preference to local people by recruitment of unskilled and semi-skilled labour from project villages and this should be done through local areas councils from where those seeking employment should get letters of recommendations.

8.3.2 Quality Management Plan

A quality management plan defines the quality policies and procedures relevant to the project for both project deliverables and project processes and who is charged with what responsibility to ensure compliance to set stands. Given the nature of this project, the contractor should have a quality management plan to guide the quality control and assurance processes to achieve the intended outcomes in terms of social, design, structural and investment outcomes in line with environmental and social safeguards policies.

8.3.3 Erosion Control Plan

Soil erosion risks are expected to be mainly associated with vegetation clearance, construction of access roads and storage of excavated materials. In some cases, the project area may receive high amounts of rainfall that will be associated with soil erosion.

An erosion control plan should be overlaid on the project grading plan(s) or site plan if there is not a grading plan. The erosion control plan needs to show what Best Management Plans (BMPs) will be used and where, as well as the total disturbance area. The plan must include measures to prevent erosion, contain sediment and control drainage. The erosion control plan must also include installation details of the BMPs as

well as notes. Construction sites often have areas where soil disturbing activities such as clearing, grading, or cut/fill work has stopped for a period of time. Bare areas that are not actively under construction need some type of temporary cover to prevent or minimize erosion in the event of rainfall. Applicable areas include topsoil stockpiles, rough graded areas, sediment basin dikes, ditches, temporary earthen structures, and graded areas undergoing settlement. The following controls may be considered:

- Stabilization which includes a wide range of erosion prevention practices that cover exposed soil such as the use of straw, mulch, erosion control blankets, plastic sheeting or tarpaulins.
- Temporary seeding which is a soil stabilization practice involving the establishment of temporary vegetative cover to reduce erosion on construction sites that have disturbed areas that are temporarily idle.

8.3.4 Waste Management Plan

The Waste Management Plan (WMP) shall be prepared to address waste management aspects in line with legal and regulatory requirements. The Contractor, all subcontractors, and vendors involved in the project shall have to adhere to this Plan. The Contractor is responsible for ensuring that waste is managed in accordance with this Plan by providing the necessary resources and by issuing instructions and guidance during project execution. The Contractor will implement waste management measures and practices throughout the construction period to mitigate the associated risks. The WMP will contain the following information:

- Relevant legislation and guidelines for waste management of the Project;
- The procedures and initiatives proposed to address the management of waste materials;
- Safeguards, mitigation measures and monitoring to manage waste impacts during construction;
- Roles and responsibilities of those involved in the implementation of waste management controls;
- An effective monitoring, auditing and reporting framework to assess the effectiveness of the controls implemented
- Checklists and forms for day-to-day waste management activities.

The Contractor shall undertake measures to respond to all generated categories of wastes. The Contractor should be aware that large quantities of cut to spoil may be generated which will require disposal. Therefore, the contractor is expected to identify potential sites for waste disposal before excavation works commence in order to secure the requisite approvals in a timely manner.

8.3.5 Occupational Health and Safety Plan

The Contractor will have to prepare a document that presents the framework for occupational health and safety management and monitoring measures to undertake. The OHS plan should typically cover safety programs that will be applied for promoting health and safety, preventing harm, fatality and hazards to the employees, sub-contractors, properties and the general public. These can be dangerous if approached and disturbed.

8.3.6 Community Health and Safety Plan

This Plan applies to project construction activities and the associated risks and potential impacts that these activities may have on community health and safety. The risks and potential project impacts to community health and safety can emerge from both within and outside the so-called project area of influence. Therefore, the scope of this plan focuses on the management of aspects associated with the interaction of construction activities, the workforce, and the community as well as mitigation of contagious diseases. The Plan should include control measures designed to avoid, minimize or mitigate the adverse effects of project activities on the health and safety of the community, while at the same time, enhancing the beneficial effects and capitalize on opportunities that may contribute to improving overall community well-being.

8.3.7 HIV/AIDS and Gender Management Plan

The Contractor in pursuit of his commitment to health and safety will organize trainings, conduct awareness and education on the use of infection control measure in the workplace. The Contractor is expected to provide appropriate PPE to protect workers from the risk of exposure to HIV/AIDS and incorporate HIV/AIDS information in occupational health and safety inductions, provide guideline in preventing the spread of HIV/AIDS and other sexually transmitted infections (STIs), publicize knowledge related to HIV/AIDS and STIs to the work crews and the surrounding communities, provide information on good HIV prevention interventions, including promotion of the correct use of condoms and ensure sufficient resources are available for HIV programs.

All the relevant stakeholders should be kept informed and up to date on issues pertaining to the project activities especially those, which affect them or where they have influence.

The Contractor should also provide a plan documenting how gender issues such as gender-based violence, employment segregation based on gender, among others will be addressed sexual violence.

8.3.8 Traffic and Road Safety Management plan

The major purpose of this plan is to help protect road users and workers and keep traffic delays to a minimum through proper and clear signage and controls. The Traffic Management Plan will provide actions to ensure safety of road users and construction staff during construction the bridge and access roads. It will outline traffic control and traffic management procedures to prevent potential hazards associated with road use during construction. Any road work resulting in obstruction of roads needs to be managed so that safety is not compromised and disruptions and delays to road users are kept to a minimum. The Plan shall include a road safety awareness program.

8.3.9 Cultural Heritage Management Plan

This plan will include measures to manage risks and impacts on cultural heritage during construction. There could be other unknown physical cultural resources (PCRs) within the construction areas. If any chance finds are made, measures must be taken to ensure ‘conservation’ in accordance with legislation and to contact the Department of Monuments.

8.3.10 Stakeholder Engagement Plan (SEP)

All stakeholders need to be kept informed during project implementation so as to accord the necessary support and advice. This consultation and public participation will be on-going process that will continue throughout the implementation of the ESIA. In pursuit of timely, meaningful and appropriate stakeholder engagement, the contactor is expected to have a clear strategy for stakeholder engagement to assist in managing and facilitating future engagement through the various stages of the Project's life cycle from mobilization up to handover. The SEP shall detail the key stakeholders to be engaged and the schedule of engagements throughout the various stages of construction, decommissioning and the defects liability period.

8.3.9.1 Purpose of SEP

The SEP is an instrument for mapping and prioritizing stakeholders across levels and regions; and for guiding planned consultations and disclosure of relevant project information to/with identified stakeholders.

8.3.9.2 Stakeholder Categorization

Three (3) categories of stakeholder to be mapped out (across three levels at the national, regional and community) as follows.

a) Primary level stakeholders considered to have high influence and power in respect to the project, project area and potential impacts and project implementation. These require regular engagements and consultations throughout the project life.
b) Secondary level stakeholder considered to have either high influence but low power or high power but low influence. These will require to be initially consulted and regularly kept informed.
c) Tertiary stakeholders considered to have low power and low influence.

