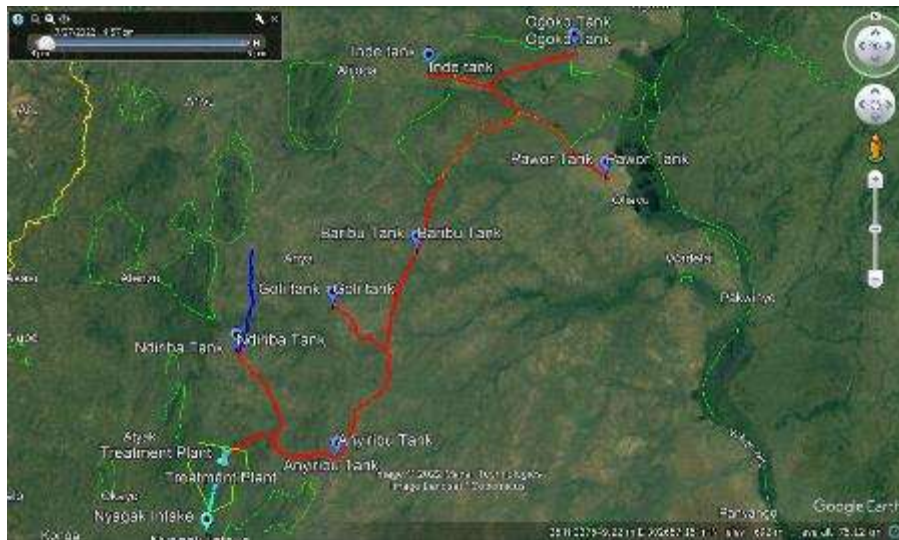




**MINISTRY OF WATER AND ENVIRONMENT
 INTERGRATED WATER MANAGEMENT AND DEVELOPMENT
 PROJECT**

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR
 NYAGAK WATER SUPPLY SYSTEM
 IN ZOMBO, NEBBI & MADI-OKOLLO DISTRICT**



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MARCH 2023

CERTIFICATION

We the undersigned certify that this Environmental and Social Impact Assessment Report for the proposed Nyagak Water Supply System (WSS) in Zombo, Nebbi and Madi-Okollo district was conducted under our direction, supervision and based on the Terms of Reference provided to us by Ministry of Water and Environment. We hereby certify that the particulars given in this report are correct and true to the best of our knowledge and as at the time of the study.

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I certify that I have read and understood the contents of this Environmental and Social Impact Assessment report for the proposed Nyagak Water Supply System in Zombo, Nebbi & Madi-Okollo district. I agree to undertake all the recommended mitigation measures and all aspects of monitoring in order to protect the environment from any form of pollution and degradation.

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LIST OF ACRONYMS

AC	Alternating Current
AIDS	Acquired Immune-Deficiency Syndrome
AOI	Area of Influence
AP	Angle Point
BDL	Below Detectable Level
BOD	Bio-chemical Oxygen Demand
BOT	Build Operate and Transfer
BPT	Brake Pressure Tank
CAO	Chief Administrative officer
CBD	Convention on Biological Diversity
CBOs	Community Based Organisations
CCO	Certificate of Customarily Ownership
CDAP	Community Development Action Plan
CDO	Community Development Officer
CFU	Colony Forming Units
CGV	Chief Government Valuer
CITES	Convention on International Trade in Endangered Species
CMS	Conservation of Migratory Species of Wild Animals
CPA	Comprehensive Peace Agreement
CR	Critical (Globally (G-CR) or Regionally (R-CR))
CSEAP	Construction Social and Environmental Action Plan
dB A	Decibel Amperes
DC	Direct Current
DCA	Danish Church Aid
DD	Data deficient
DDP	District Development Plan
DEA	Directorate of Environmental Affairs
DEO	District Environment Officer
DLGs	District Local Governments
DN	Diameter Nominal
DNRO	District Natural Resource Officer
DO	Dissolved Oxygen
DOSH	Department of Occupational Safety and Health
DWRM	Directorate of Water Resources Management
E	Easting
EA	Environmental Assessments.
EAC	East African Community
EC	Environmental Consultant
EHS	Environment Health and Safety
EI	Environmental Inspector
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Electro-Magnetic Fields

EMMP	Environmental Mitigation and Monitoring Plan
EMP	Environmental Management Plan
EN	Endangered
ENR	Environment and Natural Resources
EO	Environmental Officer
EOC	Equal Opportunities Commission
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
ERA	Electricity Regulatory Authority
ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessments
ESIS	Environmental and Social Impact Statement
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
FSTP	Faecal Sludge Treatment Plant
GBV	Gender Based Violence
GFS	Gravity Flow Scheme
GIIP	Good International Industry Practice
GIS	Geographical Information System
GOU	Government of Uganda
GPS	Global Positioning System
GRC	Grievance Redress Committee
Hasl	Height Above Sea Level
HAZID	Hazard Identification
HC	Health Centre
HDPE	High Density Polyethylene
HMMP	Hazardous Material Management Plan
HRM	Human Resource Manager
HS&E	Health, Safety and Environment
HSMP	Health and Safety Management Plan
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICSS	Interim National Constitution of South Sudan
IDP	Internally Displace People's camps
IFC	International Finance Corporation
ISS	Integrated Safeguards Policy Statements
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resources Management
Km	Kilometres
KPI	Key Performance Indicator
kV	Kilo Volt
LC	Least Concern
LFMP	Labour Force Management Plan
LG	Local Government
LR	Lower Risk
LRA	Lord's Resistance Army

MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MED	Ministry Energy and Dams
MEMD	Ministry of Energy and Mineral Development
MoGLSD	Ministry of Gender, Labour and Social Development
MoLUD	Ministry of Lands and Urban Development
MOU	Memorandum of Understanding
MRI	Magnetic Resonance Imaging
MSDS	Material Safety Data Sheets
MTWA	Ministry of Tourism Wildlife and Antiquities
MUH	Makerere University Herbarium
MW	Mega Watts
MWE	Ministry of Water and Environment
N	Northing
NBI	Nile Basin Initiative
NDP	National Development Plan
NE	Near Endangered
NEA	National Environment Act
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NGO	Non-Governmental Organisation
NHPC	National Housing and Population Census
NP	National Park
NPHC	National Population and Housing Census
NT	Near-Threatened
NTU	Nephelometric Turbidity unit
NWSC	National Water and Sewerage Corporation
O&M	Operation and Maintenance
OD	Outer Diameter
OP	World Bank Operation Policy
OS	Operational Safeguard
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	Project Affected Household
PAP	Project Affected Person
PCR	Physical Cultural Resources
PCRM	Physical Cultural Resource Management Plan
PE	Person Equivalent
PEL	Permissible Exposure Level
PFD	Personal Floatation Device
PIU	Project Implementation Unit
PM	Particulate Matter
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PSCP	Pollutant Spill Contingency Plan

RA	Risk Assessment
RAP	Resettlement Action Plan
RCDAP	Resettlement and Community Development Action Plan
RDC	Resident District Commissioner
RE	Resident Engineer
ROW	Right of Way
RSPM	Respirable Suspended Particulate Matter
SCADA	Supervisory Control and Data Acquisition
SDC	Site Disciplinary Committee
SE	Supervising Engineer
SEA	Sexual Exploitation and Abuse
SEAP	Social and Environment Action Plan
SEM	Site Environmental Manager
SI	Safety Inspector
SMEC	SMEC International Pty Ltd
SO	Safety Officer
SOW	Scope of Work
SPM	Suspended Particulate Matter
SSM	Site Safety Manager
SSP	Source Protection Plan
TASO	The Aids Support Organisation
TCRSS	Transitional Constitution of the Republic of South Sudan
TDS	Total Dissolved Solids
TMP	Traffic Management Plan
TOR	Terms of Reference
TSC	Timed Species Count
TSS	Total Suspended Solids
UBOS	Uganda Bureau of Standards
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations International Children's Emergency Fund
UNRA	Uganda National Roads Authority
US	United States
USAID	United States Aid for International Development
USD	United States Dollars
UTM	Universal Transmecater
UV	Ultra Violet
UWA	Uganda Wild Authority
VAT	Value Added Tax
VAT	Value Added Tax
VAWG	Violence against Women and Girls
VCT	Voluntary Counselling and Testing
VES	Visual Encounter Surveys

VHT	Village Health Team
VOC	Volatile Organic Compounds
VOCs	Volatile Organic Compounds
VU	Vulnerable
WB	World Bank
WBG	World Bank Group
WCS	Wild Life Conservation Society
WGS	World Geographical System
WHO	World Health Organisation
WMD	Water Management Department
WMP	Waste Management Plan
WMZs	Water Management Zones
WSDFs	Water and Sanitation Development Facilities
WSS	Water Supply System
WTP	Water Treatment Plant

MEASURES AND UNITS

A	Ampere (a unit of current)
d(BA)	Decibel
g	gram
Ha	Hectare (= 10 000 square metres)
kg	Kilogram (= 1 000 g)
Km	Kilometre (= 1 000 metres)
KV	Kilovolt (10 ³ volt)
kVA	Kilovolt-ampere (10 ³ volt-ampere)
kWh	Kilowatt-hour (10 ³ watt-hour)
M	Meters
MVA	Mega volt-ampere (= 10 ⁶ volt-ampere)
MWh	Megawatt-hour (= 10 ⁶ watt-hour)
MW	Megawatt (= 10 ⁶ watt)

DEFINITION OF KEY WORDS AND TERMINOLOGIES USED

Project means the proposed Nyagak Water Supply system and associated components.

Compensation means cash or in-kind payments at replacement value for an asset or a resource acquired or affected by the Project at the time the asset is replaced.

Project-Affected Person (PAP) means any person who, as a result of the implementation of the Project, loses the right to own, use, or otherwise benefit from a built structure, land (residential, agricultural, pasture or undeveloped/unused land), annual or perennial crops and trees, or any other fixed or moveable asset, either in full or in part, permanently or temporarily. PAPs may include:

- Physically Displaced People, i.e. people subject to Physical Displacement as defined hereunder,
- Economically Displaced People, i.e. people subject to Economic Displacement as defined hereunder.

Physical Displacement means loss of shelter and assets resulting from the acquisition of land associated with the Project that requires the affected person(s) to move to another location.

Economic Displacement means loss of income streams or means of livelihood resulting from land acquisition or obstructed access to resources (land, water or forest) caused by the construction or operation of the Project or its associated facilities.

Project-Affected Household (PAH) means a household that includes one or several Project-Affected Persons as defined above. A PAH will usually include a head of household, his/her spouse and their children, but may also include other dependents living in the same dwelling or set of dwellings, like close relatives such as parents and grandchildren.

Project-Affected Area means an area, which is subject to a change in use because of the construction or operation of the Project.

Transmission & Distribution Corridor means area measuring up to 3 meters in width and Approximately 211.3 km in length that will be acquired for the establishment of the Nyagak Water Supply System in both Zombo, Nebbi and Madi-Okollo districts.

Access roads mean all existing and newly established roads and tracks, and areas cleared or driven over to provide access to and from the construction areas, and for the transportation of the construction workforce, equipment and materials.

Authenticity of photos used: Unless specified as file photo, all photos presented in this ESIA report were taken by the ESIA consultants at the time of conducting ESIA studies in the month of October-December 2022.

Coordinates used: Unless specified, all coordinates used in this ESIA report are captured in UTM-WGS 84 coordinate system.

Introduction

Government of Uganda (GoU) through the Ministry of Water and Environment (MWE), with financial support from the World Bank, under the Integrated Water Management and Development Project (IWMDP) is undertaking Water and Sanitation sub-projects in small towns and rural growth centres. The Project focusses on three strategic areas: (i) delivering necessary Water and Sanitation Services(WSS) infrastructure and catchment management measures in targeted areas; (ii) supporting water related institutions (MWE, local government, and service providers) to establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve Integrated Water Resource Management (IWRM). The Project comprises of four components: Component 1–WSS in Small Town & Rural Growth Centers which cover Support to Small Town & Rural Growth Centres and Support to Refugee & Host Communities; Component 2–WSS in Urban Large Towns; Component 3–Water Resource Management and, Component 4–Project Implementation & Sector Support. Sub-components. The proposed project that this ESIA focuses on falls under component-1 and specifically Support to Refugee & Host Communities. The project will be implemented by MWE at central level through the Rural Water Supply and Sanitation Department, with close collaboration with Rural Water Supply and Sanitation Regional center- based in Lira as well as district local governments. Under this project, the Ministry of Water and Environment identified the Ala - Ora water supply system, as one of the interventions in raising the safe water access in refugee hosting communities and settlements in northern Uganda. The Ala - Ora water supply and sanitation system comprises two separate surface water supply systems with water sources from River Nyagak and Enyau. For purposes of this report, the environmental and social aspects presented are for Nyagak water supply system only.

Nyagak water supply system shall be executed in the districts of Zombo, Nebbi and Madi-Okollo. The project area is approximately 1,324km² covering Okollo, Anyiribu, Ogoko, Pawor and Offaka sub counties in Madi-Okollo district, which was curved out of Arua district. R. Nyagak was established to have adequate water to meet the water requirement for the projected population of 80,655 in the ultimate year 2043. Assuming an average house hold population of 4.6 individuals, this translates to 10,577 households expected to benefit at the maximum supply capacity of the water scheme.

Raw water will be abstracted from River Nyagak at rate of 3,009m³/day in Zombo district and treated at a facility about 6.7km downstream of the intake through a transmission system (pipes). Treated water will then be distributed to the benefiting centers downstream along a transmission and distribution network of about 211.3km. The design consideration for Nyagak Water Supply System will consist of six storage tanks targeting sub-counties of Offaka, Anyiribu, Okollo, Ogoko and Pawor.

The sanitation component of the project has provided for a two 9-stance water borne toilets that shall be constructed. The toilet facilities shall have a section for female users and a section for male users. The section for female users shall comprise 3 stances plus 1 stance for persons with disabilities while the section for male users shall comprise 2 stances plus 1 stance for persons with disabilities plus urinals. In addition, the project shall construct a water office which will be used for managing the WSS.

The need for Environmental Impact Assessment

The implementation of the Nyagak WSS Project will result in a number of environmental impacts that require an Environmental and Social Impact Assessment (ESIA). Furthermore, the fifth schedule of the National Environment Act No. 5 of 2019 as amended, lists such projects (Construction of large-scale gravitational water schemes of more than 1000 m³/day or where the ecosystem is fragile and sensitive in section 4(j) among those to be considered for environmental impact assessment.

Section 19 (3) of the National Environment Act No. 5 of 2019 as amended made an Environmental and social Impact Assessment mandatory for all projects or policies that may, are likely to or will have significant impacts on the environment so that adverse impacts can be identified, Avoided, reduced, mitigated or compensated for based on the mitigation hierarchy. Furthermore, the World Bank's OP 4.01 Environmental Assessment requires ESIA/ESMP to be undertaken for projects that are considered to pose negative environmental and social impacts. Since the proposed project activities are likely to pose site specific environmental and social risks and impacts, ESIA is required as per OP 4.01 policy requirements. Therefore, this ESIA study seeks to ensure compliance of the project with applicable national and World Bank environmental and social safeguard policies, while also providing the overall framework for addressing social and environmental risks.

Purpose of the ESIA

- To investigate the likely impacts of the proposed project on the biophysical and social-economic environment and propose appropriate mitigation measures to avert or reduce such impacts.
- To promote environmental sustainability through identifying and implementing appropriate mitigation measures.
- To facilitate informed decision making by the Ministry of Water and Environment (Project Proponent), National Environment Management Authority (NEMA) and other Lead agencies and to set terms and conditions for the implementation of the water and sanitation project.
- To involve and engage stakeholders including communities in the project area in the decision-making process and also make them part of the project

Project location

Nyagak WSS will be located in 7 sub-counties, 18 parishes and 42 villages in the affected district of Zombo, Nebbi and Madi-Okollo district.

Project description

The scheme components shall include; an intake, raw water main, water treatment plant, transmission mains, reservoirs and distribution networks. The scheme shall also include water office and sanitation facilities. The design for each component is described as follows;

- Intake with diversion weir length of 30m long across the river and finished at an elevation 100mm above the intake chamber inlet wall/ weir. Intake chamber weir length = 1m. The inlet chamber depth shall be 0.185m with an abstraction of 0.115m³/s
- Coarse and fine screens of spacing 30mm and 10mm between bars, respectively
- Raw water transmission main of 6.7km of 300mm pipe size
- Two baffled tanks with 5 compartments each of 1.1m width, effective depth 2.7m and length 2.37m
- Two horizontal flow tanks each of width 4.65m and length 13.95m
- Two filter beds each 2.9x2.9m
- Backwash water pumped from a clear well to the elevated tank of capacity 50m³
- A clear tank 5.3m wide, 2m deep and 6.3m long
- Chlorine dosing done through OD 20mm pipe into the tank while alum dosing will be done in the flocculators.
- 76 km of primary distribution network (27km of OD160mm-OD63mm Offaka-Anyiribu, 10km of OD90mm-OD50mm Goli-Okollo, 20km of OD160mm Pawor, 7km of OD160mm Inde and 12 km of 110mm Ogoko)
- Six reservoir tanks of various sizes

ESIA methodology and approach

The study was preceded by internalization of the Terms of Reference and formulation of appropriate data collection tools. It assessed each of the activities of the project covering physical, biological, socio-economic (including occupation health and safety); and socio-cultural environment as detailed herein. It determined and listed potential direct and indirect environmental impacts for each of the planned activities; evaluated and recommended mitigation measures for negative/adverse impacts.

The methodology used included; Literature review, Stakeholder consultations, key stakeholders' investigations/engagements, survey of social economic activities, Water resources assessment, Biodiversity studies on flora and fauna, Baseline noise assessment, Mapping and photography, Visual observations, Impact screening, Impact assessment, evaluation and analysis.

The EIA study was based on data collected along the proposed project route (project sites) as well as review of documents provided by the Developer and those from other sources such as, Feasibility study reports, Environmental and Social Management Framework (ESMF), World Bank Safeguards policies, IFC Environmental Health and Safety Guidelines for Water

and Sanitation Projects, and other documents provided by district staff on project location such as District Development Plans, district state of environment and health reports, among others. Other documents reviewed include relevant National Household survey reports, policies, regulations, legal framework impacting on the water and sanitation sector. Consultations with stakeholders constituted a major part of the ESIA methodology in information gathering. Stakeholder perceptions, views and concerns were collected through focus group discussions, meetings and personal interviews with the target audience including but not limited to all communities in Nebbi, Zombo and Madi Okollo District Local Government, NGOs among others.

Emphasis was laid on environmental concerns expected from construction of the abstraction structures, sanitation facilities, and storage facilities and laying of water transmission and distribution pipes within the rest of project area, obligations of the various parties in mitigating the anticipated impacts and the procedure for operating the water and sanitation project among others. Concerns were analyzed, documented, and addressed in the Environmental and Social Management Plan (ESMP).