8.3.9.3 Information Needs

The following information should be made available to all stakeholders, who are likely to be affected by positive and adverse environmental or social impacts from the project:

a) Purpose, nature, objectives and scale of the project.
b) Schedule and duration of proposed project activities.
c) Potential project risks and impacts extracted from the ESIA.
d) Proposed mitigation plans.
e) Available grievance mechanisms.
f) Envisaged consultation process, if any, and opportunities and ways in which the public can participate (via the SEP) and
g) Time and venue of any planned public meetings.

8.3.9.4 Disclosure Mechanisms

A number of strategies can be used to enhance public information disclosure and stakeholder consultations including:

I. Scheduled public hearings at community level (village and parish) for initial disclosure, disclosure of draft reports and final reports including their implementation
II. Dedicated and select meetings with institutional stakeholders at the central

regional, district and sub-county levels at different project phases

III. Dedicated meetings with select social groups like livelihoods groupings and vulnerable social groups including women, youth, PWDs and local leaders.
IV. Project Background Information Document (PBID) summaries will be prepared, translated and shared alongside other strategies described herein
V. Non-Technical Summaries (NTS) of the ESIA will also be developed for public disclosure through print media and info-shops for the regulators, funder and project proponent.

A template of a stakeholder engagement plan is depicted in Table 33.

Table 33: Stakeholder Engagement Plan template

Project phase	Activity	Objectives	Level and type/group of stakeholders	Methods/ Tasks and Materials	Schedule/Frequency

8.4 Grievance Redress Mechanism (GRM)

8.4.1 Grievance Procedure and Rationale

This section describes the procedure and mechanism through which community members and PAPs will be able to report, make, place/lodge or express a grievance against the project, its staff or contractors as part of the mitigation measures. It also describes the roles and responsibilities for different structures in resolving grievances. A grievance is any dissatisfaction or sense of injustice, or unfairness felt by a person-in this respect a community member, PAP or his/her representative in connection with his/her compensation entitlements, RAP implementation process, the project Developer, Contractor and other scenarios related to project implementation. The grievance is usually brought to the attention of the person(s) in charge, referred to here as the Grievance Officer (GO). This grievance procedure is intended to put in place and facilitate accessible, prompt and cost-effective handling of grievances at the nearest points of service to community members and the PAPs.

The aim and purpose of this system is to make the grievance handling procedures accessible, prompt and affordable to the PAPs given the generally low values of some of the properties to be affected; and also provide an alternative to the costly and time-consuming formal courts procedures for handling grievances and disputes. The objective of the grievance handling systems and procedure is to establish for the community members and PAPs mechanisms for raising complaints related to compensation for loss of land and other livelihood properties and assets and having such complaints resolved as amicably as possible through acceptable and binding corrective actions.

8.4.2 Steps of the Grievance Process

The grievance mechanism is adopted from the MWE-RPF, 2012 already disclosed. The grievance mechanism operating at each location will receive inputs from four main sources:

I. Directly from the PAPs or other members of affected community.
II. From the RAP implementation team.

III. From the Monitoring and Evaluation Officer who will forward issues/concerns identified in the field.

IV. From the Local Government Offices at the Sub-county/District Levels since these are as close to the community as possible. Steps of the grievance process are described below.

Receipt of Complaint/Grievance

A verbal or written complaint from a PAP or community member will be received by the Grievance Officer (GO) (refer to Table 34 for the roles of the GO) or an assigned contact officer in a given administrative jurisdiction/authority near to community level and recorded in a grievance log which will be held in the Sub-county. The contact officer at the sub-county will be the Sub-county Chief.

Table 34*: Role of a Grievance Officer*

Role of a Grievance Officer
A Grievance Officer (GO), who will be a member of the Project Implementation Team, will lead the grievance mechanism. Principal responsibilities of the GO will include: 1. Recording the grievances, both written and oral, of the affected people, categorizing and prioritizing them and providing solutions within a specified time period. 2. Discussing grievances on a regular basis with the Working Group and coming up with decision/actions for issues that can be resolved at that level. 3. Informing the Steering Committee of serious cases within an appropriate time frame. 4. Reporting to the aggrieved parties about developments regarding their grievances and decisions of the Steering Committee. 5. Providing inputs into the monitoring and evaluation process **Source: MWE-RPF (Ministry of Water and Environment-Resettlement Policy Framework), 2012**

The grievance team will hold meetings at sub-county headquarters where grievances are received by a contact person who would then hand over received complaints to the GO, for entering into the grievance log using the grievance form.

The grievance log will indicate grievances, date opened/lodged, actions taken to address or reasons the grievance was not acted upon (e.g., the grievance was not related to the resettlement process); information provided to complainant and date the grievance was closed.

Grievances can be lodged at any time, either directly to the GO or the Sub-county headquarters. The process for lodging a complaint is outlined below:

I. The GO will receive a complaint from the complainant or from the

appointed contact person at the sub-county headquarters.

II. The GO will ask the claimant questions in their local language, write the answers in English and enter them in English onto the Grievance Form.

III. A representative of an independent local civil society organization witnesses translation of the grievance into English.

IV. The GO reads the complaint in English and translates it into the complainant`s local language on the Grievance Form.

V. The local leader (representative of an independent local civil society organization) and the complainant both sign the Grievance Form after they have both confirmed the accuracy of the grievance.

VI. The GO lodges the complaint in the Grievance Log.

Determination of Corrective Action

If in their judgment, the grievance can be solved at this stage, the GO and a representative of a local independent civil society/organization will determine a corrective action in consultation with the aggrieved person. A description of the action; the time frame in which the action is to take place; and the party responsible for implementing the action will be recorded in the grievance data base.

Grievances will be resolved and status reported back to complainants within 30 days. If more time is required, this will be communicated clearly and in advance to the aggrieved person. For cases that are not resolved within the stipulated time, detailed investigations will be undertaken and results discussed in the monthly meetings with affected persons. In some instances, it may be appropriate to appoint independent third parties to undertake the investigations.

Meeting with the Complainant

The proposed corrective action and the timeframe in which the grievance is to be implemented will be discussed with the complainant within 30 days of receipt of the grievance. Written agreement to proceed with the corrective action will be sought from the complainant (e.g., by use of an appropriate consent form). If no agreement is reached, Step 2 will be re-visited.

Implementation of Corrective Action

Agreed corrective actions will be undertaken by the project developer or its contractors within the agreed timeframe. The date of the completed action will be recorded in the grievance database.