Policy, Legislation and Regulations

Two frameworks in regard to policy, legislation and regulations have been reviewed i.e. World Bank Environmental and Social safeguard policies and Uganda national policy, legal and institutional framework. The following World Bank Environmental and Social safeguard policies are triggered by the project: Environmental Assessment OP/BP 4.01 because of the likely negative environmental and social impacts arising from the construction and operational activities of the proposed project; Natural Habitats OP/BP 4.04 because the intake is located in a wetland and along the river banks; Physical Cultural Resources OP/BP 4.11 because construction excavations may unearth chance finds; And Involuntary Resettlement OP/BP 4.12 as a result of land intake and likely impact on livelihoods and economic displacement.

The main Ugandan national policies, laws and regulations that the project will guide project development and implementation are those that deal with water, environment, land, labour, child-abuse and gender aspects. These include but not limited to: - the Water Act Cap 152; the National Environment Act No.5 of 2019; the Land Act Cap 227; the Land Acquisition Act Cap 226; the Occupational Safety and Health Act No. 9, 2006; Employment Act, 2006; Workers' Compensation Act 2000 and Children Act Cap 59.

Key Baseline Features

Biophysical baseline

The proposed Nyagak Water Supply Scheme traverses majorly savannah grasslands and subsistence farmlands under farrow up to 80% and the remaining segments are patches of savanna grasslands mixed with woodlands. The active farmlands that will be affected by the project were estimated at 30%. The vegetation assemblage along the savanna grasslands

indicates such areas were one-time farmlands but later abandoned probably due to the insurgency or other factors.

A total of 240 plant species to 156 genera and 52 families were recorded from the surveyed project area. Among these, herbs registered the highest number of 138 herbs, trees were 59, shrubs were 34 and 10 were lianas. Some of the recorded species include *Vachellia hockii* (*Acacia hockii*), (*Vitalleria paradoxa* & *Tamarindus indica* both IUCN red listed), *Combretum molle*, *C. collinum*, *Terminalia brownii* and *Ficus* spp. Species of seasonal wetlands include *Echinochloa pyramidalis* Least Concern (LC), *Loudetia simplex* Not Evaluated (NE), *Cyperus* spp., *Fimbristylis dichotoma* (LC), *Cissampelos mucronata* (NE), *Leersia hexandra* (LC) and *Polygonum salicifolium* (LC). *Cyperus papyrus* (LC), *Phragmites mauritiana* (LC), *Phoenix reclinata* (LC) were among the many species of permanent wetlands. Invasive plants like *Chromolaena odorata*, *Parthenium hysterophorus* and *Xanthium strumarium* were common.

The topography of the project area is in such a way that the land scape gently slopes eastwards enabling gravity flow of water from the intake in zombo to the lower areas of Inde Town Council, Pawor and Ogoko sub-counties in Madi-Okollo district. The highest point is at the intake at 1087m above sea level and the lowest area is at the River Nile bank at 626m.

The quality of water of R. Nyagak showed complying physical chemical characteristics with exception of TSS and turbidity as provided for by National Standards for Untreated Portable Water. However, it did not comply with bacteriological characteristics as provided for by the National Standards for untreated Portable Water.

The assessment of air quality indicated that ambient average oxygen concentrations at all sampled points was 20.8 percentage volume. Gas emissions of carbon monoxide, Hydrogen Sulphide, LEL methane and VOCs and H₂S were all not detected while analysing (reflecting the low population density, absence of heavy industry, and low traffic levels). The possible sources of air contaminants within the project area are small and are likely to result from traffic, Grain milling machines and a number of rural households where wood and kerosene are the main fuel for cooking and lighting.

The project area is rich of amphibians. A total of 25 amphibian species belonging to one Order Anura, 10 families and 13 genera were recorded during the study and have been identified. The commonest species were *Ptychadena nilotica* (Nile Grass Frog), recorded in 12 out of the 16 sites surveyed, followed by *Afraxalus quadrivittatus* (Four-lined Spiny Reed Frog) and *Hyperolius viridiflavus* (Common Reed Frog) (11/16 each), *Phrynobatrachus natalensis* (Natal Dwarf Puddle Frog) 10/16), *Hoplobatrachus occipitalis* (Crowned Bullfrog) and *Sclerophrys regularis* (African Common Toad) (/16 sites each) while *Sclerophrys maculate* (Flat-backed Toad) was recorded in eight out of the 16 sites. The team noted that none of the species identified is of conservation concern.

A total of 21 species of mammals were recorded in the project area. All species except Cane rat *Thryonomys gregorianus* were recorded from interviews with people from the local community. The exceptions listed here were recorded either from direct observation of their presence and foot prints. For all mammal species encountered, one species is near

threatened (Spot necked Otter *Lutra maculicollis*) and one species is vulnerable (Tree pangolin *Mani's tricuspis*).

The project area is rich of avian biodiversity. A total of 179 individuals were observed in the study area representing 45 species of birds. The proposed intake area had the highest number of bird species compared to the proposed Water Treatment Plant area or the tanks downstream along transmission pipelines. The common bulbul 91% followed by the Black Bishop 74%, one forest visitors (Blue spotted wood dove) was observed, eight grassland specialists and two non-water specialists often found near water, that are usually found next to water but can as well survive where there is no water, five grassland specialists were the most common in the area.

Socioeconomic baseline

The proposed Nyagak Water Supply Scheme will traverse 42 villages, 18 sub-counties and mainly the two district of Zombo and Madi-Okollo. However, a smaller segment (about 6km) of the raw water transmission main and the water treatment plant will be situated in Odhure village, Nebbi district. The total length of the raw water transmission main and treated distribution network is about 211.3 km traversing mainly private land by approximately 67%. Within the project area, 30% of the respondents were female while 70% were male, these belonged to age-groups of 18-30 years (26%), 31-50 years (65%) and 51+ years (9%). In addition, 87% of the respondents were married, while 13% were single (unmarried). The survey further determined that 21% of the households had People with Disabilities (PWDs) while 78% had none. Over 30% had primary education, 47% attained secondary education, 4.5% had tertiary education, 4.2 attained university while 13% were illiterate. Furthermore, the survey noted that over 82% of the respondents can read and write. Roman catholic was the most common belief (78.18%), followed by the Anglicans (13.03%) and Pentecostal (8.7%). The tribes are predominantly Lugbara (43.64%), followed by Madi (34.85%) and Alur (21.52%). Farming is the major socioeconomic activity in area, accounting for 91.21% of the households, while service provisioning such as hospitality and beauty salons account for 4.2%. Secondary income is obtained from brick making, and petty trade among others.

The project area has an average household size of 4.9 which is slightly higher than the national average household size of 4.7 and this is associated with high poverty levels. Similarly, the area generally had a young population with 59.6% of its population aged 19 years and below, while the elderly constituted only 3.9%, which implies a growing population with associated challenges such as high dependence ratio, high demand for education and health facilities. It was established that 52.12% of the households' income is below the national per capita income of 882 USD (Approximately 300,000 Uganda shillings per month) according to the third national development plan 2020/2021-2024/2025. The settlements are generally sparsely populated, except in and around trading centres such as Awed Kedi, Okollo, Ndriba and Inde where there are clustered settlements.

Access to water varies from 38% of the households in Madi-Okollo to 95% in Uleppi Sub-County. However, majority of the water points in the area have not been functional and are abandoned. Similarly, sanitation in the area remains a challenge with low pit latrine coverage. Nonetheless, handwashing facilities and practices were improved especially during the COVID-19 pandemic. Transport in the project area is characterized of earth/gravel roads which range from poor to fair condition since most of them are motorable but only a few villages inaccessible. There are a number of health facilities including Okollo health centre IV was the supreme public facility within Madi Okollo district, and Ogoko H.C III, Pawor H.C III, Ofakka H.C III, Akino H.C III, Inde H.C III and Nyapea H.C III. The most prevalent diseases include malaria (78%), respiratory diseases like cough, asthma and flu cough (6%), intestinal worms (11%) and water related diseases (5%).

Project impacts

The purpose of this project is to increase sustainable access to safe water and basic sanitation in the targeted sub-counties of Zombo, Madi-Okollo and Nebbi district.

1. Positive Impacts

The following positive benefits are expected to accrue from this project;

- **Reduction in diseases prevalence**

The proposed Nyagak Water Supply and Sanitation Project will contribute towards reduction in the prevalence rates of waterborne diseases, especially cholera, dysentery and diarrhea. This expected since the refugees and refugee host communities will access clean water for drinking and domestic activities. The project would have significant strategic benefits in reducing the burden on the cost of health care services as diseases could be reduced. This positive impact will be enhanced if the following are done:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
2. Ensuring that operations and maintenance are properly done to avoid issues of water contamination
3. Ensuring that water is affordable and available all the time.

The improved health conditions will significantly result in a reduction in health costs and time for collecting water which translates into substantial savings for rural households.

- **Easing of the water fetching burden**

One of the major positive impacts of this project will be the easing of the burden of fetching water, which is one of the most arduous tasks for women and young girls in the rural areas. Therefore, the time which has always been wasted on water fetching can be invested into the

development of income-generating activities especially for the women. This impact will be enhanced if the following are done:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
2. Ensuring that water is affordable and available all the time

- **Improved livelihoods of the local people**

The proposed project would result in increase of volume of water for production, which could result in improved livelihoods of the local people. The project would, therefore increase productive activities through reduced sick days and time saved in fetching water. This impact will be enhanced through the following:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
2. Ensuring that water is affordable and available all the time
3. The project should put initiatives in place to promote productive use of water

- **Improved service delivery**

The proposed project would result in bringing improved water and sanitation services closer to the people. This impact will be enhanced through:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
2. Ensuring that operations and maintenance are properly done to avoid issues of water contamination
3. Ensuring that water is affordable and available all the time

- **Reduction of child mortality**

Safe drinking water, personal/household hygiene and improved sanitation would reduce infant/child morbidity and mortality; improve their nutritional status and their ability to perform better in schools. This impact will be enhanced through the following:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
2. Ensuring that water is affordable and available all the time

- **Improved maternal health**

The Project would result in reduced physical stress and improved health status of pregnant women, thereby reducing miscarriages, maternal deaths, and adverse impacts on fetus and new-borns. This impact will be enhanced through the following:

1. Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.

2. Ensuring that water is affordable and available all the time

• **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). This impact will be enhanced through:

1. ensuring that women and girls are given priority while recruiting personnel for the project
2. Ensuring that all the households within the project footprint are either connected or have access to clean and safe water.

• **Increase in investment in the area**

The business community could take advantage of the proposed development to establish businesses that would otherwise be impossible without piped water. This impact will be enhanced through:

1. Ensuring that the project uses locally produced materials where possible.
2. The water distribution network connections should target SMEs
3. The project should have an initiative of promoting productive use of water

• **Human capacity building and creation of jobs**

Human capacity building and the creation of jobs in water management through the involvement of private operators in the construction, management, repair and maintenance of water supply facilities will come along with this project. These will constitute skilled, semi-skilled and unskilled laborers. During construction, about 100-150 people will be employed and about 10-20 people will get jobs during operation phase. More employment will be created to the local proprietors who will be providing services like food, accommodation, medical care, among other services. This will be enhanced through giving priority to local communities while recruiting workers for the project. This will not only enhance skills development in water construction but also environmental and social sustainability.

• **Increased Revenue to the government**

This water supply and sanitation project will generate revenue to the districts and the country in general. This will be in form of VAT on water supply and other taxes associated with extension such as expanded and improved business opportunities in the project areas. This will be enhanced by putting in place an efficient mechanism for revenue collection.

2. Negative impacts and mitigation measures

The major negative risks and impacts associated with the Nyagak water and sanitation are summarised in the impact/risk-mitigation –responsibility matrix (ESMP) under section 9.2. The analysis of the full range of the impacts assessed are contained in Section 8 of this report. The most significant environmental and social impacts, rated as of medium significance and higher, are:

1. The influx of people and the increase in social disruption and human health issues, related specifically to the influx of people and HIV/AIDS, with which specific management is required to guide social interaction during the construction period
2. The loss of crops on the RoW, when it deviates from the road reserve
3. The construction activities like excavations and vehicle movements during construction are likely to generate noise levels beyond the current levels. Exposure of communities and workers to high noise levels can be a health concern.
4. The project activities like excavations and waste management may increase sediments in water sources and/or pollute them with contaminants
5. The construction works may negatively impact water quantity and quality of streams, water bodies, and ground water resulting in seasonal hydrologic changes and potential negative impacts on downstream river biota and communities.
6. Excavations, construction activities, transportation of workers and equipment may pose occupational and community safety risks.

The mitigation measures for the above listed potential impacts include: Proper containment and re-use of cut and spoil/excavated soils for backfilling the excavated pits, hoarding off of key construction sites, provision and enforcement of adequate and appropriate personal protective wear, construction of suspended water pipes across streams and wetlands on concrete pillars to ensure future disturbance during repairs will not result into further interface with the water resources in these ecosystems, proper and appropriate construction and sanitary waste management, sprinkling of water on dusty sections of the construction sites and limiting speed of project vehicles to 30km/hr in the project area. The affected property and crops/trees shall be compensated in line with the approved RAP, Communities in the project area should be engaged and sensitised about all the components and requirements of the project. After construction, there should be landscaping and then grass left to recolonize the disturbed area naturally. MWE in collaboration with the local authorities shall undertake catchment management activities to support local environmental protection programs including support tot afforestation initiatives to enhance tree cover areas as a way of reducing project footprint. Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads to avoid unintended damages to fauna. The affected sites should be restored to almost its original position. Trenching, pipework laying as well as well as backfilling will be done concurrently. For open pits the contractor shall ensure that every evening, they are covered with timber while being

secured with a warning tape. Following construction, rehabilitation of all areas disturbed during construction phase and that are not required for regular maintenance operations shall be undertaken to desired ecological conditions and all exposed areas shall be re-vegetated using indigenous species. To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic preferably on weekends and the contractor shall develop and implement a traffic management plan. To mitigate social impacts, workers shall as much as possible be recruited from the project area, develop and implement a comprehensive stakeholder management and engagement plan, Structures like shrines and graves should be avoided as much as possible, all public institutions like schools and health centers in the project footprint should be connected to the water supply and requirements for vulnerable groups (like child protection and prevention of GBV) should be mainstreamed and integrated in project activities.

Management and Monitoring of Impacts and Risks

The ESMP provides a summary of activities, their related potential impacts and the corresponding recommended mitigation measures to be carried out during the pre-construction, construction, operation and decommissioning phases of the Project. It details active remedial and mitigation measures to be continuously carried out to prevent or minimize impacts on the bio-physical and socio-cultural environments as well as to promote occupational safety and health of employees. It also seeks to identify the various institutional responsibilities to manage the environmental aspect of the Project as well as the cost involved.

The Contractor will be required to prepare standalone safeguards management plans as part of the Contractor's Environment and Social Management Plan. Reference should always be made to the Contractor's Environmental and Social Management Plan as the overarching document that contains general Control Statements for management of various impacts such as air quality, solid waste, and hazardous materials, water quality and ecosystems, noise and vibration control, erosion control, waste excavation and disposal and occupational health and safety, sexual exploitation and abuse, sexual harassment, traffic, labour force, grievance redress and so on. In addition to the Management Plans, the Contractor should prepare Method Statements for specific activities such as earthworks and submit for the Supervision Engineer's review and comments before commencement of works. If the Consultant/Engineer notifies the Contractor that a specific method statement has failed to provide adequate mitigations, such a statement should be revised and approved by the Client/MWE/or their representative – Supervision Consultant/Engineer.

Several statutory and contractual approvals and licenses will be required before commencement of certain construction activities. Securing of approvals requires preparation of the relevant documentation and/or 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 etc) are sourced from sites that are approved by NEMA and compliant with environmental laws. Permits for water abstraction and construction on surface water will be obtained during the mobilization period.

Where relocation of utilities is to occur, the contractor will obtain permission from relevant service providers during the mobilization period to avoid delays. For all new materials sites to be opened up and operated by the Project, NEMA approval must be secured while all existing sites should undertake/provide proof of having valid approvals and/or having environmental compliance agreements with NEMA.

Routine inspections will be carried out to cover all aspects of environmental and social management on the site. Either a standalone Monthly Environment Report shall be prepared, or safeguards shall be sufficiently covered in the Contractor's Monthly Progress Report in fulfilment of the Contractor's contractual reporting obligations. The report will highlight different activities undertaken to manage environmental and social aspects of the project in line with contract specifications, laws, standards, policies, and plans of Uganda and World Bank ESF. MWE will take the responsibility to fulfil the requirements for conduct of periodic environmental and social audits in line with the National Environment Act 2019. Implementation of ESMP activities will be approved by MWE and safeguards compliance will be one of the bases for payment. Final payment for the contractor shall be tagged to successful restoration of all disturbed areas and clean-up of all construction sites.

MWE has on behalf of Government of Uganda committed to provide human and financial resources to implement several safeguards aspects of this project as required. MWE will hold all project implementers accountable for putting in place adequate material measures and actions to mitigate the Project's potential environmental and social risks and impacts. It is strongly recommended that MWE reviews and updates its environmental and social management processes before commencement of the civil works.

Staffing – The human resource equation for the delivery of environmental and social safeguards compliance over-sight by environment and social safeguards experts of the Ministry has been reinforced with the recruitment of the Project Social Development Specialist and Environmental Specialist. Hence the Ministry has adequate capacity to monitor the implementation of the safeguards requirements of the project.

Equipment – In execution of supervisory and monitoring role, Ministry relies largely on physical site inspections, interviews and review of records without going into some in situ measurements of some physical and ecological parameters. The approach can be exploited by fraudulent contractors since they will have known that, there will be measures for on-site physical verifications. It is therefore important that the Ministry obtains some in-house equipment for rapid verification of noise, air quality, vibrations and water, and the results may be used to inform resolution of related complaints. In the same vein, there should be readily available logistics in terms of vehicles for the environment and social personnel of the Ministry to rapidly respond to environmental and social safeguards emergencies in the projects as they happen.

Responsibility and capacity of stakeholders for ESMP implementation and monitoring

The management and supervision of the ESMP is strictly the responsibility of the Ministry of Water and Environment as the Developer. During construction, the Contractor will be responsible for the day-to-day implementation of the ESMP while the Operator will be responsible for the implementation of the ESMP during operations phase.

At the local level, the community, Madi Okollo, Nebbi and Zombo districts will be responsible for the day-to-day monitoring of the ESMP in their areas of jurisdiction while at National level, the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSHS) of the Ministry of Gender, Labour and Social Development will undertake environmental and social/health and safety monitoring respectively.