Verification of Corrective Action

To verify satisfaction, the aggrieved person will be approached by the GO to verify that the corrective action has been implemented. A signature of the complainant will be

obtained and recorded in the log and/or on the consent form (see Step 3). If the complainant is not satisfied with the outcome of the corrective action additional steps may be undertaken to reach agreement between the parties. If additional corrective action is not possible alternative avenues maybe pursued.

Action by the Local Leaders and Project Contractors

If the GO and independent observer cannot solve the grievance, it will be referred to relevant parties such as local leaders, District Officers, Construction Contractor, Valuer and MWE, for consultation and relevant feedback provided.

Action by the Grievance Committee

If the complainant remains dissatisfied and a satisfactory resolution cannot be reached, the complaint will be handled by the Grievance Committee. A dedicated Grievance Committee will be established to assess grievances that arise from disputes in each district (Agago, Kitgum, Pader). This will include the following members:

I. District Land Office Surveyor;
II. Representative of the valuer;
III. Grievance Officer
IV. SC LC III Council Representative where it applies.

This committee must have a quorum of at least three persons. Decisions will be reached by simple majority. The Grievance Committee should be constituted for as long as grievances are being lodged.

Once the Grievance Committee has determined its approach to the lodged grievance, this will be communicated to the GO, who will communicate this to the complainant. If satisfied, the complainant signs to acknowledge that the issue has been resolved satisfactorily. If the complainant is not satisfied however, the complainant notes the outstanding issues, which may be re-lodged with the Grievance Committee or the complainant may proceed with judicial proceedings.

Action by Developer (MWE)

If no satisfactory solution is reached by the Grievance Committee, the complainant can be advised to lodge the complaint with the management of the developer at their regional head/offices to make the process easily accessible to the complainants. If no satisfactory solution is reached by developer's management, the complainant has the option to seek redress via judicial processes.

Alternative Action by Chief Government Valuer (CGV)

Some grievances may be beyond the capacity of the GO or the Grievance Committee to handle expeditiously without the technical support of other professionals like the CGV. Some of the grievances may be specifically related to the valuation process, valuation rates and awards. Therefore, the GO will determine whether a complaint can be resolved by the Grievance Committee or, if not, should be referred to the CGV for technical and administrative advice.

The CGV will make necessary consultations with offices he/she deems fit to consult in his/her capacity as CGV. If satisfactory solution is not achieved or provided by the CGV, the aggrieved person can resort to the judicial process.

8.4.3 Capacity Building for the Grievance Officer and Grievance Committee

It will be important for the appointed GO to be appointed based on his/her experience and training in conflict resolution through mediation and reconciliation. It will also be important for the GO to have sufficient skills in data management including data entry, data analysis and storage. This notwithstanding, it will be important that steps are taken to orient and build the capacity of the GO as part of the project implementation team in conflict resolution procedures such as mediation and reconciliation and other management areas such as record keeping and report writing and ICT equipment management.

The Grievance Committee members will also need to be oriented about the grievance management system. The capacities of the grievance committee members will also need to be built around issues of conflict identification, conflict information analysis and resolution based on issues in the land legislation through reconciliation and mediation.

8.4.4 Other alternatives

The other alternative recourse suggested as a last resort is for the complainant to seek redress from formal courts of law. The Land Act, Cap 227 establishes Land Tribunals at regional/district level. It empowers the Land Tribunals to determine disputes relating to amount of compensation to be paid for land acquired compulsorily for public interest. The affected person may appeal to a higher ordinary court. The Land Acquisition Act allows for any person to appeal to the High Court within 60 days of the award being made. The Land Act, Cap 227 also states that traditional authority mediators can play a role in settling land disputes.

8.5 Capacity Building and Trainings

The Capacity building and trainings will be conducted using the AfDB's and the National social and environmental (E&S) safeguards, as required by the AfDB for its projects to ensure early identification of possible risks and propose management measures so that the project is able to address the risks while maximizing positive outcomes.

Training will be conducted with the following primary objectives:

- Train the project beneficiaries and other government staff interested in the general safeguard requirements built into the E&S safeguards.
- Introduce the participants to the safeguard requirements of the AfDB and of the country.
- Examine the specific safeguard requirements of the AfDB funded projects.

The following outcomes are expected as the result of training.

- Improved knowledge and understanding on the E&S concepts and standards.
- Improved knowledge and understanding on the ESIA concepts and methodology.
- Improved knowledge and understanding on the ESMMP preparation.
- Improved knowledge and understanding on the ESMMP monitoring and reporting.

8.6 Required Approvals, Permits and Licenses

Several approvals and licenses will be required before commencement of certain construction activities. Securing of approvals requires preparation of the relevant documentation and payment of fees. This needs to be done during mobilization to ensure that all approvals are secured in a timely manner to avoid construction delays. It is important to ensure that all materials (sand and aggregates) are sourced from quarries, borrow pits and sand mines approved by NEMA and compliant with environmental laws. For all new materials sites to be opened up, NEMA approval must be secured while all existing sites should undertake/provide proof of having undertaken environmental compliance audits. For the success of the Cwero Water Supply and Sanitation System, the following permits and licenses may be required by the project as presented in Table 35.

Table 35: Approvals, permits and licenses that may be required by the project

Approvals, Permits and Licenses Required	Issuing Authority	Party responsible for acquiring permit/license	Legal Framework
Water Abstraction Permit	DWRM	MWE Contractor	Water Act, cap 152
Wastewater Discharge permit	DWRM	MWE Contractor	Water Act, cap 152
Waste Disposal Permit	NEMA	MWE Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
Waste Transportation License	NEMA	Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
Storage of Hazardous/ Non-Hazardous Waste	NEMA	Contractor	National Environment Act Cap 153; National Environment (Waste Management) Regulation
License to emit noise in excess of permissible noise levels	NEMA	Contractor	National Environment Act Cap 153
Blasting, importation, storage and transportation of explosives	Ministry of Internal Affairs	Contractor	Explosive Act, Cap 298

Approvals, Permits and Licenses Required	Issuing Authority	Party responsible for acquiring permit/license	Legal Framework
Mining Permit, Extraction of minerals, opening up of quarries and sand pits	MEMD/ NEMA approval	Contractor	Mining Act, Cap 148
Permit for Storage of Petroleum Products and dispensing license	MEMD	Contractor	Petroleum Act, Cap 2003
Work Permits	Ministry of Internal Affair	Contractor MWE	Immigrations Act, Cap 66
Permit if the water transmission line is to cross the UNRA road (Road Permits)	UNRA	MWE	The Uganda National Roads Authority (General) Regulations 2017
Traffic Diversions consent	Uganda Police	Contractor	Traffic and Road Safety Act 1998
RAP approval conditions for this project	Chief Government Valuer	MWE Contractor	The Land Act Cap 227

8.7 Environmental and Social Monitoring Plan

A monitoring process will need to 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 the construction stage and continue throughout the operation phase. It should also include 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.