The Contractor shall hire the following key staff to undertake project implementation: Project Manager, Environmental Specialist, Sociologist, Health and Safety Officer. MoGLSD, MWE and NEMA have safeguards personnel that have capacity in terms of equipment and training in environmental and social management and monitoring. However, the beneficiary communities and District Local Governments will need capacity building to enhance their ability to monitor E&S implementation progress of the project. The contractor may also need awareness and training in the environmental and social aspects of the project. MoGLSD, MWE and NEMA staff need refresher training in environmental monitoring, RAP implementation, reporting and modeling as well as catchment management approaches.

Management of Grievances

The project has a Grievance Redress Mechanism that will address any grievance or complaint by the PAPs promptly and fairly in a manner acceptable to all parties concerned. Committees with composition that includes among others representative of vulnerable and women shall be established at village and district levels. The Mechanism also has a referral system to the courts of laws. The Committee members shall be trained and facilitated to effectively undertake their activities. The GRCs will be responsible for receiving and logging complaints and resolving disputes. The GRCs will work with the MWE to resolve each grievance or dispute to ensure that redress actions are implemented. If affected persons are not satisfied with the grievance redress structures, they will be entitled to seek redress from the district committee and Courts of Law. The GRM spells out the process involved from lodging a complaint to its resolution.

The Contractor shall also be required to establish a committee to handle workers' grievance. The committee will comprise the Project Manager, Foreman and the social and environment safeguards personnel and the representative of the Supervising Engineer.

Cost of implementing the ESMP

It is estimated that the implementation of the ESMP including the management of associated environmental and social aspects of the project, training and capacity building will cost approximately USD 420,000. It is recommended that this should be provided for under the provisional sum in the bidding documents.

Conclusions and Recommendations

Access to clean water is one of the primary constraints to the Ugandan rural communities, providing such access unlocks health, social and economic opportunity. In the context of the proposed project, such opportunity would most likely be taken up by women and children since traditionally, the positive impacts from this project will result in local economic, social and health improvement in the Project Area in various parts of Madi-Okollo, Nebbi and Zombo Districts.

Through effective implementation of the mitigation measures, stipulated in the Environmental and Social Management Plan (ESMP), the probable risks of this project can be adequately managed and mitigated. It is critical to realise that the project must be implemented within the suggested ESMP guidelines, to avoid significant negative impacts, like the spread of HIV/AIDS, gender inequality, gender-based violence, the abuse of children and exclusion of vulnerable groups. Of primary importance, is for the final design stage to now be focussed on site specific issues and opening discussions directly with relevant landowners, as can be facilitated through the implementation of the Resettlement Action Plan (RAP) process.

Recommendation is made for the consideration of approval of the project, based on conditions that the proposed mitigation measures are effectively implemented; proof of which must be made available regularly to relevant authorities and stakeholders and be submitted upon completion of the construction phase through the submission of a final environmental and social audit.

The following specific recommendations are made:

1. The proposed route be more closely aligned with the road reserve, as there seem to be no reasons for the predominant deviation from the road reserve;
2. The final location of the proposed route and other infrastructure, be specifically designed during the final design stage, to avoid the identified environmental and social impacts, as far as is possible;
3. MWE should consider the needs of institutions such as churches, schools and health centres, and rural growth centres that fall outside the proposed routing, for possible further inclusion into the revised designs for the project.

4. Labour and recruitment – MWE should give priority consideration to recruitment of unskilled local labour on the project. Gender considerations should also be given due attention during project implementation;
5. Should there be a need to change the alignment and the design from the current, MWE should endeavour to include sociologists in the final design and construction teams to overcome the biases and gaps that are often overlooked by teams that are predominantly engineering professionals;
6. Communication and feedback - MWE is requested to ensure that reports or outcomes of the on-going assessment are shared with the relevant Districts, as soon as they are available – in the interest of transparency and accountability;
7. Necessary training regarding safety aspects to the personnel working on the project will be provided by the Contractor. Personal protective equipment, like safety gloves, helmet, mufflers etc., should be provided during the construction period and during the maintenance work and according to national and international Occupational Health and Safety good practice standards;
8. Strict Contractor adherence from the work force regarding zero tolerance to disturbances on the local community, surrounding habitats, flora and fauna, to be maintained at all times;
9. Selection of approved locations for material storage yards and construction yards away from wetland and low-lying areas, as well as away from other sensitive environmental areas, must be ensured;
10. Continued sensitisation of the affected community must be done, together with planning with local political and civil authorities and involving District Environment Officers and Community Development Offices;
11. The project should at all times ensure health and safety for both workers and the public, during all stages of the project; and
12. MWE will need to work extensively and more regularly with local leaders, to help sensitise the general public to better manage local community expectations regarding compensation for loss of crops, woodlots and/or property.

1 INTRODUCTION

1.1 Over view

Government of Uganda (GoU) through the Ministry of Water and Environment (MWE), with financial support from the World Bank, under the Integrated Water Management and Development Project (IWMDP) is undertaking Water and Sanitation sub-projects in small towns and rural growth centres. The Project focusses on three strategic areas: (i) delivering necessary Water and Sanitation Services(WSS) infrastructure and catchment management measures in targeted areas; (ii) supporting water related institutions (MWE, local government, and service providers) to establish and consolidate operational efficiency and service quality in small towns and rural areas; and (iii) strengthening national and regional capacity to improve Integrated Water Resource Management (IWRM). The Project comprises of four components: Component 1–WSS in Small Town & Rural Growth Centers which cover Support to Small Town & Rural Growth Centres and Support to Refugee & Host Communities; Component 2–WSS in Urban Large Towns; Component 3–Water Resource Management and, Component 4–Project Implementation & Sector Support. Sub-components. The proposed project that this ESIA focuses on falls under component-1 and specifically Support to Refugee & Host Communities. The project will be implemented by MWE at central level through the Rural Water Supply and Sanitation Department, with close collaboration with Rural Water Supply and Sanitation Regional center- based in Lira as well as district local governments. Under this project, the Ministry of Water and Environment (MWE) identified the Ala - Ora water supply system, as one of the interventions in raising the safe water access in refugee hosting communities and settlements especially in northern Uganda. The Ala - Ora water supply and sanitation system comprises two separate surface water supply systems with water sources from River Nyagak and Enyau. For purposes of this report, the environmental and social aspects presented are for Nyagak water supply system only.

Nyagak water supply system shall be executed in the districts of Zombo, Nebbi and Madi-Okollo. The project area is approximately 1,324km² covering Okollo, Anyiribu, Ogoko, Pawor and Offaka sub counties in Madi-Okollo district, which was curved out of Arua district. R. Nyagak was established to have adequate water to meet the water requirement for the projected population of 80,655 in the ultimate year 2043. Assuming an average house hold population of 4.6 individuals, this translates to 10,577 households expected to benefit at the maximum supply capacity of the water scheme.

Raw water will be abstracted from River Nyagak at rate of 3,009m³/day in Zombo district and treated at a facility about 6.7km downstream of the intake through a transmission system (pipes). Treated water will then be distributed to the benefiting centers downstream along a transmission and distribution network of about 211.3km. The design consideration for Nyagak Water Supply System will consist of six storage tanks targeting sub-counties of Offaka, Anyiribu, Okollo, Ogoko and Pawor.

The sanitation component of the project has provided for a two 9-stance water borne toilets that shall be constructed. The toilet facilities shall have a section for female users and a section for male users. The section for female users shall comprise 3 stances plus 1 stance for persons with disabilities while the section for male users shall comprise 2 stances plus 1 stance for persons with disabilities plus urinals. In addition, the project shall construct a water office which will be used for managing the WSS.

1.2 Project location

Nyagak WSS will be located in 7 sub-counties, 18 parishes and 42 villages in the affected district of Zombo, Nebbi and Madi-Okollo district. Table 1.1 below presents a summary of the various administrative units crossed by the Nyagak WSS. Figure 1.1 below presents an overview of the project area as impacted by the project.

Table 1.1: Administrative units crossed by the Nyagak Water Supply Scheme

No	District	Sub county	Parish	Village
	Madi - Okollo	Ogoko	Parabok	Parabok Upper
	Madi - Okollo	Ogoko	Panduku	Mubanda
	Madi - Okollo	Ogoko	Olali	Degia
	Madi - Okollo	Ogoko	Ayavu	Ajai Game Reserve
	Madi - Okollo	Ogoko	Ayavu	Ayavu - Gazi
	Madi - Okollo	Ogoko	Enyio	Ombokoro
	Madi - Okollo	Ogoko	Ayavu	Ojiba
	Madi - Okollo	Okollo	Onyomu	Pamva / Omveko
	Madi - Okollo	Okollo	Onyomu	Osabu / Anyora
	Madi - Okollo	Okollo	Onyomu	Drajini
	Madi - Okollo	Okollo	Onyomu	Baribu
	Madi - Okollo	Okollo	Okollo	Ndubu
	Madi - Okollo	Okollo	Okollo	Panzoro
	Madi - Okollo	Okollo	Okollo	Pauni
	Madi - Okollo	Okollo	Okollo	Ayiju
	Madi - Okollo	Okollo	Okollo	Vuu
	Madi - Okollo	Okollo	Okollo	Okollo Tr.C
	Madi - Okollo	Okollo	Okollo	Opibu
	Madi - Okollo	Okollo	Okollo	Parabu
	Madi - Okollo	Offaka	Omua	Anibu-Arasi-Ayira
	Madi - Okollo	Offaka	Omua	Kango/Anyora
	Madi - Okollo	Offaka	Ombachi	Anibu /Pajuru
	Madi - Okollo	Offaka	Ombachi	Pajuru / Aviba
	Madi - Okollo	Offaka	Ombachi	Pajobi / Arasi
	Madi - Okollo	Offaka	Ombachi	Adribu /Oloyi
	Madi - Okollo	Offaka	Adraa	Ayira
	Madi - Okollo	Offaka	Adraa	Ayibu/Osabu
	Madi - Okollo	Offaka	Adraa	Pamachi
	Madi - Okollo	Offaka	Adraa	Adraa
	Madi - Okollo	Offaka	Elibu	Ndriba/Wua/Ibbi
	Madi - Okollo	Offaka	Ochebu	Ombachi
	Madi - Okollo	Offaka	Oribu	Omvuloo / Alibu
	Madi - Okollo	Offaka	Oribu	Ndu
	Madi - Okollo	Offaka	Oribu	Patru / Pamura
	Madi - Okollo	Offaka	Ochebu	Ocebe-Alibu/Ndriba-
	Madi - Okollo	Offaka	Ochebu	Ndriba-Adabu
	Zombo	Paidha	Otheko	Uruku Awendu Kedi
	Zombo	Paidha	Otheko	Alindi
	Zombo	Nyapea	Abeju	Areju
	Zombo	Nyapea	Abeju	Athele
	Zombo	Atyak	Anyola	Nyawir
	Nebbi	Nebbi	Kalowang	Odhure
Total	3	7	18	42

1.2.1 Intake

The intake will be located about 90meters downstream of Nyagak III Hydropower station in Uruku Awendu Kedi village, Paidah Sub County, Zombo district at E:276312, N: 276426, H:1087m. The river bank is loosely vegetated with grasses with evidence of cultivation up to the water mark. Gardens of maize and bananas were observed on either side of the river. This activity not only compromises the stability of the bank but also increases soil erosion hence affecting the quality of water in the river. Access to the intake is currently via Nyagak III hydropower infrastructural roads.



Figure 1: Google earth image showing the Nyagak WSS intake relative to Nyagak III Hydropower plant.



Plate 1: Physical appearance of Nyagak WSS intake

1.2.2 Water Treatment Plant (WTP)

The water treatment plant (WTP) will be located within Omier Central Forest Reserve (CFR) at E: 282300, N: 277624, H: 1036m. Despite being a Central Forest Reserve, the site had been cultivated with cassava and maize. The owner of the gardens could not be identified although it was assumed that they are owned by the people in the surrounding communities. Access to the site would require extensive rehabilitation of a 2.6km existing access road from the nearby trading centre and additional opening up of an 800meter fresh access road within Omier CFR.

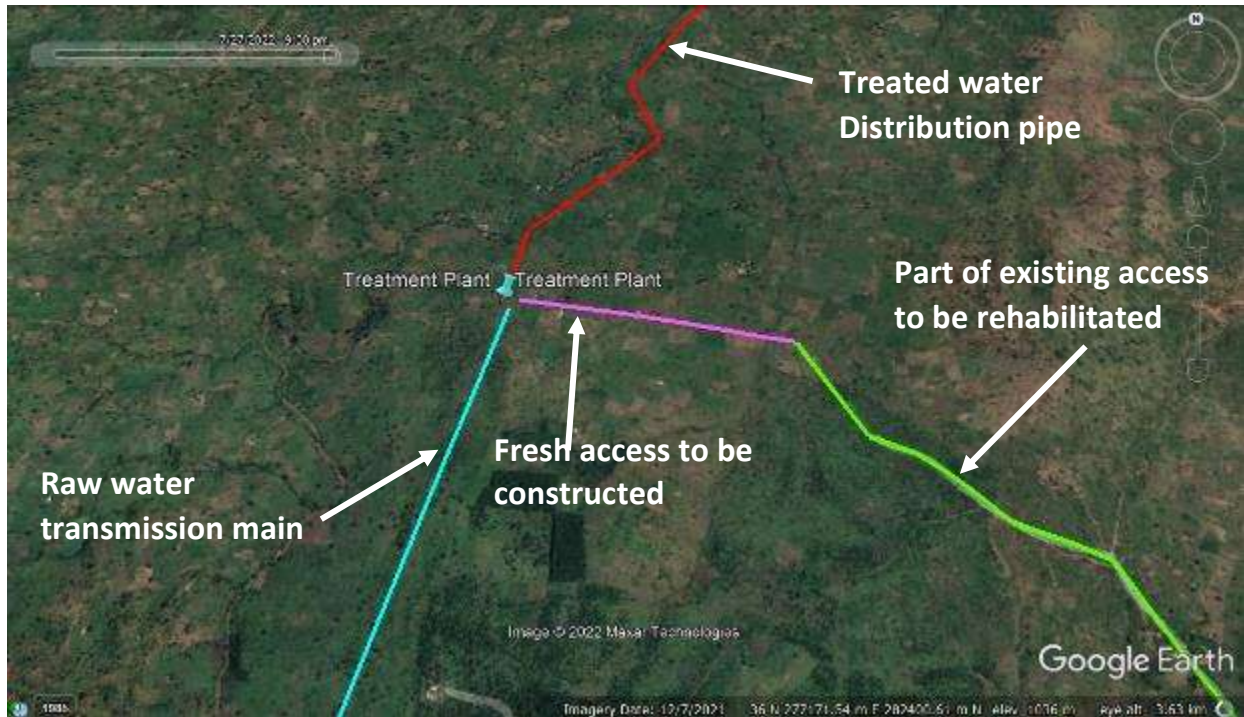


Figure 2: Access to the Nyagak Water Treatment Plant



Plate 2: Proposed location of the Water Treatment Plant in Omier Central Forest Reserve

1.2.3 Goli Tank

Goli tank will be situated at Goli hill which is a rock outcrop at E: 297561, N: 288308 and at 1020m above sea level. The site is a wooded grassland with scattered tree of mainly *Combretum spp*, *Accacia spp* and *Euphobia spp*. The site is about 500 meters west of Nebbi-Arua highway. The existing access to the hill top is via a foot path. This means that access to the site (hill top) during construction and installation of Nyagak WSS infrastructure will require opening of a fresh access road of about 500 meters to the hill. It was also established through consultations with the locals that all the land surrounding the hill is owned by one landlord under the care of the LCI chairman (identified as James). The hill was also said to contain no physical cultural values.



Plate 3: Goli hill (location of Goli tank) in the back ground

1.2.4 Baribu tank

Baribu tank will be situated in Baribu village, Okollo subcounty, Madi-Okollo district at E: 302773, N: 296284, H: 803m opposite Baribu Primary school. The site which is a wooded grassland is about 80 meters from Okollo-Rhino Camp Road. According to Mr. Serigyo Ondiya, a resident of Anyora village (neighboring village), Baribu tank site is owned Mr. Awudo Clement (a retired teacher). The project site is accessible and will not require fresh construction of access road

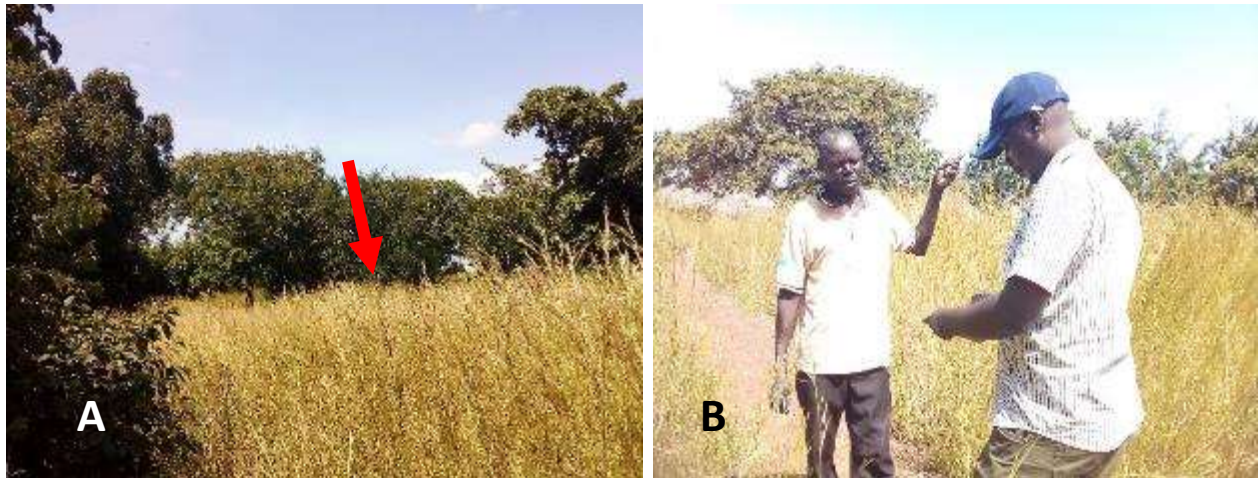


Plate 4: Location of Baribu tank (A) and ESIA team consults Mr. Serigyo Ondiya at project site (B)



Figure 3: Google Earth image showing the location of Baribu water tank

1.2.5 Anyiribu tank

The proposed Anyiribu tank site is a garden under farrow owned by Mr. Geoffrey Alija. Located at E: 283373, N:288726, H:966m in Kangu village, Anyiribu sub county, Madi Okollo district, the site is currently covered by shrubs and surrounded by a line of *Tectona grandis* trees. Access to the site will require opening up a fresh access road of about 30 meters from the nearby homestead in Anyiribu trading centre.