A monitoring plan has been prepared considering the chronology of potential project activities. The recommendations in this report would provide a basis for tracking progress of the proposed project activities with regard to sound environmental practice and mitigation measures.

8.8 Roles and Responsibilities

In order to enhance the potential for integrating sustainability concerns in this proposed Piped Water Supply System, it is important to assign clear roles and responsibilities to dominant professionals, contractors and/or sub-contractors so as to ensure that environmental plans are implemented effectively.

8.8.1 Project Developer (MWE)

The MWE will be responsible for the implementation of the Project through contractors. The MWE will be responsible for contract management and will ensure that the contactors adhere to their contractual obligations and that they are compliant with the environmental and social standards as spelt out in their contracts.

The Project Developer will:

i) Have overall responsibility for environmental and social compliance;

ii) Ensure that appropriate resources are allocated to facilitate environmental and social management of the Project, including financial and human resources;
iii) Review for quality and approve the CESMP for project implementation;
iv) Ensure that adequate supervision for implementation of the ESMMP is provided at all times;
v) Check that penalties for non-compliances with contractual environmental commitments are actioned. The Contractor's Environmental Specialist, Social Development Specialist and Health & Safety Specialist will ensure that the provisions in this ESMMP are implemented within the sites under their supervision and to collect and transmit relevant information to the Supervising Engineer.
vi) Undertake regular compliance audits, including the mandatory Annual Environmental Compliance Audit in accordance with the National Environment Act.

8.8.2 Project Development Partner (AfDB)

The AfDB will be financing the project. Like other financing entities, the AfDB is expected to offer implementation support supervision to the project's environmental and social performance through reviews, approvals, meetings, training field inspections and missions. The AfDB is expected to have a safeguards team that can participate in safeguards missions.

Therefore; the AfDB will;

i) Provide appropriate guidance towards compliance with the Operational Safeguards;
ii) Allow for quick feedback on the any safeguards documentation of the project;
iii) Provide no-objection on environmental and social matters whenever required; and
iv) Play an oversight role in implementing the Safeguards Requirements.

8.8.3 NEMA and Lead Agencies

NEMA will, in consultation with Gulu District Local Government (represented by District Environment Officer), monitor all environmental phenomena with a view of assessing any possible changes in the environment and their possible impacts; the operation of the water supply facility with a view of determining its immediate and long-term effects on the environment.

8.8.4 Project Contractor

During sites preparation and construction, the contractor will be responsible for ensuring compliance with all relevant legislation as well as adherence to all environmental and socio-economic mitigation measures specified in the Environment and Social Management Plan. The contractor is also responsible for managing the potential environmental, socio-economic, safety and health impacts of all contract activities whether these are undertaken by themselves or by their subcontractors. Other responsibilities of the contractor include: preparation of a Contractors Environmental and Social Management Plan (CESMP), workers' Code-of-Conduct that all workers will have to read and abide with through signing.

8.8.5 Gulu District Local Government

Although the contractor will have the primary role in delivering on the measures set out in the ESMMP, Gulu District Local Government will have the ultimate responsibility for ensuring that the measures are delivered. In this respect, Gulu District Local Government will review and approve contractor plans for delivery of the actions contained in the ESMMP and subsequently during project operation, review contractor performance through monitoring, audits and inspection to ensure that all proposed mitigation measures are implemented as well as ensuring regulatory compliance.

8.9 The Monitoring Team

It is recommended that a core team of individuals preferably headed by the Gulu District Environment Officer (DEO) and the Water Officer (DWO). Other important players to take part in monitoring include the Community Development Officer (CDO) at the district or sub-county levels and the local leaders at sub-county, parish and village levels.

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 in this report. The monitoring team will most particularly check for the following issues among others:

- Collaboration of the Project Proponents with NEMA and other relevant authorities to ensure that operations of the water scheme meet regulatory requirements.
- Efficient and functional water and sanitation system at the premises.
- Proper storage, handling and final disposal of any solid waste produced at the premises.
- General cleanliness and good housekeeping in and around the facilities.
- Emergency preparedness especially in cases of fire outbreak.
- Constant acquisition of appropriate permits and/or licenses from respective institutions and compliance with the regulatory framework.
- Supervise implementation of all the proposed mitigation measures.
- Compile a monitoring report indicating all non-conformances to mitigation measures.

8.10 Enforcement of Compliance

Laxity in implementation and reporting on safeguards issues is common amongst contractors during project implementation largely because they do not take safeguards issues seriously. This can be addressed by requiring the contractor to prepare monthly environmental and social monitoring reports. These should either be pay items and clearly included in the BoQs or a condition for certification and payment approvals. The contractor must be required to undertake proper recordkeeping of all safeguards' activities. Slackness in the provision and use of PPE is a risk to the safety of workers. The BoQs should provide a sum for PPE and supervision be done to ensure that all workers undertake works while in full PPE.

The Supervising Engineer must strictly supervise implementation of the ESMP and where there are breaches, the supervising engineer should issue written instructions, cautions and warnings as applicable. Where the contractor fails to comply, contractual clauses should be invoked, and penalties or fines effected. If necessary, the civil works can be suspended if the contractor repeatedly fails to adhere to instructions. The MWE should penalize the supervising consultant if he fails to supervise and enforce ESMP implementation by the contractor.

8.11 Environmental and Social Management and Monitoring Plan (ESMMP) Matrix

The ESMMP matrix (Table 36) provides a detailed guidance for managing impacts, monitoring indicators, indicative costs for impact mitigation, responsibility for implementing the mitigation measures, the monitoring institution and the monitoring frequency. The Contractor and Developer/Operator must ensure that the ESMMP is implemented, and should allow the monitoring institution to carry out the monitoring duties without any obstruction.

Table 36: Environmental and social management and monitoring plan

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Positive Impacts						
Employment opportunities and income	▪ Prepare a labour force management plan ▪ Preference for employment opportunities should be given to the local people where they have the required skills (for skilled labour activities). Otherwise, all activities which do not require skills such as casual activities should be given to the locals ▪ All laborers should be given contracts specifying their roles and responsibilities and remunerations ▪ The use of appropriate labour-intensive methods for some of the construction activities (for example excavation for pipelines) should be undertaken to enable as many local people (including women) as possible get jobs ▪ Priority for sourcing materials for construction and other services such as food and accommodation should be given to local suppliers ▪ Ensure that children are not employed on the project	-Labour force management plan in place -Details of the project staff, including origin, age	5 million (for the labour force management plan)	Contractor MWE	CDO	Monthly
Acquisition/improvement of skills	▪ Foreign companies (if contracted) should be required to have a joint venture with local companies to build their capacity. ▪ Contracts terms for construction works for the project's construction and O&M phase should emphasize knowledge transfer and the project developer should monitor and ensure that the objectives are met. ▪ O&M manual and standard operating procedures must be handed over to the operator	-Details of the Contractor, including country of registration -Details of the Contracts agreement -Presence of the O&M manual	0	Contractor MWE	CDO DWO	Once, before start of construction works
Reduction of poverty and improved livelihoods of the local people	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Improvement in public health	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area	-Records of water abstraction and supply -Records of water quality assessment	1 million (for community sensitization)	MWE	DWO CDO	Quarterly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Provide as many public stand pipes as possible where poor people can obtain water ▪ Sensitize communities on the dangers of using unsafe water sources	-Number of households connected, and number public stand pipes -Minutes of community sensitization				
Achievement universal primary education	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Promotion of gender equality and empowerment of women and the girl child	▪ Ensure consistent supply of water of adequate quality and quantity ▪ Extend water to as many users as possible in the project area ▪ Provide as many public stand pipes as possible where poor people can obtain water	-Records of water abstraction and supply -Records of water quality assessment -Number of households connected, and number public stand pipes	Part of the contract	MWE	DWO CDO	Quarterly
Negative Impacts						
Pre-construction and Construction Phase						
Loss of land and property	▪ Prepare and implement a RAP ▪ All privately owned land to host project components should be duly compensated prior start of construction activities ▪ All property should be valued and duly compensated prior to start of construction works ▪ For property like crops, where possible, owners should be informed early about the project work plan and allowed to harvest them prior to start of construction ▪ Prepare a stakeholder engagement plan and ensure that stakeholder engagement is a continuous process throughout the project implementation	-RAP in place -Agreements of land sale -Compensation agreement	-50 million for a RAP -Cost of land and other property to depend on the actual value	Developer	CDO	Once, to be cleared before start of construction
Disruption of traffic flow	▪ Prepare and implement traffic management plan	-Traffic management plan in place	5 Million	Contractor	CDO	Weekly
	▪ Liaise with the local traffic authority to manage traffic at busy crossings e.g., markets, schools, churches	-Records of agreed work plans with traffic police	1 Million	Contractor	CDO	Weekly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
					Traffic police Department, Gulu	
Loss of vegetation and soil cover	▪ Prepare a vegetation restoration plan	-A vegetation restoration plan in place	10 million	Contractor	DEO NEMA	Once, before start of construction activities
	▪ Restrict clearance to only areas to be constructed.	-Presence of bare soils	Part of the Contract	Contractor	DEO NEMA	Weekly
	▪ Landscaping and re-vegetation after construction especially around the water source and reservoir	-Presence of gullies due to soil erosion.	3 Million	Contractor	DEO NEMA	Weekly
	▪ Restrict alignment of the transmission route along road reserves	-Layout of the transmission line	Part of the Contract	Contractor	DWO /DEO	Monthly
Introduction of invasive plant species	▪ All Construction machinery should be cleaned prior to their transport to and assembly at the project sites	-Records of machinery cleaning	1 Million	Contractor	DEO NEMA	Once, before start of construction activities
Disruption of social order	▪ Prioritize employment of local people where they have the required skills	-Record of project staff and their area of origin	Part of the Contract	Contractor	CDO	Weekly
	▪ Sensitize all workers to ensure awareness of and sensitivity to the local cultures, traditions and lifestyles	-Record of sensitization sessions	2.5 Million	Contractor	CDO	Monthly
Noise from construction machinery	▪ Schedule noise-intensive work for the least noise-sensitive time of the day (work between 8 am and 5 pm)	-Work schedule -Complaints about noise;	0	Contractor	DEO	Weekly
	▪ Provision of PPE to project workers	-PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Regular noise assessments	-Noise assessment reports	1 Million	Contractor	DEO	Monthly
	▪ Sprinkle water to dusty grounds during the dry seasons	-Records of water sprinkling	3 Million	Contractor	DEO	Weekly
	▪ Cover earth materials with tarpaulin during transportation to minimise their falling off trucks;	-Presence of tarpaulins for covering loose material	1 Million	Contractor	DEO	Weekly
Solid waste generation	▪ Prepare a waste management plan	-A waste management plan in place	6 million	Contractor	DEO	Once, before start of construction activities
	▪ Use the excavated material for backfilling.	-Heaps of waste & excavated material on site	Part of the Contract	Contractor	DEO	Monthly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
		-Areas backfilled				
	▪ Provide waste bins for proper storage.	-Waste bins within the project area.	0.2 Million	Contractor	DEO	Monthly
	▪ Contract a waste management company where waste volumes are large	-Contract agreement with a waste management company	4 Million	Contractor	DEO	Monthly
	▪ Provide temporary eco-san toilets on site during site works	-Eco-san toilet on site	Part of the construction contract	Contractor	DEO	Monthly
Occupational health and safety issues	▪ Prepare an occupational Health and safety plan	-An occupational health and safety plan in place	6 Million	Contractor	CDO DEO DHI	Once, before start of construction works
	▪ Provide workers with PPE and sensitise them on basic safety precautions.	-PPE in use	Part of the Contract	Contractor	DEO	Weekly
	▪ Provision of a first aid kit	-First aid kit	Part of the Contract	Contractor	DEO	Monthly
Community health and safety issues	▪ Prepare a community health and safety plan	-A community health and safety plan in place	6.5 Million	Contractor	CDO DEO DHI	Once, before start of construction works
	▪ Cordon off all dangerous areas along public roads	-Marks of dangerous places	3 Million	Contractor	CDO DEO	Weekly
	▪ Project vehicles transport material along community roads should not exceed 40 km/h.	-Records of sensitization of project drivers on speed limits -Speed limit signs on roads	2 Million	Contractor	DEO	Monthly
	▪ Schedule of construction works along community access roads should be communicated to public at least a week prior to start of construction works	-Proof of communication of work schedule with communities -Number accidents recorded	1 Million	Contractor	DEO	Bi-monthly
	▪ Prepare and implement an HIV/AIDS management plan	-An HIV/AIDS management plan	10 Million	Contractor	DCDO	Quarterly
Increased susceptibility to soil erosion	▪ Prepare an erosion control plan	-An erosion control plan in place	4 Million	Contractor	DEO NEMA	Once, prior to start of construction activities