Plate 5: ASIA team consults Ms. Amichil Fortunate (AF) at Anyirbu tank site

1.2.6 Pawor tank

Pawor tank will be situated in Payira village, Pawor sub county, Madi Okollo district at E: 309722, N: 314197. H: 693. The site is currently a mixture of cassava, maize and simsim garden belonging to Mr. Ocaya Lore (Landlord). The site is adjacent to a telecommunication mast number 608699 belonging ATC. It is about 340 meters from Pawor trading center with a clear access road. According to Mr. Christopher Onyanji (neighbor), the access road was opened during the construction of the existing telecommunication mast.



Plate 6: Pawor tank site adjacent an existing telecommunication mast

1.2.7 Ndiriba tank

The Ndiriba Tank will be located at Ndiriba hill at E: 293542, N: 279213 in Ndiriba-Adabi village, Ocebu parish, Offaka sub county, Madi-Okollo district. Although Ndiriba hill is accessible using existing foot path, water transmission to the tank will require a direct and separate fresh access route of about 270 meters from Ndiriba-Patru-Uleppi Road. At the time of conducting ESIA, the project site was a savanna grassland surrounded by acacia-combretum woodland. The owner of the Ndiriba project site was not identified. Figure xx below present a google earth image showing the water distribution approach to the site.

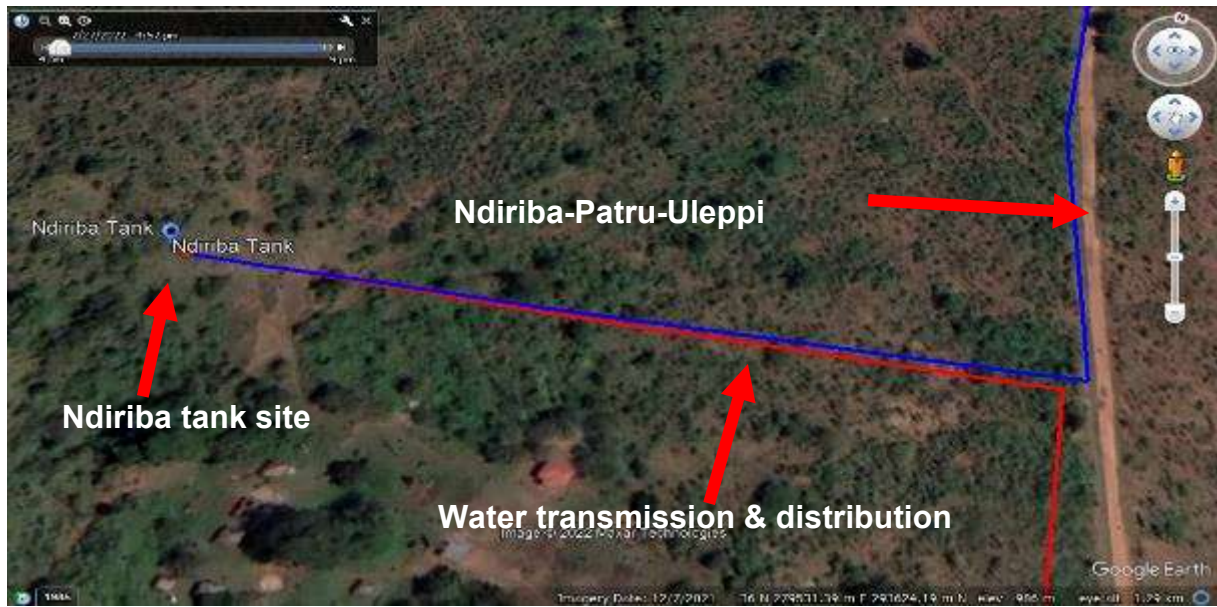


Figure 4: Google earth image showing the location of Ndiriba Tank

1.2.8 Ogoko tank

Ogoko tank will be located in Degia village, Ogoko Sub county, Madi-Okollo district at E: 321779, N: 311245, H: 673m. The project site is within the institutional land of Inde Technical School. At the time of conducting this ESIA, the site was an open area with clear access road. The site is about 360 meters from Ogoko-Rhino camp road.



Figure 5: Google Earth Image showing the location of Ogoko tank

1.3 Project justification

The purpose of this project is to increase sustainable access to safe water and basic sanitation in the benefiting districts especially those areas (villages and trading centers) along the proposed water network. The following benefits are expected to accrue from this project;

- i. Reduction in the prevalence rates of waterborne diseases, especially cholera, dysentery and diarrhea;
- ii. A significant reduction in health costs and time for collecting water which translate into substantial savings for rural households;
- iii. The easing of the burden of fetching water which is one of the most arduous tasks for women and young girls in the rural areas;
- iv. The development of income-generating activities for women given the free time accruing from the reduced burden of fetching water;
- v. An increase in the enrolment ratio, especially for girls, and in the female literacy rate;
- vi. The reduction in social conflicts related to water use;
- vii. The promotion of local governance and decentralization;
- viii. The efficient management and maintenance of water supply and sanitation facilities; and

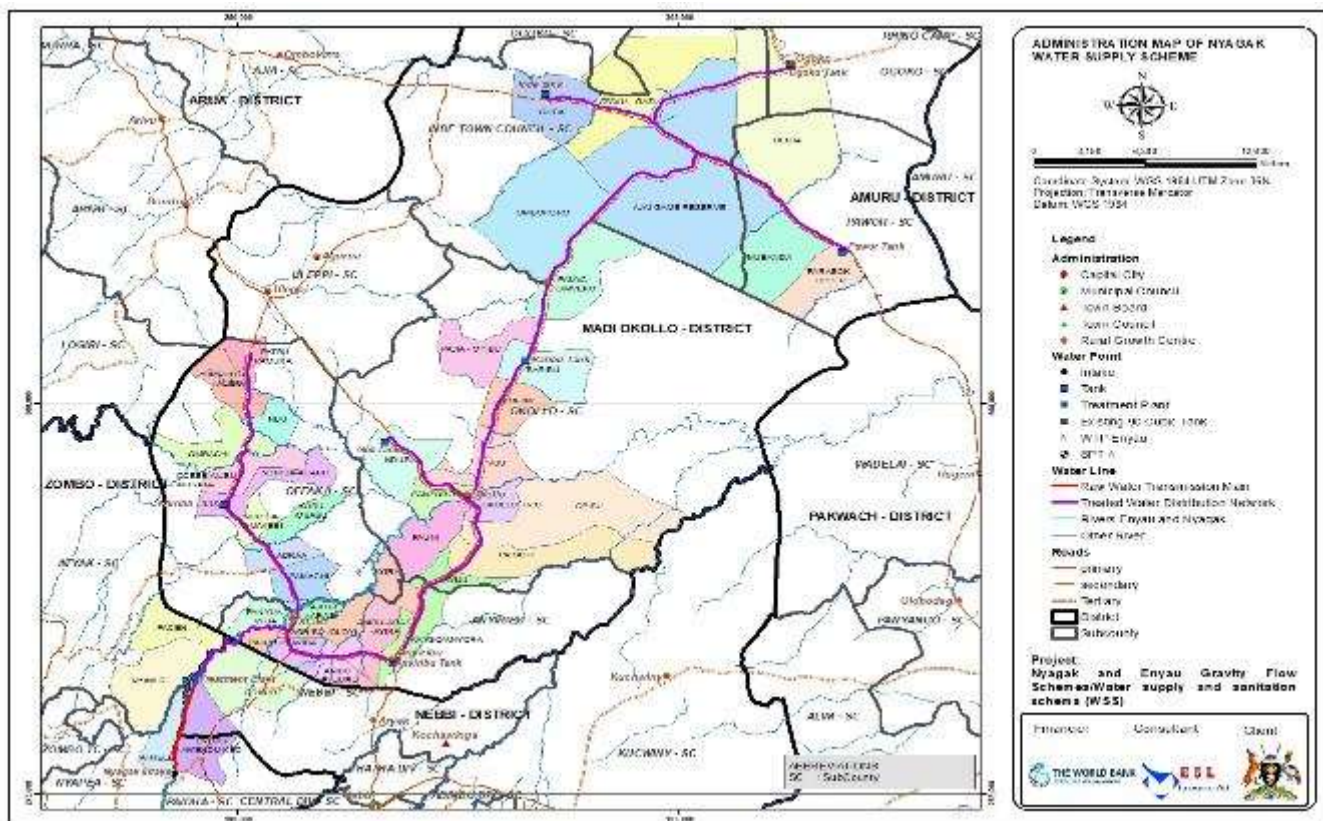


Figure 6: Administrative units affected by the Nyagak WSS

1.4 The need for Environmental Impact Assessment

The implementation of the Nyagak WSS Project will result in a number of environmental impacts that require an Environmental and Social Impact Assessment (ESIA). Furthermore, the fifth schedule of the National Environment Act No. 5 of 2019 as amended, lists such projects (Construction of large-scale gravitational water schemes of more than 1000 m³/day or where the ecosystem is fragile and sensitive in section 4(j) among those to be considered for environmental impact assessment.

Section 19 (3) of the National Environment Act No. 5 of 2019 as amended made an Environmental and social Impact Assessment mandatory for all projects or policies that may, are likely to or will have significant impacts on the environment so that adverse impacts can be identified, Avoided, reduced, mitigated or compensated for based on the mitigation hierarchy. Furthermore, the World Bank's OP 4.01 Environmental Assessment requires ESIA/ESMP to be undertaken for projects that are considered to pose negative environmental and social impacts.

Since the proposed project activities are likely to pose site specific environmental and social risks and impacts, ESIA is required as per OP 4.01 policy requirements. Therefore, this ESIA study seeks to ensure compliance of the project with applicable national and World Bank environmental and social safeguard policies, while also providing the overall framework for addressing social and environmental risks.

1.4.1 Purpose of the ESIA

- To investigate the likely impacts of the proposed project on the biophysical and social-economic environment and propose appropriate mitigation measures to avert or reduce such impacts.
- To promote environmental sustainability through identifying and implementing appropriate mitigation measures.
- To facilitate informed decision making by the Ministry of Water and Environment (Project Proponent), National Environment Management Authority (NEMA) and other Lead agencies and to set terms and conditions for the implementation of the water and sanitation project.
- To involve and engage stakeholders including communities in the project area in the decision-making process and also make them part of the project

1.5 Approach and Methodology

1.5.1 Overview

The study was preceded by internalization of the Terms of Reference and formulation of appropriate data collection tools. It assessed each of the activities of the project covering physical, biological, socio-economic (including occupation health and safety); and socio-

cultural environment as detailed herein. It determined and listed potential direct and indirect environmental impacts for each of the planned activities; evaluated and recommended mitigation measures for negative/adverse effects and enhancement measures for the positive impacts.

1.5.2 Literature Review

The ESIA study was partly undertaken by intensive literature review, using documents provided by the Developer and those from other sources such as, Feasibility study reports and design reports (MWE,2022) , Environmental and Social Management Framework (ESMF) for the Integrated Water Management and Development Project (MWE 2018), World Bank Safeguards policies, IFC Environmental Health and Safety Guidelines for Water and Sanitation Projects (WB 2018), and other documents provided by district staffs on project location such as District Development Plans For 2021, district state of environment and health reports among others. Other documents reviewed include relevant National Household survey reports (UBOS 2020), policies, regulations, legal framework relevant to the water and sanitation sector.

1.5.3 Stakeholders' consultations

Consultations with stakeholders constituted a major part of the ESIA methodology in information gathering. Rational data collection instruments were designed and centered mainly on the proposed water and sanitation project and other associated systems. Data on the potential environmental and social impacts and stakeholder perceptions, views and concerns were collected through focus group discussions (Plate 1.1), meetings and personal interviews with the target audience including but not limited to all communities in all the benefiting trading centers and villages along the Nyagak WSS in Zombo, Nebbi and Madi-Okollo district.

Emphasis was laid on environmental and social concerns expected in the process of laying transmission and distribution water pipes within the rest of project area, obligations of the various parties in mitigating the various impacts anticipated and the procedure for operating the water and sanitation project among others. Concerns were analyzed, documented and analysed in chapter 5 and other details in (Annex 1). All concerns and issues raised have been addressed in the environmental and social management plan.



Plate7: ESIA team consulting PAPs along the project area

1.5.4 Social economic baseline studies

1.5.4.1 Review of Literature

The review of literature was in equal measure about the use of secondary information. Prior to commencement of the study, was the review of literature and desk study of available baseline information from studies earlier collected and reviewed from the project area; including but not limited to relevant legal frameworks, project-specific information from MWE and the current district development plans and categorical reports. More particularly, this involved the review of the categories of Literature;

- a) District information (District Development Plans) for 2021,
- b) District statistics on population, health, literacy and poverty levels, 2020
- c) Uganda National Population and Housing census 2014
- d) The National Environment Act No.5, 2019
- e) The National Environment (Impact Assessment) Regulations, 2020

1.5.4.2 Field Surveys and Photographic records

After the review of relevant literature, field surveys were undertaken with the intention of getting acquainted with the project area, conducting stakeholder meetings with district and sub county officials and community members. This would eventually help to ground truth some of the information initially collected from secondary literature. Field surveys helped in correlating the information obtained from secondary sources and stakeholder consultation such as settlement patterns, housing typology, economic activities and transport.

During field surveys, information obtained through household surveys, interviews and focus group meetings was verified through direct observation by the study team. Observation was specifically aimed at assessing physical assets of people in affected areas, living conditions, settlement patterns, and capacity to diversify income, and social and economic networks. Where possible, observations were backed up by photographic records.

1.5.4.3 Questionnaire surveys

Questionnaire/socio-economic survey or household survey was considered a convenient method for collecting large amounts of data from respondents. This generated primary data which together with secondary data has been used to form the socioeconomic baseline

1.5.4.3.1 Study design

The study employed a cross-sectional study design. The main method of socioeconomic data collection was the questionnaire. A number of variables were assessed within the questionnaire which were clustered under major themes that included; household income, expenditure, access to water, health services, social networks, food and nutrition energy sources, housing conditions, transport, vulnerability and land ownership.

1.5.4.3.2 Selection of the sample size

The areas traversed by the project are generally sparsely populated save for Okollo and Ide Town councils. A substantial part is occupied by Ajai Game reserve, therefore the survey was limited to sections with settlements.

The simple random sampling technique was used which accorded all households along the line equal chances of being selected. Household heads were selected as the major respondents in this survey since they have sufficient and required information. In cases where the Household (HH) head was absent, their spouses were considered. In instances where both the household head and spouse were not available, then any other adult household member was selected.

Based on the 2014 NPHC all the eight directly and indirectly affected sub counties (Anyiribu, Offaka, Ogoko, Okollo, Pawor, Paidha, Nyapea and Nebbi) had a population of 134,832 and a household size of 4.9 which translated into 27,517 households

The Raosoft (2004) formula for sample size calculation was used to estimate the household sample size for the study. With the total household of 27,517 along the transmission line, the formula recommends a minimum sample size of 379 households, for a confidence level of 95 percent and a margin of error of 5%. The sample size n and the margin of error E are derived by:

$$X = Z \left(\frac{C}{100} \right)^2 r(100 - r)$$

$$n = \frac{Nx}{((N - 1)E^2 + x)}$$

$$E = \sqrt{\left[\frac{(N - n)x}{n(N - 1)} \right]}$$

Where

N is the population size (27,517),

r is the fraction of the responses of interest, and

Z = is the critical value for the confidence level c.

A total of 330 respondents were administered with a structured questionnaire in five of the eight sub counties affected by the project. This represented an 87% response rate, which was considered sufficient because the population from which the sample was drawn considered the respective sub county total population although in reality not entire populations within these sub counties were likely to be affected. Villages along the water lines in these sub counties were selected using the lottery method but their number was limited to two villages for each of these sub counties.

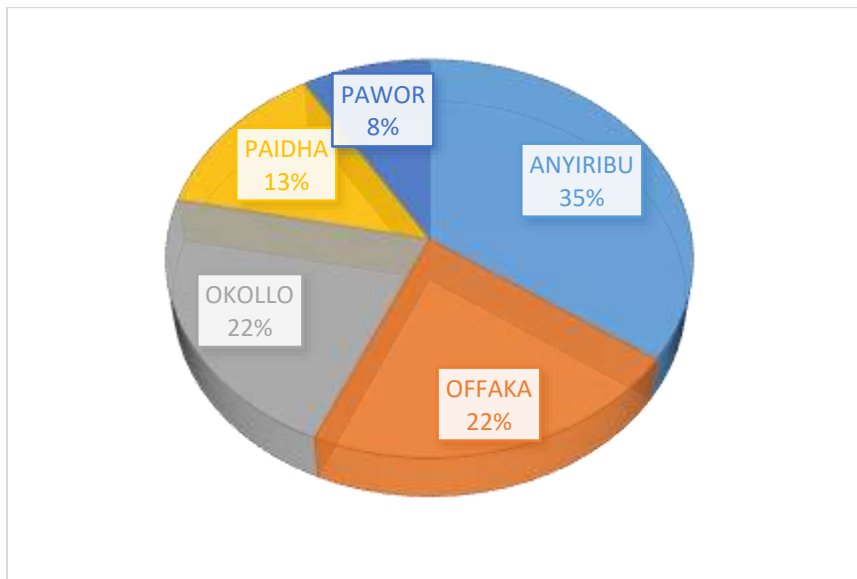


Figure 7: Showing Distribution of Respondents by Sub county (n=330)

1.5.4.3.3 Sampling procedure for Qualitative data collection

Purposive sampling was used to select participants with relevant information to this study. Purposive sampling was the method of choice because it allows a selection of relevant information-rich participants.

Table 1: Categories and sizes of the samples selected

Hierarchy	Category of Respondents	Details of Stakeholders	Sampling method	Sample size
National Level	Lead Agencies	NEMA, UWA, NFA, MWE, OPM and DWRM,	Purposive	6
District Level	Zombo, Nebbi and Madi Okollo, Districts Local Government	Different Departments of the respective District Local Government (District Chief Administrative Officer (CAO) District Environment Officer (DEO), District Natural Resource Officer (DNRO), District Physical Planner (DPP), District Community Development Officer (DCDO).)	Purposive	3
Sub county level	Anyiribu, Offaka, Okollo, Pawor, Paidha	Sub-county Chiefs, Community Development Officers, Parish chiefs and LC III Chairpersons and area council representatives	Purposive	5
Local	Households	Households in the sub counties with project infrastructure.	Simple random sampling	330

1.5.4.4 Key Informant Interviews

Key informant interviews were conducted to gather information from leaders at National, District, Sub-county and community levels. The sample at the district level included; Chief Administrative Officer, District Natural Resources Officer, District Environment Officer, District Forestry Officer, District Community Development Officer, District Water Officers, District Physical Planner and the District Chairperson. At sub county level key informants included, Sub county chief, Community Development Officer and L.C III chairperson. At village level, L.C I chairpersons were the center of focus and Government authorities including Uganda wildlife Authority (UWA), National Forestry Authority (NFA), OPM. These also included interviews with NGOs (Water Mission, World Vision and UNHCR)

1.5.4.4.1 Focus Group Discussion

This technique involved a small group of respondents (usually 6-10 respondents) who were interviewed together in a common location. The interviewer led the discussion and ensured that every person had an opportunity to respond. Focus groups allow deeper examination of complex issues than other forms of survey methods. Seven focus group discussions were held with sub county leaders each involving an average of 7 people making a total of about

49 FGD participants. Focus group discussions were held with sub counties of Anyiribu, Offaka, Ogoko, Okollo, Pawor, Paidha and Nebbi. The sub-county sample included: Sub-county Chiefs, Community Development Officers, Parish chiefs, LC III Chairpersons and area council representatives of parishes traversed by the water pipes.

1.5.4.4.2 Structured interviews

Primary data was collected by interviewing sampled members of the study population. The structured interview method was used to collect household data with the aid of a semi-structured questionnaire.

1.5.4.5 Stakeholder identification, consultations and Disclosure

Consultation with key stakeholders is a continuous process that was carried out throughout the ESIA process. During the scoping phase a stakeholder mapping exercise was undertaken to identify Interested and Affected Parties (I&APs) to the project. Each individual stakeholder or group of stakeholders identified had particular sets of priorities and objectives specific to the project.

Relevant and adequate project information was provided to stakeholders to enable them to understand project risks, impacts and opportunities. Stakeholder consultation aimed at:

- Generating understanding of the project
- Understanding local expectations of the project
- Characterizing potential environmental, socio-economic impacts
- Obtaining consensus on mitigation options

To plan stakeholder involvement, it was essential to begin with a master list of people/groups that could possibly have an interest in the project. A list of stakeholders consulted was developed and updated, as required at each stage of the study, to reflect changing developments and the possibility of identifying new stakeholders. Therefore, stakeholder consultations were very significant in highlighting the environmental, safety and potential socio-economic concerns/ impacts that could be associated with the implementation of the proposed Nyagak gravity flow water scheme project. The consultations were also important in determining the appropriate mitigation measures and views raised were considered and incorporated into the ESIA report.

Consultations were conducted with the Madi Okollo, Zombo and Nebbi district local governments, Ogoko, Offaka, Paidha, Nyapea, Atyaka and Nebbi. Consultations were also held with all the 44 affected villages.

Based on proposed wayleave corridor, the PAPs were identified with the assistance of the Chairpersons Local Council one (LC-1). At national level, consultations were conducted with the National Environment Management Authority, Uganda Wildlife Authority, National Forestry Authority, Ministry of Gender, Labour and Social Development, Ministry of Water and Environment as well as the Office of the Prime Minister, NGOs like Water mission, UNHCR and World Vision.

In these meetings, key environmental and social issues to consider while choosing project location were highlighted from each stakeholder's point of view. Data on stakeholder perceptions, views and concerns was collected through focus group discussions, meetings and personal interviews with the target audience/communities that likely to be affected by the water and sanitation project in all the villages of the proposed project areas. Emphasis during engagements was laid on environmental and social concerns expected from project activities, obligations of the various parties in mitigating the various impacts anticipated and the procedure for operating the water and sanitation project among others. This was aimed at ensuring that the communities give their views from an informed point. Concerns raised were documented, analysed, and addressed in the environment management plan.

1.5.4.6 Direct observation

Participant observation was vital in directly corroborating the information. Most importantly, direct observation was vital in verifying people's livelihood (e.g. livelihood activities), nature of structures and mode of transport and evidence of social economic activities carried out by people in the district. This method draws on the direct evidence of the eye to witness events at first hand. And it is based on the premise that, for certain purposes, it is best to observe what actually happens (Denscombe, 1998). Direct observation method too, was complimented by photography through which observed events and features were recorded. Photographs provided the qualitative physical evidence of what actually exists.

Adhoc and unstructured observations were made throughout the data collection exercise during the visits to the project areas. Observations of social - economic activities in the project area, physical environmental set up of the project area were done to get firsthand information to prompt additional probing for more information on the physical, social-economic dynamics of the project area.

1.5.4.6.1 Data quality control measures

The sociologist coordinated and supervised the entire process of the socio-economic survey by guiding the data collection process. Recruitment and selection of the research assistant and field assistants was done emphasizing minimum academic qualifications, experience, socio-cultural compatibility and gender balance.

The RA and field assistants were recruited targeting social scientists with knowledge and experience in conducting socio-economic and behavioural studies with ability to use both qualitative and quantitative methods as well as able to speak the local languages. Madi and Alur were the main languages in the project area. The research team met on a daily basis to review the day's field performance, compare notes and to plan for the next day. This was aimed at enhancing reliability and consistency of the collected data.

1.5.4.7 Data analysis

1.5.4.7.1 Quantitative Data

Data was regularly cleaned before entry. Quantitative data was entered and analysed using Microsoft excel software where frequency and percentage tables as well as bar charts were generated and used to present the quantitative results.

1.5.4.7.2 Qualitative Data

Qualitative data was transcribed and arranged according to existing and emerging themes through content analysis methods. The qualitative analysis largely followed the questions and themes of the study within the interviews and FGD guide.

1.5.4.8 Ethical considerations

Consent to conduct the ESIS in the respective districts was sought from relevant district, sub county and community leaders. All respondents in the study were informed that participation in the study was voluntary and all information collected would be used to strictly inform the planning process of the proposed project. Though the respondents were informed about anonymity, none of them preferred to be anonymous.

1.5.5 Physical measurement and assessment of environmental parameters

The ESIA team gathered relevant baseline data on biophysical and socio-economic environmental parameters that are in the project area. The objective was to record empirical evidence on the status quo so as to facilitate future monitoring of project activities on the environment. Below are some of the parameters that were investigated;

1.5.5.1 Baseline noise and air quality measurement

Baseline noise conditions were investigated at various sections of the project site using an Extech 407730 Sound Level Meter. The current noise conditions are necessary for monitoring future impacts of the project activities on the neighboring communities, the safety and health of the workers and the environment as a whole. Findings on noise and air quality are presented in sections 4.1.7 respectively.

The Particulate matter sport assessment was carried out at selected points of the transmission corridor for five minutes at each point to check the extent of particulate matter emissions at various receptors using a Casella cell, 712.Micro Dust pro Machine. This instrument operates by using a modulated beam of infra-red light which is projected into a measurement chamber. The instrument offers four real time measurement ranges and for purposes of this report and sensitivity of the project, a range of 0.001-2.500 mg/m was used. Other ranges that can be adopted using the same machine include 0.01 to 25.00 mg/m³, 0.1 to 250.0mg/m³ and 1 to 2500mg/m³.



Plate 8: ESIS team conducting a baseline noise assessment along sections of the project sites

1.5.5.2 Biodiversity inventories

The ESIA team conducted biodiversity inventories and documented the conservation status of flora and fauna within the project site and project area (farmlands, forest reserves and homesteads) and details are presented in chapter 4.



Plate 9: ESIA team conducting inventory on flora at various project sites

1.5.5.3 Mapping and Photography

Data in respect of the project site was captured using Global Positioning Systems (GPS), and maps were processed and generated using Geographic Information Systems (GIS). Photographs of vital importance and concern on the site’s status quo, stakeholders’ meetings and the surrounding environment were taken using digital cameras to record empirical evidence as presented in the various sections of the report.

1.5.5.4 Visual Observation

The consultant's visual and intellectual judgment was also used to influence the kind of mitigation measures that have been suggested in this report.

1.5.5.5 Impact screening

Checklists structured on the basis of environmental components in the case of the biophysical environment, and of socio-economic concerns in the case of activities, man-made structures, institutions or likely demographic-economic changes by the proposed project were used for the preliminary screening of the major impacts. Both National (As presented by NEMA) and international EIA checklist were used. Major impacts were defined for the selected aspects of the biophysical and socio-economic environment.

1.5.5.6 Assessment, evaluation and analysis of potential adverse impacts

Assessment of direct and indirect; immediate and long term; permanent and temporary impacts of the project was done according to their nature and availability of adequate data to enable predictive analysis. The assessment sought to:

- Distinguish between impacts that are of most concern (and therefore need to be avoided, mitigated or compensated) and those that are considered less important;
- Organize measures of significance in a way that allows a comparison of alternative project sitting/locations, and
- Facilitate communication of results to the concerned stakeholders and the Developer for appropriate decisions and implementation strategy.

1.5.6 Report writing

Findings of the study, discussion and recommendations were then compiled and presented in this report.

1.5.7 Structure of the Environmental Impact Statement

The structure of this EIS was derived from the TOR for EIA presented and approved by NEMA. The main sections are: Executive Summary; Introduction; Project description; Policy, Legal and Institutional Framework; Description of the environment (Bio-physical and Social economic); Public Consultation and Disclosure, Analyses of alternatives; Environmental impacts & mitigation measures; Environmental Management Plan; Recommendations & Summary conclusions; and Appendices

2 PROJECT DESCRIPTION

2.1 Introduction

The Ministry of Water & Environment through The Rural Water Supply and Sanitation sub-sector intends to construct water supply and sanitation systems to improve the prevailing undesired water supply situation in selected areas of Zombo, Madi-Okollo and Nebbi district using water from river Nyagak.

The proposed project shall comprise of surface water abstraction, treatment, transmission main to storage reservoir, primary and secondary distribution systems as well as yard connections figure 2.1 presents the process flow of Nyagak GFS water supply system. The project will also support solar power system for each scheme. Each scheme shall also have public sanitation facilities and some water office auxiliary facilities such as workers camp and materials, storage yards shall also be established. In addition, the project shall support water source/catchment protection activities to preserve the quantity and quality of the water at the planned water sources.

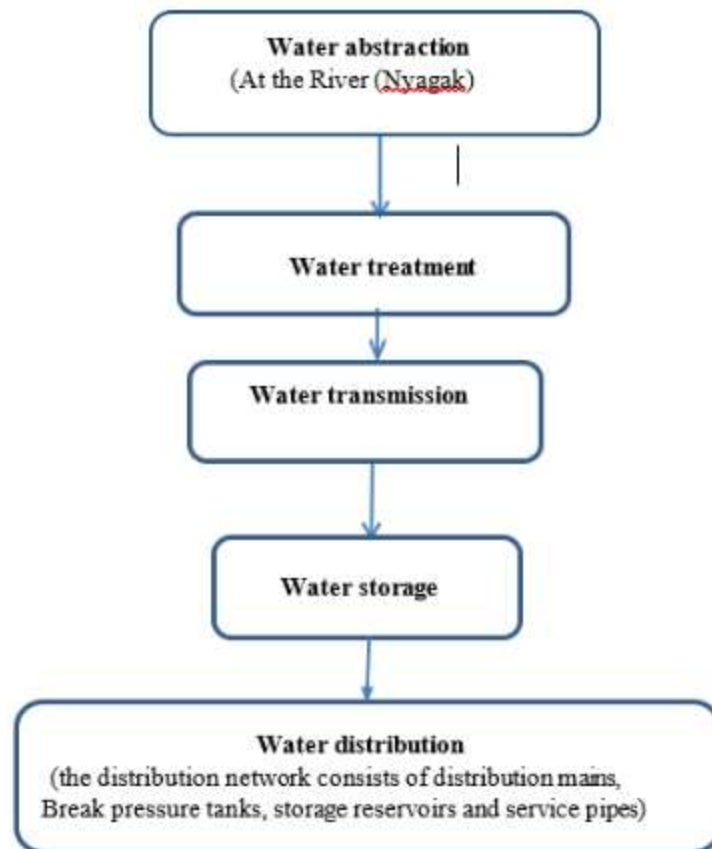


Figure 8: The Schematic process diagram of Nyagak GFS water supply system

2.2 Design Overview – Water Supply

The current designed water supply scheme is entirely gravity fed comprising an intake on River Nyagak abstracting 3,009m³/day which 0.0348 m³/s. According to the feasibility study report prepared by Alliance Consultants Ltd, the design considered the technical, social, water resources, environmental and financial considerations.

The flows for Nyagak River are as follows;

- R. Nyagak - Q95 flow – 2.3 m³/s
- Mean discharge - 5.04 m³/s
 - Minimum discharge – 2.44 m³/s
 - Maximum discharge – 8.2 m³/s

The scheme components shall include; an intake, raw water main, water treatment plant, transmission mains, reservoirs and distribution networks. The scheme shall also include water office and sanitation facilities. The design for each component is described as follows;

- Intake with diversion weir length of 30m long across the river and finished at an elevation 100mm above the intake chamber inlet wall/ weir. Intake chamber weir length = 1m. The inlet chamber depth shall be 0.185m with an abstraction of 0.115m³/s
- Coarse and fine screens of spacing 30mm and 10mm between bars, respectively
- Raw water transmission main of 6.7km of 300mm pipe size
- Two baffled tanks with 5 compartments each of 1.1m width, effective depth 2.7m and length 2.37m
- Two horizontal flow tanks each of width 4.65m and length 13.95m
- Two filter beds each 2.9x2.9m
- Backwash water pumped from a clear well to the elevated tank of capacity 50m³
- A clear tank 5.3m wide, 2m deep and 6.3m long
- Chlorine dosing done through OD 20mm pipe into the tank while alum dosing will be done in the flocculators
- 76 kms of primary distribution network (27km of OD160mm-OD63mm Offaka-Anyiribu, 10km of OD90mm-OD50mm Goli-Okollo, 20km of OD160mm Pawor, 7km of OD160mm Inde and 12 km of 110mm Ogoko)
- Six reservoir tanks of various sizes as in Table 2.2(a)

2.2.1 Treated water transmission network

The total length of Treated Water Transmission Network for Nyagak Water Supply System was approximated at 95,357meters as presented in table 2.1 below.

Table 2.1: Summary of Treated Water Transmission Network for Nyagak Water Supply System

No	Section	Pipe Description	Length (m)
1	Water treatment plant to junction Offaka	DN 250mm, PN 20 steel pipe	7,103
2	Junction Offaka to Offaka reservoir	DN 150mm, PN 25 steel pipe	11,650
3	Junction Offaka to Anyiribu	DN 200mm, PN 25 steel pipe	6,122

No	Section	Pipe Description	Length (m)
4	Anyiribu to BPT towards Inde	DN 200mm, PN 40 steel pipe	22,556
5	BPT towards Inde to Junction Pawor-Inde	DN 200mm, PN 25 steel pipe	18,466
6	Junction Okollo to Goli reservoir	DN 80mm, PN 40 steel pipe	6,043
7	Junction to Pawor reservoir	DN 150mm, PN 25 steel pipe	10,883
8	Junction to Junction Ogoko towards Inde reservoir	DN 150mm, PN 25 steel pipe	3,135
9	Junction to Inde reservoir	DN 125mm, PN 25 steel pipe	6,756
10	Junction to Ogoko reservoir	DN 80mm, PN 20 steel pipe	2,643
	Total		95,357

2.2.2 Storage tanks

The design consideration for Nyagak Water Supply System consists of six storage tanks targeting sub-counties of Offaka, Anyiribu, Okollo, Ogoko and Pawor as presented in table 2.2 below. Reservoir capacities shall be 30% of the maximum day water demand (6pm to 6am) considering ideal consumption patterns in areas where piped water supply systems exist, indicated and the operational time of 24 hours.

Table 2.2(a): Reservoirs for River Nyagak water supply system

No	Tank	Coverage
1	185m ³ elevated steel tank at Waki in Offaka sub county	Part of Elibu and Adra parishes in Offaka sub county; part of Ombachi parish in Anyiribu Sub County
2	50m ³ elevated steel tank at Anyiribu in Anyiribu sub county	Part of Ombachi and Omua parishes in Anyiribu Sub County; part of Okollo parish in Okollo sub county
3	50m ³ elevated steel tank at Goli in Okollo sub county	Part of Okollo parish in Okollo sub county
4	120m ³ elevated steel tank at Inde in Ogoko sub county	Part of Ayavu parish in Ogoko sub county
5	175m ³ elevated steel tank at Pawor in Pawor sub county	Part of Pawor sub county
6	45m ³ elevated steel tank at Ogoko in Ogoko sub county	Part of Olali parish in Ogoko sub county

The coordinates of key project features are presented in table 2.2(b) below

Table 2.2(b): Coordinates of the key project sites and features

S/No	Project Feature	Coordinates in UTM-WGS 84	
		Easting (meters)	Northing (Metres)
1	Intake Point	276323	276425
2	Water Treatment Plant	282301	277624
3	Ndiriba Tank	293542	279212
4	Anyiribu Tank	283371	288728
5	Goli Tank	297541	288315
6	Baribu Tank	302771	296287

7	Pawor Tank	309722	314197
8	IndeTank	319852	297426
9	Ogoko Tank	321776	311248

2.2.3 Proposed Sanitation/Public Toilet Facilities/Water Office

Public water borne toilet facilities shall be constructed at markets and parks. Madi-Okollo district administration was not able to agree on a specific location but promised to discuss this further and would revert to MWE at later date on where to locate the public toilet. For Nyagak water supply systems, two 9-stance water borne toilets shall be constructed. The toilet facilities shall have a section for female users and a section for male users. The section for female users shall comprise 3 stances plus 1 stance for persons with disabilities while the section for male users shall comprise 2 stances plus 1 stance for persons with disabilities plus urinals. In addition, the project shall construct a water office which will be used for managing the WSS.

2.3 Detailed Design of the Intake and Treatment Plant

The proposed water treatment plant will have a conventional design. It will consist of several treatment processes. These include: (1) Collection; (2) Screening; (3) Chemical Addition; (4) Coagulation and Flocculation; (5) Sedimentation and Clarification; (6) Filtration; (7) Disinfection; (8) Storage; (9) and Distribution.

Collection – The source water for the water treatment plant is River Nyagak. An intake wire will divert of the river water through coarse and fine screens to a water pipeline which will transport the water to the treatment plant.

Screening and Straining: –

Water from an open source like River Nyagak contains varying amounts of suspended and dissolved materials. This material may include turbidity, Colour, fish, plants, trash, etc. The material may be organic or inorganic, suspended or dissolved, inert or biologically active, and vary in size from colloidal to a tree trunk. Some of these larger items can impede equipment in the treatment process, such as a tree limb getting stuck in a water pump impeller. Therefore, the first process in conventional water treatment is to screen or strain out the larger items. This is accomplished using a large metal screen called a bar-screen, which is placed in front of the water source intake. Large items are trapped on the screen as the water passes through it. These screens shall routinely be raked or cleaned off.

Chemical Addition– Once the pre-screened source water is received into the treatment plant, chemicals are added to help make the suspended particles that are floating in the water clump together to form a heavier and larger gelatinous particle called floc. In this process, a chemical is added that reacts with the natural alkalinity in solution to form an insoluble

precipitate. These chemicals are called coagulants. The most common coagulants that will be used for this project is alum.