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
	▪ Immediately dispose of any excavated soil to avoid loose soil being washed away by storm water.	-Presence of erosion gullies within the site premises	2 Million	Contractor	DEO NEMA	Weekly
	▪ Provide an erosion barrier around stockpiles of excavated soils	-Presence of erosion barriers	5 million	Contractor	DEO NEMA	Weekly
	▪ Plant bands of grass on erosion prone surfaces.	-Presence of plant bands	4 Million	Contractor	DEO NEMA	Quarterly
Air pollution and climate change	▪ Vehicles transporting construction material along community access roads should move as lower speeds, not exceeding 40 km/hr	-Speed limit signages along access roads	5 Million	Contractor	DEO CDO NEMA	Weekly
	▪ All lose material like sand, cement, murram, soil should be covered with a tarpaulin during transportation	-Trucks covered	1 Million	Contractor	DEO NEMA	Weekly
	▪ Excavated soil stored at the site should be covered with a tarpaulin	-Soils covered	1 Million	Contractor	DEO NEMA	Weekly
	▪ Water should be sprinkled on dusty ground where other measures cannot appropriately minimize dust emission	-Records of water sprinkling	2 Million	Contractor	DEO NEMA	Weekly
	▪ Repair and maintain construction equipment following the manufacturer's specifications, including on fuelling	-Records of vehicle repair and maintenance	8 Million	Contractor	DEO NEMA	Quarterly
	▪ Offset emitted carbon dioxide during construction activities by planting local trees at all devastated sites	-Records of trees planted	6 Million	Contractor	DEO NEMA	Annually
Theft of construction materials	-Verification of project employees should be done by the local authorities.	-Records of employee verification exercise	1 Million	CDO	CDO	Prior to the start of construction activities -Any time staff are required
	Security guards should be hired to provide security at the construction sites.	-Presence of security guards	6 Million	CDO	CDO	-Weekly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Operation and Maintenance Phase						
Water Pollution	▪ Ensuring that storage containers are checked regularly for leakage	-Records of chemical leakage/ spillage	0.3 Million	Developer / Operator	DEO	Quarterly
Occupational Health and Safety	▪ Prepare an occupational health and safety plan	-Same as in the construction phase	Same as in the construction phase	Same as in the construction phase	Same as in the construction phase	Same as in the construction phase
	▪ Workers should be given appropriate PPE when handling chemical	-Workers using PPE	Part of the Contract	Developer / Operator	DEO CDO	Quarterly
	▪ Regular trainings on the operations of the water system	-Records of training on operation systems	3 Million	Developer / Operator	DWO	Quarterly
	▪ Installation of firefighting equipment at the abstraction point	-Presence of firefighting equipment	5 Million	Developer / Operator	DEO DWO	Quarterly
	▪ A well-equipped first aid kit should be availed to project workers.	-Presence of a first aid kit. -Records of injuries	Part of the Contract	Developer / Operator	DEO CDO	Quarterly
Generation of hazardous wastes	▪ Maintenance of the solar power system should be undertaken by a licensed firm	-License certificate of the hired maintenance firm	5 Million	Developer / Operator	DEO DWO	Prior to start of operation, and annually thereafter
	▪ Waste batteries and solar panels should be taken back to the supplier, who should handle it appropriately as hazardous waste. This should be agreed in the solar power supply contract	-Solar power supply contract -Records of delivery of waste solar batteries and panels to the supplier	As per the supply contract	Developer / Operator	DEO DWO	Annually
	▪ Where such agreement is not reached, the Developer (MWE) should hire a licensed firm for handling hazardous waste	-Contract agreement with the waste handling firm -Records of waste solar batteries and panels handled	5 Million	Developer / Operator	DEO DWO	Prior to start of operation, and annually thereafter
Incapacity to operate and maintain the project components by local people	▪ Train local community members in the operation and maintenance of the water supply infrastructure	-Number of trained community members in operation and maintenance of the piped water supply system	6 Million	Developer/ Operator	DWO	Quarterly
	▪ Prepare a quality management plan	▪ A quality Management plan in place	7 Million	Contractor Operator	DWO CDO DEO	Quarterly

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Unaffordability of the water charges	▪ Levy charges in consideration of the income levels of the area. Charges for poor people should be just enough to cover the operational costs	▪ Records of water charges ▪ Complaints from the public	0	Developer / Operator	DWO CDO	Quarterly
	▪ Provide many public standard pipes where poor people can obtain water cheaply	▪ Number of public stand pipes	Part of the Contract	Developer / Operator	DWO CDO	Twice a year
Air pollution	▪ Sensitize communities on the use of public toilets, and the need for better sanitation	-Records of community sensitization	2 Million	Developer / Operator	DWO CDO	Once, after completion of construction
	▪ Provide sufficient ventilation on the public toilet	-Building drawings	Part of the Contract	Developer / Operator	DWO CDO	Once, prior to, and once after construction
Spread of sanitation and water borne diseases	▪ Ensure regular supply of sufficient water for flushing and washing hands by providing a reservoir tank at the toilet	-Presence of a reservoir tank at the toilet	Part of the Contract	Developer / Operator	DWO CDO DEO	
Vandalization / theft project equipment	▪ Sensitize community members about the importance of the project	-Records of community sensitization	2 Million	Developer / Operator	DWO CDO DEO	Once, prior to, and once after construction
	▪ Hire a security guard to provide 24-hour security at sensitive components such as the abstraction/pumping station	-Presence of security guards	To depend on the local security labour cost	Developer / Operator	DWO CDO DEO	Quarterly
	▪ Fence off major project components such as abstraction and reservoir sites	-Fenced project site	Part of the construction Contract	Developer / Operator	DWO CDO DEO	Twice a year
Decommissioning Phase						
Disruption of water supply	▪ Inform the communities in the affected areas well in advance about the decommissioning activities ▪ Provide alternative source of water	▪ Records of sensitization meeting about project decommissioning ▪ Presence alternative water sources	3.5 million for sensitization meetings	Operator Decommissioning Contractor	DWO CDO DEO	Quarterly, within the last two years of decommissioning

IMPACT	ENHANCEMENT/MITIGATION MEASURE	INDICATOR	ESTIMATED COST OF MITIGATION (UGX)	RESPONSIBLE PARTY	MONITORING INSTITUTION	MONITORING FREQUENCY
Traffic disruption	▪ Same as for the construction phase	▪ Same as for the construction phase	1000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Disruption of social order	▪ Same as for the construction phase	▪ Same as for the construction phase	2500000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Noise pollution	▪ Same as for the construction phase	▪ Same as for the construction phase	5000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Solid waste generation	▪ Same as for the construction phase ▪ Further, hazardous wastes associated with solar batteries and panels should be handled and disposed of by a licensed firm for handling such wastes	▪ Same as for the construction phase ▪ Agreement with a licensed hazardous waste management firm	4200000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Occupational health and safety issues	▪ Same as for the construction phase	▪ Same as for the construction phase	-	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Public health and safety issues	▪ Same as for the construction phase	▪ Same as for the construction phase	6000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Increased susceptibility to Soil erosion	▪ Same as for the construction phase	▪ Same as for the construction phase	10000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Air pollution and climate change	▪ Same as for the construction phase	▪ Same as for the construction phase	23000000	Same as for the construction phase	Same as for the construction phase	Same as for the construction phase
Total			**249,700,000**			

Further, the following other costs (Table 37) should be clear in the BoQs during the bidding process. Additional details on the main activities are presented in Annex III.