Coagulation and Flocculation- A rapid mix unit shall be used where the coagulant is added to the water to provide a very quick and thorough mixing. The water mixing is then slowed to allow the water to come in contact with the forming floc and allow it to increase in size. The continued mixing must be gentle to allow the floc to grow and gain weight, but fast enough to keep it in suspension until you are ready for it to settle in the clarifiers. The process of adding a chemical to cause the suspended material to “clump” into larger particles is called flocculation or coagulation. The treatment unit where coagulation and flocculation are performed is called the “flocculator”.

Sedimentation and Clarification– Once the flocculation process is complete, the water then passes over the weir in the flocculator and travels to the centre of the clarifier, or sedimentation basin. Here, the water makes its way from the centre of the clarifier to the saw tooth weir at the perimeter of the unit. As the water makes its way towards the weir, the large floc particles are allowed to settle out to the bottom of the clarifier. The reason clarification occurs before filtration is so the majority of suspended material can be removed prior to filtration, which avoids overloading the filters and thus allowing much more water to be filtered before the filters must be backwashed.

Filtration – Clarified water enters the filters from the top. Gravity pulls the water down through the filters where it is collected in a drain system at the bottom of the unit. There are many different types of materials (media) used in filters. The most common being sand and gravel.

Disinfection – Once the water has gone through the filtration process, it is about as clear and clean as it can get. However, there may still be bacteria and viruses remaining. To ensure these are destroyed, there must be a disinfection process employed. The disinfection process to be used for this project is chlorination. Chlorine is added to the water in an amount to ensure all microorganisms are destroyed.

Storage – Once the disinfection process is complete, the water is stored. Elevated storage tanks that provide adequate water availability in the event of emergencies shall be used.

Figure 2.2 below shows a schematic diagram of a conventional surface convention water treatment plant

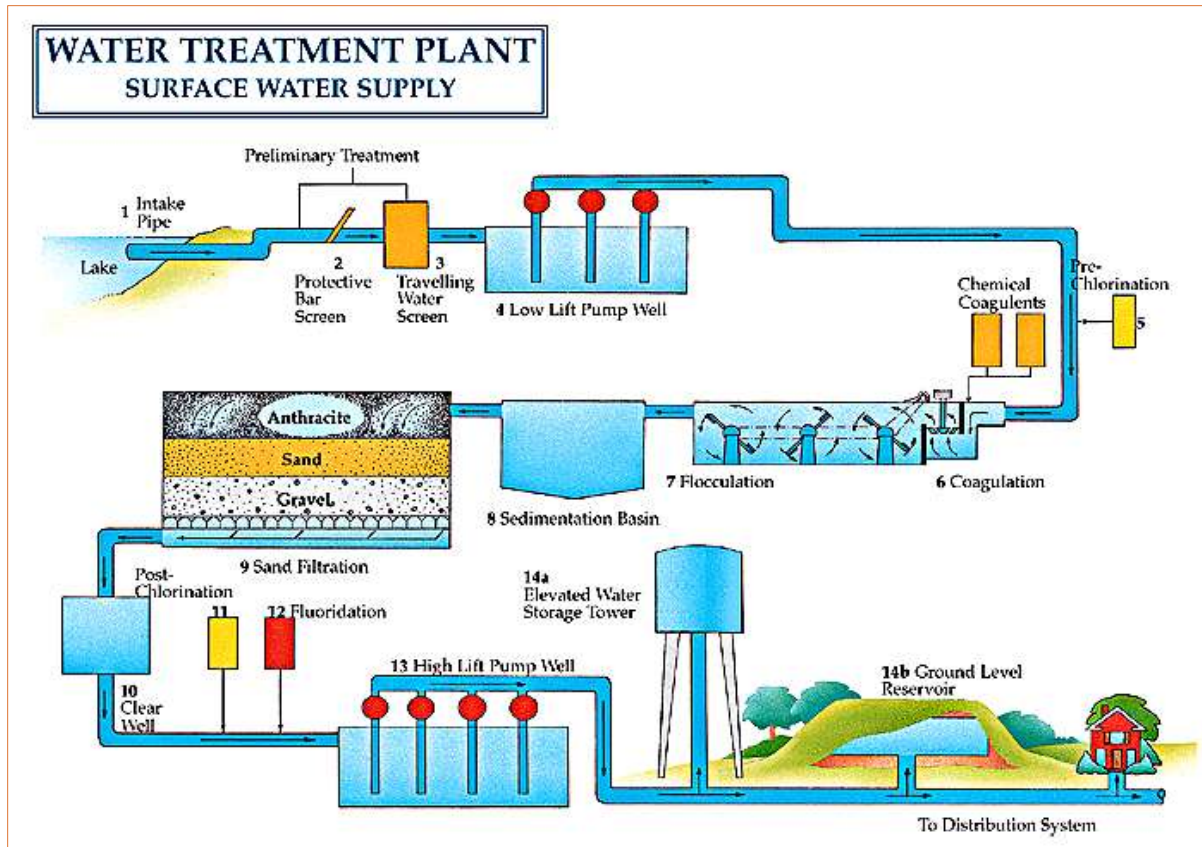


Figure 10: Schematic flow of a typical conventional surface water treatment plant

2.4 Project activities

2.4.1 Detailed design stage

The detailed design will inform the specific construction requirements for the project infrastructure. The specific activities will include but not limited to the ones outlined below;

- Detailed analysis of the project drawings and document review from the feasibility study;
- Surveying the intake point and the specific features in the catchment area and ensuring all controls are in place.
- Survey of the water treatment plant site, the topography, elevation and specific environmental features and ensuring all land requirements are available.
- Survey of the transmission and distribution lines and ensuring all sites are available and usable.
- Survey of sites of the reservoir tanks and break pressure tanks and ensuring all sites are available and usable.
- Survey of sanitary facilities sites in institutions and selected sites for public sanitary facilities and ensuring all stakeholders are in the know.
- Identification and involvement of all Project Affected Persons and beneficiaries along the project lines.

- Stakeholder involvement and consultation about the project works with both government institutions, NGOs and private sector and ensuring all parties are on board.

2.4.2 Construction stage

The construction phase will aim to put in place the following infrastructure or project components;

- Intake weir
- Raw water main
- Treatment plant site works (clearing, excavation and leveling)
- Water Treatment plant components (flocculators, clarifiers, Rapid Sand filters, clear water well, Sludge Drying Beds, Chemical house, backwash Pumping house, Backwash tank, Plant attendants house, Staff Quarters)
- Solar power system at the treatment plant
- Main water transmission lines
- Primary Distribution lines
- Six Reservoir tanks
- Two public toilets
- A water office

Construction and setting up of the above project components shall involve processes such as site clearing, Site excavation, water diversion at the intake, building of project structures (civil works), fencing of project structures, manhole constructions, pipe laying, and any other related activities. The materials and requirements for project construction will include but not limited to the following;

- Manual excavation equipment
- Site clearing and excavation machinery (bull dozers, excavators, compactor)
- Concrete and its ancillaries
- Iron pipes (steel pipes with spigot and socket type flexible joints) of various nominal diameters
- Valves and penstocks
- Plastic pipes and their specified nominal diameter
- Pipework fittings (steel fittings, bends, junctions, adaptors, tapers)
- Fencing of scheme structures (Angle Iron post and Wire galvanized chain-link fence)
- Painting (High gloss oil paint and emulsion paint)
- Damp proof (damp proof, rendering, roofing, protective layers)
- Solar power system (Solar panels, Inverter charger, Smart solar Maximum Power Point Tracking, Gel type lead acid maintenance free batteries, Solar charge controller, Battery storage rack, Combiner box, solar AC fuses, Solar DC fuses, Switches)

- Steel tanks and their specified volumes (for the backwash tank and reservoir tanks)

2.5 Other considerations for the Nyagak WSS

2.5.1 Service connections

The project shall be executed in the districts of Zombo, Nebbi and Madi-Okollo. The project area is approximately 1,324km² covering Okollo, Anyiribu, Ogoko, Pawor and Offaka sub counties in Madi-Okollo district, which was curved out of Arua district. R. Nyagak was established to have adequate water to meet the water requirement for the projected population of 80,655 in the ultimate year 2043. Assuming an average house hold population of 4.6 individuals, this translates to 10,577 households expected to benefit at the maximum supply capacity of the water scheme.

2.5.2 Land requirements

The project will require land to host project infrastructure. According to the design consultant, pipelines are to be laid along roads and within road reserves, except for raw water mains and about 8.8km of Nyagak transmission mains which run cross country through bushes, thickets and possibly some farmland. A working corridor of 3m in width of the water project along the pipelines is anticipated. Working corridors will be restored after completion of work, repossessed by the respective owners. Although the design consultant does not anticipate land take for pipelines, it's better to assume that land take will be mandatory for all pipeline.

Total land requirements for the Nyagak WSS have been estimated at **160.017 acres**. However, the project case scenario is that the transmission main and primary distribution network will follow road reserve hence actual land required for the project is **8 acres**. This excludes land requirements for access road construction which will be determined by the contractor and based on his approach to the assignment. Details of various land takes are presented in table 2.3 below.

Table 2.3: Land requirements for Nyagak WSS

Scheme	Component	Dimensions		AREA		
		Length	Width	m ²	Acres	Hectares
Nyagak	Intake Works			1750	0.432	0.175
	Treatment Plant			10550	2.61	1.055
	Ndiriba	20	20	400	0.1	0.04
	Anyiribu	15	15	225	0.056	0.0225
	Goli	15	15	225	0.056	0.0225
	Baribu	10	10	100	0.025	0.01
	Pawor	15	15	225	0.056	0.0225
	Inde	15	15	225	0.056	0.0225
	Ogoko	15	15	225	0.056	0.0225
	Total			13925	3.447	1.3925

Land requirements for the raw water mains, transmission and primary distribution assuming a width of 3 meters				
Scheme	Component	Details	Length, km	Land need (acres)
Nyagak	Raw Water Mains	DN 300, DN 250	6.3	4.67
	Transmission Mains	DN300 – OD 90	105	77.8
	Primary Distribution Mains	OD 200 – OD 60	100	74.1
	Total		211.3	156.57
Grand total land requirements for all infrastructure (acres)				160.017

Note: Transmission mains and primary distribution mains to follow road reserve hence no need for land acquisition since its public land. Therefore, actual land to be acquired is approximately 8 acres

2.5.3 Energy requirements

The daily energy needs for the Nyagak water supply scheme has been estimated at 30kWh. This power will be consumed mainly at the Water treatment plant to run the water treatment processes. The major source of power will be solar systems which will be installed as part of the project but may be supplemented by a standby generator on site. In future, it may be cheaper and more reliable to extend hydroelectricity power to the site.

2.5.4 Labour requirements

2.5.4.1 Overview

For the proposed Nyagak water and sanitation project, the number of staffs required during construction could include; project managers, supervisors, and other technical categories and unskilled workers who shall be recruited locally. Semi-skilled and unskilled workers will be trained by supervisors prior to the commencement of construction. Local people will be recruited mainly as unskilled laborers from the villages traversed by the water transmission and distribution-line, where possible. On average, an estimated 50-100 people are anticipated to constitute the workforce on the project. While in many cases the workers will arrive at the site on foot, some pool transport can be provided as necessary to bring workers to the project sites. Expatriate staff will be housed in existing accommodation preferably, modest private houses which can be rented by the expatriates within the nearby towns or trading centers in the project areas of Nebbi town, Anyiribu, Pawor and Madi-Okollo Town Council. The entire recruitment process for the workers will be managed by the contractors in accordance with Ugandan labour laws.

2.5.4.2 Other facilities

The projects implementation will be supported by auxiliary facilities. The location of the auxiliary facilities has not been known at this stage because they are supposed to be identified by the contractor. Therefore, this ESIA report does not cover the auxiliary facilities

in details. The Contractor shall be required to undertake individual ESIA's for the auxiliary facilities and acquire approvals from NEMA and clearance from MWE before construction activities begin.

2.5.4.3 Worker's accommodation

Since the majority of the workers will be casual laborers and who will be recruited from along project sites and hence commuting from home, the project will not require construction of workers camps. However, few technical workers (10-20 people) will be housed in rented houses in the project areas. However, should the contractor prefer to construct a workers' camps, s/he shall acquire land in accordance with the national laws and secure all relevant permits.

The Contractor shall also prepare site specific ESMP that will be approved by the client and subsequently by the NEMA. The selection of the workers camp location shall be in line with the national environmental and social impact management laws as well as the World Bank safeguards requirements. The proposed site shall be subjected to environmental and social screening and impact assessment. The contractor shall consider the following factors while selecting a site for the workers' camp

- a) The land use of the area: The Contractor should select a site that is not in a built-up area, off the fragile eco-systems, off the protected areas, off the social gathering points like churches, schools, market etc.; and the site must not be on land that is under cultivation.
- b) Camps will be located at least 500 m from any residential clusters or houses.
- c) Access: The site should be easily accessed so that it negates the need to construct access roads.
- d) The safety and security of the personnel and materials
- e) Topography: The site should be on a gentle hilly or relatively flat area. The site should never be in a valley which might interfere with run-off flow.
- f) The site must be in proximity of the project area.

2.5.4.4 Equipment and Materials storage yard & other auxiliary facilities

The project will require a storage yard for both materials and the equipment. The yard shall be put in a place that is secure with barren land where possible. Other auxiliary facilities may include burrow pits for murram extraction especially during access road constriction. The selection of such areas will be done in close collaboration with the local leadership. The location of the auxiliary facilities has not been known at this stage because they are supposed to be identified by the contractor. Therefore, this ESIA report does not cover the auxiliary facilities in details. The Contractor shall be required to undertake individual ESIA's for the auxiliary facilities and acquire approvals from NEMA and clearance from MWE before construction activities begin.

2.5.5 Office and storage building

A building to house offices, general stores, chemical (Coagulants/flocculants -Aluminum Sulphates and disinfectants -Chlorine) stores, chemical mixing and dosing tanks as well as a water quality analysis laboratory will be constructed. The location will be identified later during design stage. Equipment and tools that are expected to be supplied for the running of the Water Treatment Plant (WTP) as well as equipping the water office include the following;

- WTP office equipment
- Town water office equipment
- Workshop Equipment
- Laboratory Equipment
- M&E tools
- Chemical equipment and Chemicals

2.5.6 General access roads to the water transmission and distribution routes

The construction and installation of the entire 6.7km raw water transmission main infrastructure will require establishment of fresh access roads to these sites. Similarly, fresh access roads will have to be opened to construct the first 8.7km of the clean water distribution network from the water treatment plant. The rest of the clean water distribution network will follow already existing roads.

While some of the existing roads are motor able, some sections will have to be rehabilitated through expansion and stabilization to facilitate transportation of water distribution equipment and other tools to be used by the contractor. Notably, the road from Adribu village (E: 285526, N: 282950) to Andiroba tank in Ndriba-Adabu village (E: 293541, N: 279214) about 10km and further distribution to Patura Pamura village (E: 303163, N: 280737) in Offaka sub county (about 10km) will require rehabilitation because these segments were almost impassable at the time of conducting the ESIA studies. The rest of the water distribution network of about 52km will follow already existing and motor able access roads with in Madi-Okollo district.

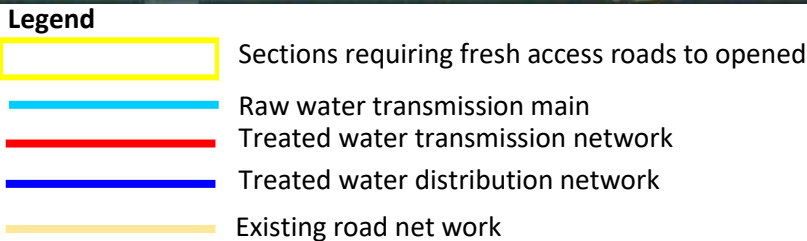


Figure 9: Nyagak WSS infrastructure routes with poor road infrastructure

2.5.7 Access roads

This ESIA has identified areas where several fresh access roads will be required (as presented in chapter 4 -Baseline biophysical environment) but the actual locations will be identified by the contractor. Therefore, the precise number and length of new access roads to be constructed for Nyagak WSS shall be determined by the contractor and will depend on the approach and work methods employed at different sites.

2.5.8 Other works and project details

Other works and project details such as water treatment technologies, reservoir structures, details of the water distribution system and others are presented in the feasibility study report which is a separate document prepared by another consultant.

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

This Chapter provides analysis of the policy, legal and institutional framework within which the proposed Nyagak water and sanitation project is expected to operate. This Chapter covers relevant Ugandan and Development Partner policies, legislations and guidelines. Key Ugandan legislations governing the conduct of Environmental Impact Assessment (EIA) are the National Environmental Act No.5 of 2019 and the National Environment Impact Assessment Regulations (2020). The National Environmental Act established the National Environment Management Authority (NEMA), and entrusts it with responsibility to ensure compliance with the EIA process in planning and execution of development projects.

3.2 Overview of the national policies and laws on environmental and social impact assessment

Several environmental and social policies and laws will apply to the proposed Nyagak WSS. A list below provides applicable policies, laws and guidelines include: -

3.2.1 Policies

- a. The National Environment Management Policy, 1994
- b. The Uganda's Vision 2040
- c. The Land Policy
- d. National Gender Policy, 1997
- e. HIV/AIDS Policy, 1992
- f. Wetlands Policy
- g. National Development Plan III
- h. National Water Policy, 1999
- i. The National Children Policy
- j. The National Climate Change Policy
- k. National Health Policy, 1999
- l. The National Policy for the Conservation and Management of Wetlands Resources, 1995
- m. Occupational Health and Safety (OHS) Policy

3.2.2 Guidelines

EIA Guidelines, 1997

- a. Environmental Impact Assessment Guidelines for water resources related projects, 2011
- b. Environmental Impact Assessment Guidelines, 1997

- c. The Environmental Audit Guidelines for Uganda, 1999
- d. The Guidelines for Occupational Safety and Health, Including HIV in the Health Services Sector 2008

3.2.3 Laws

- a. The 1995 Constitution of Uganda (as amended)
- b. The National Environment Act No. 5 of 2019 as amended
- c. The Water Act, Cap 152
- d. The Land Act, Cap 227
- e. The Land Acquisition Act, Cap 226
- f. The National Forestry and Tree Planting Act, 2003
- g. The Uganda Wildlife Act Cap 200
- h. The Public Health Act Cap 281
- i. The Occupational Safety and Health Act No. 9, 2006
- j. The Physical Planning Act, 2020 (as Amended)
- k. The Local Governments Act, Cap 243
- l. The Employment Act, 2006
- m. The Workers' Compensation Act 2000
- n. The Children Act Cap 59
- o. The Prevention of Trafficking in Persons Act, 2009
- p. The Penal Code Act Cap 120
- q. Historical Monuments Act, 1967
- r. The Mining Act, Cap. 148 2003

3.2.4 Regulations

- a. The Water Resources Regulations, 1998
- b. Water (Waste Discharge) Regulations, 1998
- c. The Water Supply Regulations, 1999
- d. The Sewerage Regulations, 1999
- e. The Environment Impact Assessment Regulations, 2020
- f. The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000
- g. The National Environment (Waste Management) Regulations, 2020
- h. The National Environment (Delegation of Waste Water Discharge Functions) Instrument, 1999
- i. The National Environment (Standards for Discharge of Effluents into Water or on Land) Regulations, 1999
- j. The National Environment (Noise Standards and Control) Control of Noise Regulations, 2003
- k. The Employment (Employment of Children) Regulations of 2012
- l. Draft National Air Quality Standards, 2006

- m. National Environment (Audit) Regulations, 2020
- n. Uganda National Roads Authority (General) Regulations, 2017

3.3 Key provisions of the environmental policies and laws

The following laws will apply and guide project construction and operation phases.