Table 37: *Other cost items to be included in the BoQs during the bidding process*

Item	Indicative Costs
Grievance Redress Mechanism	22,000,000
Stakeholder Engagement	25,000,000
Environment and Social Audit	30,000,000
Capacity Building and Trainings	20,000,000
Sub-total	**97,000,000**
Grand Total, including ESMMP (UGX 249,700,000)	**346,700,000**

9 CONCLUSION AND RECOMMENDATIONS

9.1 Conclusions

This environmental and social impact assessment for the Cwero water supply and sanitation system has examined the project need, its compatibility with the surroundings, socio-economic benefits and the adverse social and environmental impacts. Enhancement measures have been proposed for the positive impacts, while mitigation measures to avoid, reduce and minimise the adverse impacts were also suggested, either as part of the design, or as measures to be implemented. Good practice measures were also identified in order to minimize the impact of the proposed development further. The proponent has agreed to these mitigation measures and they are, therefore, expressed as commitments.

Overall, the negative impacts of this project as rated by this study are largely insignificant; however, adequate mitigation measures have been proposed to address them. When mitigation actions and environmental and social monitoring plans are implemented, the project would have minimal residual environmental effects. Hence the project can be implemented in a sustainable way.

9.2 Recommendations

This study therefore makes the following recommendations:

- Many times, Project Contractors do not comply with the recommendations given in the project environmental report. This is tantamount to violation of the law with possible halting of the whole project by the relevant authorities, including NEMA. A copy of this report would be availed to the Project Contractor, and advised to get acquainted with the impacts that were identified and their mitigation measures. The Contractor should also get aquatinted with the ESMMP and the proposed plans that should be developed during the implementing the project.
- The project ought to be approved for implementation by the relevant authorities to enable fulfilment of the project main objective of improving access to safe water in the area.

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5. The Occupational safety and Health Act (2000)
6. The design report for Cwero RGC Water Supply and Sanitation System
7. Gulu District Physical Development Plan 2022-2040.
8. The National Development Plan III (NDP III 2020/21-2024/25)
9. The National Environment (Environmental and Social Assessment) Regulations 2020
10. The National Environment Act. No. 5 of 2019
11. The Water Act, Cap 152.
12. UBOS (2014). National Population and Housing Census 2014. Uganda Bureau of Statistics, Kampala, Uganda.
13. Uganda Vision 2040
14. Bennun L, Njoroge, P. (1996). Birds to Watch in East Africa: A Preliminary Red Data List.
15. Freeman, NS, Pomeroy, D and Tushabe, H. 2003. on the use of Timed Species counts to estimate abundance in species-rich communities African Journal of Ecology 41, 337-348.
16. IUCN. (2023). The IUCN Red List of Threatened Species. Available at: www.iucnredlist.org. (Accessed: 27th January 2023).
17. Stevenson T, Fanshawe J. (2002). Birds of East Africa. T & A D Poyser Ltd.
18. WCS. (2016). Red lists of major taxa for Uganda. Wildlife Conservation Society, Kampala.

ANNEXES

Annex I: Summary of the Project Investment Cost

Description	Investment Costs (UShs)
GENERAL	
General Items	116,714,800
Method Related Charges	17,500,000
Dayworks	6,944,200
WATER SUPPLY, SANITATION AND EQUIPMENT	
Borehole Pump Stations	136,255,435
Borehole Pumping Mains	156,178,707
Storage Reservoir and Site Works	245,577,538
Distribution Network	202,742,357
Intensification Network	126,446,000
Borehole Guard House	83,384,900
Water Office	91,273,850
Mechanical & Electrical Works	594,164,796
Tools and Equipment	10,690,000
6 Stance VIP Latrine (1No.)	16,558,786
Sub-Total 1	**1,804,431,368**
Allow for 10% contingency	180,443,136.83
Sub-Total 2	**1,984,874,505**
Allow for 18% VAT	357,277,411
GRAND TOTAL	**2,342,151,916**

Annex II: List of Stakeholders Consulted

STAKEHOLDER CONSULTATIONS

Name of Agency/stakeholder/community: ~~BOKEBER~~ OMEL S/C, GULU DISTRICT BOKEBER VILLAGE

Purpose of consultation (tick appropriate box):					
	Scoping:			ESIA: ✓	
	Sensitization:			RAP:	
	Environmental Audit			Other (specify):	

DATE: 18/03/2023

PROJECT NAME: Cwero Water supply project

PROPONENT:

NAME OF PERSON/OFFICIAL MET:	DESIGNATION	CONTACT(TEL/EMAIL)	SIGN / INITIAL
Canlech Jolly Joe	LC1 Bokebe	0787423488	
Auma Lucy	Councillor	0778303292	
Akumu Kevin Odoong	Teacher	0773534339	
Ayaa BETTY	Farmer	0777833591	
Moyo Mercy Okot	Famer	0774366598	mercy
Jiriya Lapoko	P/F	—	
Ocira Alfonce	Pastor	0775325782	
AKELLO CONCY	Famer	—	
AKELLO CONCY	FAMER	—	

STAKEHOLDER CONSULTATIONS

Name of Agency/stakeholder/community: CWERO Hc II & CWERO P/School Gulu

Purpose of consultation (tick appropriate box):					
	Scoping:			ESIA: ✓	
	Sensitization:			RAP:	
	Environmental Audit			Other (specify):	

DATE: 18/03/2023

PROJECT NAME: Cwero water supply project

PROPONENT:

NAME OF PERSON/OFFICIAL MET:	DESIGNATION	CONTACT(TEL/EMAIL)	SIGN / INITIAL
LAMWAKA [illegible]	R/C	0777073174	
Abalo Grace Oringa	Teacher	0773434996	

STAKEHOLDER CONSULTATIONS

Name of Agency/stakeholder/community:	DWERE VILLAGE, PAICHO S/C GULU						
Purpose of consultation (tick appropriate box):	**Scoping:**			**ESIA:** ✓			
	Sensitization:			**RAP:**			
	Environmental Audit			**Other (specify):**			
DATE: 18/03/2023							
PROJECT NAME: Cwero water Supply Project							
PROPONENT:							