3.3.1 Policies

Uganda policies	Key provisions and Relevancy
The National Environmental Management Policy, 1994	<p>The framework points out cross-sectoral guiding principles and strategies to achieve sustainable socio-economic development. The policy sets a guiding principle that Environmental Impact Assessment should be required for any activities, which cause significant impact on the environment.</p> <p>The National Environment Management Policy 1994 supports and promotes the proposed water and sanitation project under key principle 1 which provides for a clean, safe and productive environment.</p>
Wetlands Management Policy, 1995	<p>The national policy on conservation and management of wetlands aims at curtailing loss of these resources and ensuring that their benefits are equitably distributed to all people of Uganda. The wetlands policy provides for:</p> <ul style="list-style-type: none"> i. Sustainable utilization of wetland resource; ii. Environmentally sound management of wetlands to ensure that other aspects of the environment are not adversely affected; iii. Application of environmental impact assessment procedures on all activities to be carried out in a wetland to ensure that wetland development is well planned and managed.
Land Policy 2012	<p>The Policy has two major objectives: (1) to re-orient the land sector in national development by articulating management co-ordination between the land sector and other productive sectors in the economy; and (2) enhancing the contribution of the land sector to the social and economic development of the country.</p>
National Climate Change Policy, 2012	<p>The goal of the policy is to ensure a harmonized and coordinated approach towards a climate-resilient and low-carbon development path for sustainable development in Uganda. The overarching objective of the policy is to ensure that all stakeholders address climate change impacts and their causes through appropriate measures, while promoting sustainable development and a green economy</p>
National water policy 1999	<p>The goal of this policy is to provide guidance on development and management of the water resources of Uganda in an integrated and sustainable manner, so as to secure and provide water of adequate quantity and quality for all social and economic needs, with full participation of all stakeholders and mindful of the needs of future generations</p>
National Development Plan III	<p>NDP III (2020/21 -2024/25) is third in a series of five-year plans tailored to achieving Uganda Vision 2040, whose goal is to transform Uganda into an upper middle-income country. The Vision of the Plan is “A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years” and is being implemented under the theme “Sustainable Industrialization for</p>

Uganda policies	Key provisions and Relevancy
	inclusive growth, employment and wealth creation". As such, NDP III focuses on 18 programmes among which is Human Capital Development Programme. The Programme aims to increase productivity of the population for increased competitiveness and better quality of life for all. Key expected results include among others increased access to safe and clean water and sanitation; and increased access by population to social protection. Therefore, the proposed project is inline with the NDP III.
National Health Policy, 2010	The policy aims at promoting people's health to enhance socio-economic Development. The national policy on health is guided by; primary health care, decentralization, evidence-based and forward-looking strategy, Gender-sensitive and responsive health care, Pro-poor and sustainability and Partnerships.
Uganda Forestry Policy, 2001	The policy aims at maintaining a sufficiently forested, ecologically stable and economically prosperous Uganda. Maintaining forest cover will help to conserve biodiversity and provide vital ecological services, such as soil and water protection. The government is fostering a common interest in all its developments and a sense of inclusion across all groups and localities by addressing the ways that forestry can benefit people throughout Uganda,
HIV/AIDS Policy, 1992	The goal of the national HIV policy is to provide a framework for prevention of further spread of HIV and mitigation of the socio-economic impact of HIV/AIDS within the world of work in Uganda. It sets out 6 guiding principles that are aimed at achieving this goal and these are; non-discrimination, confidentiality, HIV testing, involvement of people living with the disease, Promotion of Prevention, Treatment, Care and Support and the gender concerns in the world of work

3.3.2 Laws and guidelines

Law/Regulation/ Guideline	Key provisions and Relevancy
The Constitution of the Republic of Uganda, 1995.	The implementation of the project will take into consideration of the Constitution that provides for, <i>inter alia</i> , matters pertaining to land, natural resources (such as swamps, rivers and lakes) and clean environment. Principle XXVII of the Constitution declares that: a) Utilization of natural resources shall be managed in such a way as to meet the development and environmental needs of the present and future generations of Uganda, particularly taking all measures to prevent or minimize damage and destruction to land, air, and water resources resulting from pollution or any other kind of natural resource degradation. b) The state shall promote sustainable development and public awareness of the need to manage natural resources and to ensure that the utilization of the natural resources of Uganda shall be managed in such a way as to meet the needs of Present and future generations.
The Land Act Cap 227	The Act requires a person who owns or occupies land to manage and utilize the land in accordance with the environmental laws and other laws listed in Section 43 including the Water Act and National Environment Act.

Law/Regulation/ Guideline	Key provisions and Relevancy
The National Environment Act No. 5 of 2019 as amended	<p>This act provides for the management of the environment for sustainable development, provides for emerging environmental issues including climate change, management of hazardous chemicals and biodiversity, and provides for strategic environmental and social assessment to address environmental and social concerns for any developments of such magnitude.</p> <p>Schedule 5, part 4 of the National Environment Act lists projects for Utilization of water resources and water supply under those for which environmental and social impact assessments are mandatory</p>
The Environment Impact Assessment Regulations, 2020	<p>Regulations provide that no developer shall implement a project for which environmental impact assessment is required under the Act and under these</p> <p>Regulations unless the environmental and social impact assessment has been concluded in accordance with these Regulations.</p>
The EIA guidelines of 1997	<p>The guidelines establish three major phases through which the EIA should be conducted namely; the Screening phase, the environmental impact study phase and thirdly, the decision-making phase.</p>
The Environmental Impact Assessment Guidelines for water resources related projects, 2011	<p>The guidelines under Section 3.4.1 requires that in order to avoid excessive abstraction or pollution of the available ground water resources, an assessment be carried out for water use projects that are likely to impact on such groundwater resources.</p> <p>ESIA for this project has been conducted based on the above provisions of the Act, the EIA regulations and the guidelines. NEMA will issue an ESIA certificate for the Nyagak WSS after reviewing and approving the updated ESIA.</p>
The Physical Planning Act, 2020 (as amended)	<p>The Act regulates the approval of physical development plans and applications for development permission. Section 37 requires an applicant of a development permit to acquire environmental impact assessment certificate in accordance with the National Environment Act before he or she can be granted full approval to develop.</p> <p>Therefore, the development of the Nyagak WSS is subject to the control of Physical Planning Authority of the respective Municipal Councils as mandated under S.12 of the Act.</p>
The Water (Waste Discharge) Regulations (1998)	<p>Regulation 4 (1) require a person who wishes to discharge effluent or waste on land or into aquatic environment to apply for a waste discharge permit.</p>
The Waste Management Regulations of 2020	<p>The Regulations require waste disposal in a way that would not contaminate water, soil, and air or impact public health.</p> <p>Regulations requires a person who owns or controls a facility or premises, which generate waste to minimize the waste generated by adopting the cleaner production methods. These provisions apply to the proposed Nyagak Water Supply and Sanitation Project in respect of the construction process, domestic waste and construction waste. The contractor and other institutions responsible for the generation of this waste shall comply with provisions of this regulatory standard.</p>

Law/Regulation/ Guideline	Key provisions and Relevancy
The Local Government Act Cap 243	<p>Under Part 4 of the second schedule of the Act, the local government is mandated to ensure the protection of Wetlands, the protection and maintenance of local water resources inter alia.</p> <p>The Natural Resources/Environmental Officers shall in this respect monitor the project implementation to ensure that the project meets the environmental standards.</p>
The Wildlife Act Cap 2000	<p>The Act provides for sustainable management of wildlife.</p> <p>S.15 of the Act states that any Developer desiring to undertake any project, which may have a significant effect on any wildlife species, or community, shall undertake an environmental impact assessment in accordance with the National Environmental Act. This ESIA is carried out in line with this provision.</p> <p>Uganda Wildlife Authority (UWA) is the institutional body whose principal function is to ensure sustainable management of wildlife resources in Uganda. It shall monitor the implementation of conservational measures of the wildlife by the water project in host districts.</p> <p>Considering that much of the water pipe will go through remote section of the countryside involving clearing of vegetation, and excavation of land to create holes etc. in Ajai Wild Life Reserve., this Act is quite relevant, and relevant provisions should be complied with.</p>
The Public Health Act Cap 281	<p>Regulation 6 established permissible noise levels for a facility. Regulation 12 requires that any owner or occupier of premises whose works or activities are likely to emit noise in excess of the permissible noise levels shall apply to the Executive Director of NEMA for a license to emit noise in excess of the permissible levels.</p>
Historical Monuments Act, cap 46 1968	<p>This act provides for the preservation and protection of historical monuments and objects of archaeological, paleontological, ethnographical and traditional interest and for other matters connected therewith.</p>
National Environment (Audit) Regulations, 2006	<p>These regulations apply to:</p> <ul style="list-style-type: none"> • A developer of a project listed in Schedule 5 and 10 of the NEA 5 of 2019 • The enforcement of the schedule 126 of part XII of the National Environment Act 5 of 2019 making a requirement for Environmental Audits to any project that has or may have adverse impacts on human health or the environment; • Environmental Audit requirements by the National Environment (Environmental Impact Assessment) Regulations in section 31 where annual environmental audits of projects are mandatory; • Voluntary Environmental Audits; and <p>An environmental Audit shall be carried out by persons certified and registered in accordance with the National Environment (Conduct and Certification of Environmental Practitioners) Regulations, 2003.</p>

3.4 Key provisions of Social Policies Laws and Guidelines

The construction will require both unskilled and skilled labour. The project will be implemented within settlements. This requires good social, Health and Safety safeguards systems to be put in place. Such Health and Safety issues of workers and the general public will trigger the following policies, laws and guidelines.

3.4.1 Policies

No.	Name	Purpose
1.	Vision 2040	Uganda's Vision is to have "A transformed Ugandan society from a peasant to a modern and prosperous Country within 30 years", from 2010. This involves changing from a predominantly low income to a competitive upper middle-income country within 30 years. It is envisaged that the country will graduate to the middle-income segment by 2017 and reach a per capita of USD 9,500 by 2040. For the country to achieve its Vision 2040, it is necessary to increase access to appropriate and adequate sanitation as well clean and safe water.
2.	National Cultural Policy, 2006	The policy is put in place to protect Ugandan heritage and culture, as well as recognize specific heritage sites of national and global importance. This policy protects and conserves cultural heritage in Uganda, both tangible and intangible heritage.
3.	National Land Use Policy, 2006	This policy aims to achieve coordination, sustainability and optimal land utilization for socio-economic development.
4.	National Employment Policy 2011,	The policy will stimulate Government objectives and processes for generating jobs and ensuring a better employment environment for all workers. The Employment Policy also makes mention of vulnerable groups and recognizes the importance of and need for special considerations towards enhancing their employability. These groups include persons with disability and this aspect is important because of the number of young people who are disabled and continue to face numerous challenges when it comes to accessing employment opportunities.
5.	National Gender Policy, 1997	This primary policy is in the current debates at a national level, and aims to guide and direct the planning, resource allocation and implementation of development programs with a gender perspective in all sectors of the economy.
6.	National HIV/AIDS Policy, 2004	This essential health policy aims to provide a framework for a multi-sectoral response to HIV/AIDS in Ugandan's world of work and applies to all current and prospective employees and workers in the public and private sectors.
7.	Occupational Health and Safety (OHS) Policy	This policy seeks to: <ul style="list-style-type: none"> • Provide and maintain a healthy working environment; • Institutionalize OHS in the Water-sector policies, programs and plans; • Contribute towards safeguarding the physical environment; and

No.	Name	Purpose
		<ul style="list-style-type: none"> The OHS Policy Statement is guided by the Constitution of the Republic of Uganda and other global, national and sectoral regulations and policies. <p>The OHS Policy also takes into recognition the Water Policy and the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and working environment.</p>
8.	Uganda Resettlement/ Land Acquisition Policy Framework (2002)	<p>Regarding compensation and resettlement issues, the leading legislation is the Constitution of Republic of Uganda and the Land Act, both of which require that:</p> <ul style="list-style-type: none"> Compensation should be aimed at minimizing social disruption and assist those who have lost assets as a result of the project, in order to maintain their livelihoods; and Community infrastructure must be replaced and ideally be improved in situations where it was deficient.

3.4.2 Laws

Law/Regulation	Key provisions and Relevancy
The Employment Act No 6, 2006	<p>The Act makes provisions for governing legal statutory instrument for the recruitment, contracting, deployment, remuneration, Management and compensation of workers.</p> <p>It mandates Labour Officers to regularly inspect the working conditions of workers to ascertain that the rights of workers and Basic provisions are provided and workers' welfare is attended to. Further, it has provisions prohibiting forced labour, discrimination and sexual harassment at workplaces (Part II; Part IV), Providing for labour inspection by the relevant Ministry (Part III) and stipulating rights and duties in employment (weekly rest, working hours, annual leave, maternity and paternity leaves, sick pay, etc. (Part VI). The Developer shall be required to treat workers with fairness and</p> <p>Without discrimination and in addition, District Labour officers in the host districts shall regularly monitor the Contractor's compliance.</p>
The Occupational Safety and Health Act, 2006	<p>The Occupational Safety and Health Act, 2006 provides for, general duties, obligations and responsibilities of employers, rights and responsibilities of workers and general safety requirements.</p> <p>Section 13 (1) stipulates that it's the responsibility of the employer to take, as far as is reasonably practical all measures for the protection of his or her workers and the general public from the dangerous aspects of the employer's undertaking at his or her own cost. The employer should ensure, as far as is reasonably practical, that the working environment is kept free from any hazard due to pollution.</p> <p>Section 19 requires an employer to provide adequate and suitable protective clothing and protective equipment to the workers of his or her undertaking. The Nyagak WSS should adhere to occupational safety and health rules according to the mitigation measures suggested in this report such as</p>

Law/Regulation	Key provisions and Relevancy
	workers be trained in health safety, given the PPEs and given access to a first aid kit.

The project area has a number of both out of school and school going children. The project may have risk of using child labour at construction sites and therefore the underlying provisions have to be complied with. The following laws relating to protection from child labour will be applicable.

Law/Regulation	Key provisions and Relevancy
The 1995 Constitution of Uganda (as amended)	Article 257 defines a child as any person below the age of 18 years. (Also, Section 2 of the Children Act Cap 59 and the Prevention of Trafficking in Persons Act 2009) Article 34 (4) of the Constitution provides that Children are entitled to be protected from social and economic exploitation and shall not be employed in or required to perform work that is likely to be hazardous or to interfere with their education, to be harmful to their health or physical, mental, spiritual, moral and or social development.
The Employment Act 2006	Section 32 prohibits employment of a child under the age of twelve years to be employed in any business, undertaking or work place. The Act permits a child of under the age of fourteen years to be employed on condition that work is light work and carried out under supervision of an adult aged over eighteen years and does not affect the child's education. It also requires that the child is not employed in any employment or work which is injurious to his or her health, dangerous or hazardous or otherwise unsuitable and that a child does not work between the hours of 7 p.m. and 7 a.m. The person who employs such a child has to notify a labour officer in writing that the employment or work complies with the above conditions.
The Employment Regulations of Children of 2012	The Regulations also emphasize that a child employed under the age of fourteen years shall not be employed in any business undertaking or workplace, except for light work carried out under the supervision of an adult and where the work does not exceed fourteen hours per week. They prohibit employment of a child to do work which is injurious, dangerous, and hazardous or in the worst forms of child labour. Overtime work is prohibited for a child aged between fifteen to seventeen years and a child shall not be employed at night between the hours of 7.00 p.m. and 7.00 a.m. The Ministry of Water and Environment will work with the Ministry of Gender, Labour and Social Development to ensure prohibition of child labour by the contractors of the project.

Women and child sexual abuse by contractors' workers is a risk that needs to be managed especially at construction sites. Protection ought to be given to Children and women against sexual abuse and therefore the laws below will be applicable.

Law/Regulation	Key provisions and Relevancy
The Penal Code Act Cap 120	<p>Section 129 stipulates that any person who has sexual intercourse with a girl under the age of 18 is guilty of an offence and is liable to suffer death and also stipulates that any person who unlawfully and indecently assaults a boy under the age of 18 is guilty of felony. Section 131 prohibits procurement or attempting to procure a girl for the purpose of commercial sexual exploitation. <i>(Also, Regulation 5 of the Employment of Children Regulations 2012)</i></p> <p>Section 123 makes it an offence to have sexual intercourse with a woman without her consent and Section 132 prohibits procuring defilement of women and girls by threats or intimidation or false pretense or false representations or administration of drug, matter or thing with intent to stupefy or overpower.</p>
The Prevention of Trafficking in Persons Act 2009	<p>Section 8 prohibits recruiting a person below 16 years in any form of employment for the purposes of exploitation or introducing or matching any person to another for purposes of sexual exploitation.</p> <p>In Implementation of the project, the Ministry of Water and Environment will work with the Ministry of Gender, Labour, and Social Development to make sure that the women and children are not sexually exploited by the contractors. The district Labour officers in the host districts have a key role in monitoring compliance of the contractors.</p>

3.5 Legal, Policy and Regulatory Framework for Resettlement in Uganda

The project involves construction of sanitation facilities and water distribution network that required acquisition of land. This implied that the Central Government and Local Government had the responsibility to acquire land for the construction of the different project facilities which means compensation of Project Affected Persons (PAPs) in line with OP 4.12 and GoU compensation requirements. The difference between the national resettlement policy in Uganda and the World Bank resettlement policy OP 4.12 is that the former requires compensation to be based on the market value while OP 4.12 recommends compensation at a replacement cost in order to leave the PAPs at or better than the prevailing status.

The different types of land tenure and the acquisition processes, under Uganda laws are given below.

3.5.1 Customary Land

Most of the proposed land for the project in the project area is held under customary tenure. Land ownership is vested in the lineage and is allocated by a father to his sons, who in turn assign it to their wives and children for cultivation. The situation indicates that the youth and the women only have a user-right to the land and not ownership, which disadvantages a vulnerable group. Therefore, there is need to involve the owners of land where the project is going to be implemented during the entire cycle of the project.