NAME OF PERSON/OFFICIAL MET:	DESIGNATION	CONTACT(TEL/EMAIL)	SIGN / INITIAL
AKOLI NANCY	FARMER	0760018438	
Acen Immaculate	"	-	
Anyemo ROSE	"	-	
AMATO CHRISTINE	"	-	
Opola Francis	"	-	
Okello Sally Joe	"	0783060048	
Atto Evelyn	"	—	ATTO
LAKOT GLORIA	"	0763367102	
Ocira George	"	0761273139	
Akello Gladys	FARMER	0761273139	
Ogen Rwot Stephen	FARMER	—	

STAKEHOLDER CONSULTATIONS

Name of Agency/stakeholder/community:	GULU DISTRICT H/QS						
Purpose of consultation (tick appropriate box):	**Scoping:**			**ESIA:** ✓			
	Sensitization:			**RAP:**			
	Environmental Audit			**Other (specify):**			
DATE: 17/03/2023							
PROJECT NAME: Cwero water supply Project							
PROPONENT:							

NAME OF PERSON/OFFICIAL MET:	DESIGNATION	CONTACT(TEL/EMAIL)	SIGN / INITIAL
Anyemo Joyce Latugo	Env't officer	0779196943	
Kilama Bosco	District water officer	0775594463	

STAKEHOLDER CONSULTATIONS

GULU DISTRICT

Name of Agency/stakeholder/community: DWERE					
Purpose of consultation (tick appropriate box):	**Scoping:**			**ESIA:**	✓
	Sensitization:			**RAP:**	
	Environmental Audit			**Other (specify):**	
DATE: 18th / 03 / 2023					
PROJECT NAME: CWERO W.S.S SYSTEMS (ASWA COUNTY)					
PROPONENT:					

NAME OF PERSON/OFFICIAL MET:	DESIGNATION	CONTACT(TEL/EMAIL)	SIGN / INITIAL
TORACH WALTER	L.C.I, DWERE	0780197335	
TIABU DAVID	m	0777665424	
	M	—	
OJOK FRANCIS	M	0777343204	
TEKO MICHEAL	M	0774078748	
OLAK LORERI	Landowner	0774078748	
OYET BAZIL	Member	----	

Annex III: Other items to be considered during preparation of the BoQs

a) Grievance Redress Mechanism Main Activities

S/N	ACTIVITY	Indicative COST (UGX)
1.	Preparations for and attending monthly meetings for project workers and the contractor's representatives.	1000000
2.	Gender sensitizations for project contractor about employment considerations for both men and women	2000000
3.	Gender mainstreaming on the project including gender inspections and monitoring	2000000
4.	Establishment of grievance mechanism structures and committees in the project	2000000
5.	Establishment of grievance office and orientation of office personnel	1000000
6.	Rent for GRM office	1000000
7.	Renumeration and facilitation for the grievance officer	4000000
8.	Stakeholder sensitization on the grievance procedure	1000000
9.	Stipends and refreshments for GRM committee members	1000000
10.	Community sensitizations and engagements about grievance mechanism redress	2000000
11.	Office facilities, stationery and other secretarial services for GRM offices and committees	4000000
12.	Monitoring and Evaluation by the project staff and the district team	1000000
13.	GRAND TOTAL	22,000,000

b) Stakeholder Engagement Plan Main Activities

ITEM	ACTION PLANNED	TARGETED PERSONS	ENGAGEMENT APPROACHES	ISSUES FOR DISCUSSION	Indicative Cost (UGX)
1	Engagement and consultative meetings With district leaders	- HIV Focal Person, - Health Centers III or IV Heads, Population offices in the Districts, LC5s, RDC, CDO, LABOUR OFFICE DPC, DISTRICT ENGINEERS	-Face to face meetings -Informal working sessions/KIIs -Data/information sharing -Distribution of IEC materials -Media coverages through radio and TV spots	• Mitigation of likely impacts of the project. • Baseline environmental, economic & social information. • Project views/concerns. • Grievance management • Mitigation/monitoring	3,000,000
2	Engagement with LCI, LCII, LCIII, LCIV Chairpersons	Project affected persons	-Face to face meetings -panel discussions -Information leaflets and fliers, -Observations -photographs -Information dissemination and sharing	• Project impacts • Affected PAPs • Grievances • Police records	4,000,000
3	Engagement with Employer's workforce	Project affected persons	Focus group discussions	• Regulatory requirements/ permits and licenses; • mitigation and monitoring • Grievance management	3,000,000
4	Local Community Engagements at village levels	Project affected persons	-Community gatherings -Focus group discussions	• impacts and expectations • Local solutions • Links and ties with the local community • Compensation of PAPs	2,000,000
5	Radio talk shows	Project affected persons	Discussions		2,000,000
6	Formation of GMCs	Project affected persons	Community meetings	• impacts and expectations • Local solutions • Links and ties with the local community	3,000,000
7	Project safety campaigns	Project affected persons	Community meetings and schools	• Project safety incidences, mitigation measures	5,000,000

ITEM	ACTION PLANNED	TARGETED PERSONS	ENGAGEMENT APPROACHES	ISSUES FOR DISCUSSION	Indicative Cost (UGX)
8	NGOs in HIV/AIDS, GBV and Child protection & awareness sector	Groups; women, children elderly	Key informant interviews Case studies, photographs	• Project impacts and expectations from the proposed project	3,000,000
Total					**25,000,000**

c) Environmental and Social Audit

The Environmental and Social Audit should be conducted during and at the end of the construction phase to understand the compliance of the Contractor in relation to the implementation of the ESMMP.

The Environmental and Social Audit should include the following activities:

S/N	Activity	Indicative cost (UGX)
1.	Review of the ESMMP	2000000
2.	Interviewing the Contractor about the implementation of the ESMMP	2000000
3.	Interviewing the workers about the implementation of the ESMMP	4000000
4.	Interviewing community members about the implementation of the ESMMP	12000000
6.	Carrying out measurements and observations on the biophysical environment	4000000
6.	Assessing the compliance of the Contractor to ESMMP	3000000
7.	Identifying issues that require correction	3000000
Total		30,000,000

d) Capacity Building and Trainings

S/N	Description of training	Target participants	Timeframe	Cost (UGX)
1	Labour conditions, GRM health and safety	District Local Government	During construction and operation	10,000,000
2	Water rights issue, Community disagreements, GRM	Project Beneficiaries/ Farmers	During Operation	10,000,000
Total				20,000,000