Law/Regulation	Key provisions and Relevancy
The 1995 Constitution	The Constitution restored recognition of the rights of those who held customary land (Article. 237 (3) (a) and (4)).
The Land Act Cap 227	Section 3 (1) of the Act explicitly recognized that customary law should regulate this form of land tenure. It states that customary land tenure shall be governed by rules generally accepted as binding by the particular community. Anyone who acquires land in that community shall also be bound by the same rules except where such rules are repugnant to natural justice, equity and good conscience. The required land therefore shall be acquired as per the customary rules in the respective areas with the involvement of Local Council 1 chairpersons to verify ownership and women and the youths' due their vulnerability.

3.5.2 Freehold Land

Law/Regulation	Key provisions and Relevancy
The 1995 Constitution of Uganda	Article 237 (3) (b) provides that land in Uganda belongs to the citizens of Uganda and shall vest in them in accordance with the land tenure systems provided for in there under including freehold tenure
The Land Act Cap 227	Section 2 provides for the different tenures of land including freehold. According to S.3 (2), the freehold tenure may involve either a grant of land in perpetuity, or for a lesser specified time period. The Act specifies that the holder freehold land has full power of ownership of it and as such, he may use it for any lawful purpose, dispose of it by will or transact it in any other way as he or she sees fit upon negotiation with the project developer. A search has to be done with the District Land Board to certify title to the required land for the Water intake and the WTP as under the Registration of Titles Act Cap 230 S.101.

3.5.3 Public land

The water transmission and distribution pipes will be laid mainly along the road reserve. Similarly, the water treatment plant will be located within Omier Central Forest Reserve. This is public land, which shall require public use by the water project. It requires the involvement into discussions by the MWE and the Ministry of Justice and constitutional affairs, National Forestry Authority and Zombo District Local Government. Where a government institution wants land that belongs to another government institution an application should be made to the Uganda Land Commission for change of use or shared use. For utilization of the lakeshore, a Wetland, Riverbank and Lakeshore User Permit shall be obtained from NEMA.

3.6 Key international environmental and social laws

3.6.1 International Protocols and Conventions

The relevant international protocol and conventions which Uganda is a signatory to are presented below;

No.	Name	Purpose
1.	African Convention on the Conservation of Nature, 1968	Encourages individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.
2.	United Nations Framework Convention on Climate Change (UNFCCC), 1992	The Convention requires parties to avoid adverse effects on the environment and adopt measures and policies to control carbon dioxide emissions in technologies, considering their common, yet differentiated responsibilities, as well as their specific national and regional development priorities, objectives and circumstances. They are required to take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment of projects or measures undertaken by them to mitigate or adapt to climate change.
3.	United Nations Convention to Combat Desertification (UNCCD), 1994	Binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In the 10-Year Strategy of the UNCCD (2008-2018) that was adopted in 2007 with a view to <i>forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability.</i>
4.	Montreal Protocol for the Protection of the Ozone Layer, 1987	The protocol was designed to protect the <u>ozone layer</u> by phasing out the production of numerous substances that are responsible for <u>ozone depletion</u> . All of the ozone depleting substances controlled by the Montreal Protocol contain either chlorine or bromine (substances containing only <u>fluorine</u> do not harm the ozone layer). The provisions of the Protocol include the requirement that the Parties to the Protocol base their future decisions on the current scientific, environmental, technical, and economic information that is assessed through panels drawn from the worldwide expert communities.
5.	Stockholm Convention on Persistent Organic Pollutants, 2001	Protects human health and environment from Persistent Organic Pollutants that remain intact in the environment for long periods and can become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife, which can lead to serious health effects.
6.	Strategic Approach to International Chemicals Management, 2006	Fosters sound management of chemicals and to ensure that by the year 2020, chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health.
7.	International Labour Organization Convention, 1998	Sets out basic principles and labour rights at work, based on international best practice.

3.6.2 World Bank Operational Policies

The Operational Policies provide basis on which the World Bank screens proposed projects to determine the appropriate extent and type of Environmental Assessment to be undertaken. The Bank classifies proposed projects as Class A, B, C or F1 depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. The categorization of projects is based on an assessment of their likely environmental and social impacts. Below is a brief description of different categories:

- **Category A Project:** which may have potentially significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented;
- **Category B Project:** may have potentially limited adverse social or environmental impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures;
- **Category C Project:** likely to have minimal or no adverse social or environmental impacts, including certain financial intermediary projects with minimal or no adverse risks; and
- **Category FI Project:** Assigned to business activities undertaken by Financial Intermediaries or through delivery mechanisms involving financial intermediation. The table below summarizes safeguards' policies that were triggered by the project.

OP No.	World Bank Safeguards Operational Policies triggered by the project	Key provisions and Relevance
OP 4.01	Environmental Assessment	In general, the project falls under Category B of the World Bank's classification of projects requiring an ESIA/ESMP given that its potential adverse environmental and social impacts will be site specific, few if any are irreversible, and in most cases mitigation measures can be readily designed. Additionally, the World Bank Environment Health and Safety Guidelines (EHSGs), with specific reference to the EHSGs for water and sanitation projects, applies to the project.
OP 4.04	Natural Habitat	The Bank supports the protection, maintenance, and rehabilitation of natural habitats and their functions. The conservation of natural habitats is essential for long term sustainable development. OP 4.04 is triggered due to potential loss or degradation of natural habitats including, riparian and wetland habitats, through project planning, physical activities or use of water resources. The construction and operation activities will impact legally protected areas of Omier central forest reserve and Ajai wild life reserve
OP 4.12	Involuntary Resettlement	This is the guiding policy when a project results in involuntary resettlement. OP 4.12 describes the detail and elements that a

OP No.	World Bank Operational Policies triggered by the project	Key provisions and Relevance
		resettlement plan should include. These include objectives, potential impacts, socio economic studies, legal and institutional framework, eligibility, valuation and compensation of losses, resettlement measures, relocation planning, community participation, and grievance redress procedures, implementation schedule, costs and budgets, and monitoring and evaluation. This report conforms to the WB policy requirement on contents and structure. OP 4.12 is triggered due to land acquisition at the water intake, WTP and water storage tanks.
OP 4.11	Physical Cultural Resources	<p>This policy gives guidelines for the preservation of cultural property and seeks to avoid their elimination, otherwise mitigation activities be undertaken to limit the adverse impacts as far as possible.</p> <p>Whereas there are no serious cultural properties along the proposed water transmission and distribution corridors, chance finds could be encountered during construction especially while trenching channels for the water transmission pipes. Detailed in the EMP are measures to mitigate impacts on cultural properties. When RAP studies are carried out, any physical cultural resources in the water transmission corridor will be enumerated as structures and all affected PAPs will be compensated for such structures to ensure that they are relocated in accordance with cultural norms of the affected people and society.</p> <p>So far in this ESIA no PCRs like graves, shrines have been found above ground along the project corridor. However, with excavations chance finds of archaeological / paleontological value may be found. Hence a chance finds procedure has been developed for this project;</p>
OP 4.36	Forests	The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services. Although no forest will be affected, the project will put in place measures that enhance the tree cover in the project area in line with the National forestry and tree planting guidelines.
	World Bank Policy on Access to Information (July 1, 2010)	This policy is triggered since there is need for disclosure of information to all the stakeholders. There is need for disclosure of information to all the stakeholders. Compliance shall be ensured by disclosing the information to all the stakeholders such as district technocrats, Municipal and Local council leaders, and communities among others during the consultation process and the information is accessible.

3.6.3 The World Bank Group Environmental, Health and Safety Guidelines for water and sanitation project

The EHS Guidelines for water and sanitation project include information relevant information relevant to the operation and maintenance of (i) potable water treatment and distribution systems, and (ii) collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities. The document lists environmental issues, occupational health and safety concerns and community health and safety impacts which are associated with water and sanitation projects. All the issues presented in these guidelines were either taken care of at design stage or are discussed and mitigated as part of this report.

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, the EHS Guidelines are applied as required by their respective policies and standards. The industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

The guidelines shall govern both workers' (occupational) safety and public safety. The applicability of the EHS Guidelines are tailored to the hazards and risks established for each project based on the results of an environmental assessment in which site-specific factors are considered.

The guidelines provide for effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations in the project activities through:

- 1) Identifying project hazards and associated risks as early as possible;
- 2) Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks, and carry out specialized environmental management functions
- 3) Understanding the likelihood and magnitude of the risks
- 4) Prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment;
- 5) Favoring strategies that eliminate the cause of the hazard at its source;
- 6) Incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences;
- 7) Preparing workers and nearby communities to respond to accidents;
- 8) Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability.

The following has been considered when assessing the potential risks related to health and safety

- 1) Infrastructure and Equipment Safety
- 2) Hazardous Materials Safety
- 3) Environmental and Natural Resource Issues;
- 4) Community safety and exposure to project related risks
- 5) Emergency Preparedness and Response.

3.7 Permits and Licenses

The following Consents and Permits will be required for the Contractor to achieve legal compliance with Environment and Social requirements

Consent/Permit required	Issuing Agency	Applicable law
ESIA certificate	NEMA	National Environment Act No.5 of 2019
RAP approval conditions for this project	CGV	The Land Act Cap 227
Wetland Permit to carry out a regulated activity in a wetland/River Bank /Lakeshore	NEMA	The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, No. 3/2000
Work Place Registration Certificate	MoGLSD	The Occupational Safety and Health Act, 2006
Traffic Diversions consent	Uganda Police	Traffic and Road Safety Act 1998
Water Abstraction Permit(s)	DWRM	The Water Act, Cap 152

3.8 Institutional framework

The Project will be implemented by Ministry of Water and Environment (MWE) and the host District Local Governments of Zombo, Nebbi and Madi-Okollo with support of regional entities (WMZs, WSDFs). Ministry of Water and Environment as the Developer is responsible for the management, coordination and supervision of project activities including the implementation of environmental and social safeguards requirements as detailed out in the ESMP. However, during construction, the Contractor will be responsible for the day-to-day implementation of the ESMP but under the direct supervision of the MWE.

Legally, the host district local governments are responsible for day to day monitoring of the environmental and social aspects of the project while at the National level, the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSHS) of the Ministry of Gender, Labour and Social Development are responsible for monitoring of environmental, social and safety aspects of the project. This section mainly sets out the roles and responsibilities for the management of the project's safeguards aspects by different government institutions.

3.8.1 Ministry of Water and Environment

The Ministry of Water and Environment (MWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water Development (DWD) and the Directorate of Environmental Affairs (DEA). MWE regulates water resources utilization and wetlands management through DWRM and DEA. In addition to regulatory functions, MWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented.

3.8.2 National Environment Management Authority

National Environment Management Authority (NEMA) was established under the National Environment Act No.5 of 2019 as the principal agency in Uganda charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management in Uganda. In this context, NEMA will be responsible for review and approval of this environmental impact assessment, ensuring proposed mitigation measures are implemented, monitoring compliance with approval conditions, and ensuring any other impacts that may arise are mitigated.

3.8.3 National Forestry Authority

The National Forestry Authority (NFA) is a government statutory entity responsible for the management of Central Forest Reserves (CFRs) on a sustainable basis, as well as, to supply high quality forestry-related products and services in Uganda. Although there was no natural forest within the project area, there was pockets of planted forests mainly comprising of teak trees along the water transmission and distribution network, NFA will be interested in ensuring tree clearance is minimized especially while working within Omier Central Reserve. NFA has a number of regional NFA offices that have Forest managers and supervisors to inspect and report any impacts on the forests.

3.8.4 Uganda Wildlife Authority

UWA is mandated to ensure sustainable management of wildlife resources and supervise wildlife activities in Uganda both within and outside the protected areas. UWA will be a key lead agency while undertaking works since the main water transmission line will pass through Ajai Wild Life Reserve.

3.8.5 Wetlands Management Department

Wetlands Management Department (WMD) is mandated to manage wetland resources and its goal is to sustain the biophysical and socio-economic values of the wetlands in Uganda for present and future generations. The Wetlands Management Department is a key

stakeholder of the project because some key project components are located in wetlands. For example, the intake is located in a wetland and along the river banks

3.8.6 Directorate of Water Resources Management

The Directorate of Water Resources Management (DWRM) 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.

3.8.7 Ministry of Lands, Housing and Urban Development

Ministry of Gender Labour and Social Development is a Government Ministry with a responsibility to empower communities in diverse areas. The Ministry came into being by a constitutional requirement of the 1995 Constitution, Chapters 4 and 16 which mandates government to: “empower communities to harness their potential through skills development, labour productivity and cultural growth. The Ministry promotes cultural growth, skills development and labour productivity while promoting gender equality, labour administration, social protection and transformation of communities. This Ministry has one of its major tasks to ensure that all Ugandans enjoy better standards of living, especially the disadvantages and vulnerable groups.”

The Directorate of Labor, Employment and Occupational Safety and the Directorate of Gender and Community Development in the Ministry are responsible for inspection of workplace environment to safeguard occupational safety, rights of workers and gender equity. Specifically, DOSH Activities in ensuring enforcement of OSH at workplaces, it carries out the following activities: i) Developing/reviewing occupational safety and health policy, laws, regulations, technical standards, strategy, guidelines, code of conduct and manuals. ii) Registering all workplaces in the country. This assessment recognises key gender health and safety and social issues, as emerging from stakeholder consultation and places emphasis on the management of such in the ESMP.

3.8.8 Uganda National Roads Authority

The mandate of UNRA is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others. Some of UNRA responsibilities include: management of the National Roads Network; maintenance and development of the national roads network; and establishing and maintaining road reserves among others. UNRA is a key stakeholder under the project because the distribution lines components largely run along the road reserves.

3.8.9 Ministry of Local Government

The 1997 Local Government Act provides for decentralization and devolution of government functions, powers and services from the central to Local Governments and sets up the political and administrative functions of local governments. The Local Governments are responsible for the protection of the environment in their respective areas of jurisdiction. Local Governments shall be consulted on projects to be located within their jurisdiction and on matters that affect their environment.

At the District Level, the District Environmental Officers, District Engineer and Community Development Officers in the respective areas of project implementation will participate in monitoring the projects to ensure that mitigation measures are adequate and advice or point out additional compliance requirements following their inspections. The District Land Boards and Lands Officers will provide guidance on issues of compensation or land acquisition.

3.8.10 The Ministry of Finance, Planning and Economic Development

- a) The mandate of the Ministry is to:
- b) To Formulate policies that enhance stability and development
- c) To mobilize local and external financial resources for public expenditure
- d) To regulate financial management and ensure efficiency in public expenditure.
- e) To oversee national planning and strategic development initiatives for economic growth

3.8.11 Ministry of Gender, Labour and Social Development

Ministry of Gender Labour and Social Development is a Government Ministry with a responsibility to empower communities in diverse areas. The Ministry came into being by a constitutional requirement of the 1995 Constitution, Chapters 4 and 16 which mandates government to: “empower communities to harness their potential through skills development, labour productivity and cultural growth. The Ministry promotes cultural growth, skills development and labour productivity while promoting gender equality, labour administration, social protection and transformation of communities. This Ministry has one of its major tasks to ensure that all Ugandans enjoy better standards of living, especially the disadvantages and vulnerable groups.”

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3.8.12 The Equal Opportunities Commission (EOC)

The Equal Opportunities Commission (EOC), was established by the Equal Opportunities Act 2007. The Commission is mandated to provide a framework for redressing imbalances, which exist among the marginalized groups while promoting equality and fairness to all. The Commission was established pursuant to article 32 (3 – 4) of the Constitution and is a body corporate with perpetual succession and a common seal and may sue or be sued in its corporate name and, may do, enjoy or suffer anything that bodies corporate lawfully do, enjoy or suffer.

The Commission gives effect to the State’s constitutional mandate to eliminate discrimination and inequalities against any individual or group of persons on the ground of sex, age, race, Colour, ethnic origin, tribe, birth, creed or religion, health status, social or economic standing, political opinion or disability, and take affirmative action in favor of groups marginalized on the basis of gender, age, disability or any other reason created by history, tradition or custom for the purpose of redressing imbalances which exist against them; and to provide for other related matters.

3.8.13 The Zombo, Nebbi and Madi-Okollo District Local Governments

Zombo, Nebbi and Madi Okollo district local governments are mandated under the Local Government Act and the National Environmental Act to ensure that all project activities are implemented in accordance with the national legal and policy framework. The district, is responsible for major functions and services previously carried out by the central government i.e. land administration and surveying; the construction and maintenance of feeder roads, and; the provision and maintenance of water supplies. Therefore, these District Local Governments are a key stakeholder for the project.

3.8.14 Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

Ministry of Agriculture, Animal Industry and Fisheries is mandated to formulate, and review national policies, plans, legislation, standards and programmes relating to fisheries and agricultural sector as well as control and manage crop and animal epidemic diseases affecting production. The project may have an impact on fisheries activities and therefore Ministry of Agriculture, Animal Industry and Fisheries is a key stakeholder of the project.

4 BASELINE BIOPHYSICAL ENVIRONMENT

4.1 Physical Environment

This section presents the characteristics of the physical environment of the project area.

4.1.1 General physical aspects of the environment traversed by the Nyagak Water Supply Scheme infrastructure

The proposed Nyagak Water Supply Scheme will traverse 42 villages, 18 sub-counties and mainly the two district of Zombo and Madi-Okollo. However, a smaller segment (about 6km) of the raw water transmission main and the water treatment plant will be situated in Odhure village, Nebbi district. The total length of the raw water transmission main and treated distribution network is about 211.3 km traversing mainly private land by approximately 67%. The rest of the corridor will be situated in Omier Central Forest Reserve (8.4%) and Ajai Wild Life Reserve (24%) respectively.

In terms of land cover, Nyagak water supply scheme traverses majorly savannah grasslands and subsistence farmlands under farrow up to 80% and the remaining segments are patches of savanna grasslands mixed with woodlands. The active farmlands that will be affected by the project were estimated at 30%. The vegetation assemblage along the savanna grasslands indicates such areas were one-time farmlands but later abandoned probably due to the insurgency or other factors. Generally, there are few farmlands (gardens) that were noted to be traversed by the water supply scheme. However, this observation may change if more PAPs decide to open up the farmlands under farrow in the near future. Figure 4.1 below presents the land cover characteristics of the area as affected by the proposed Nyagak water supply scheme. Plates 4.1-4.4 present the physical aspects of the project sites as at the time of conducting the ESIA studies.



Plate 10: Typical grassland savannah (A) and wooded grassland (B) along majority of project site in Madi-Okollo district



Plate 11: Woodland savanna in Ajai Wild Life Reserve



Crop farming along Okollo-Ogoko road



Teak woodlot along Okollo-Ogoko road



Ongoing road works with in Ajai wild Life



Plate 12: Physical characteristic of the proposed treated water distribution network project sites



Plate 13: Other aspects of the project sites

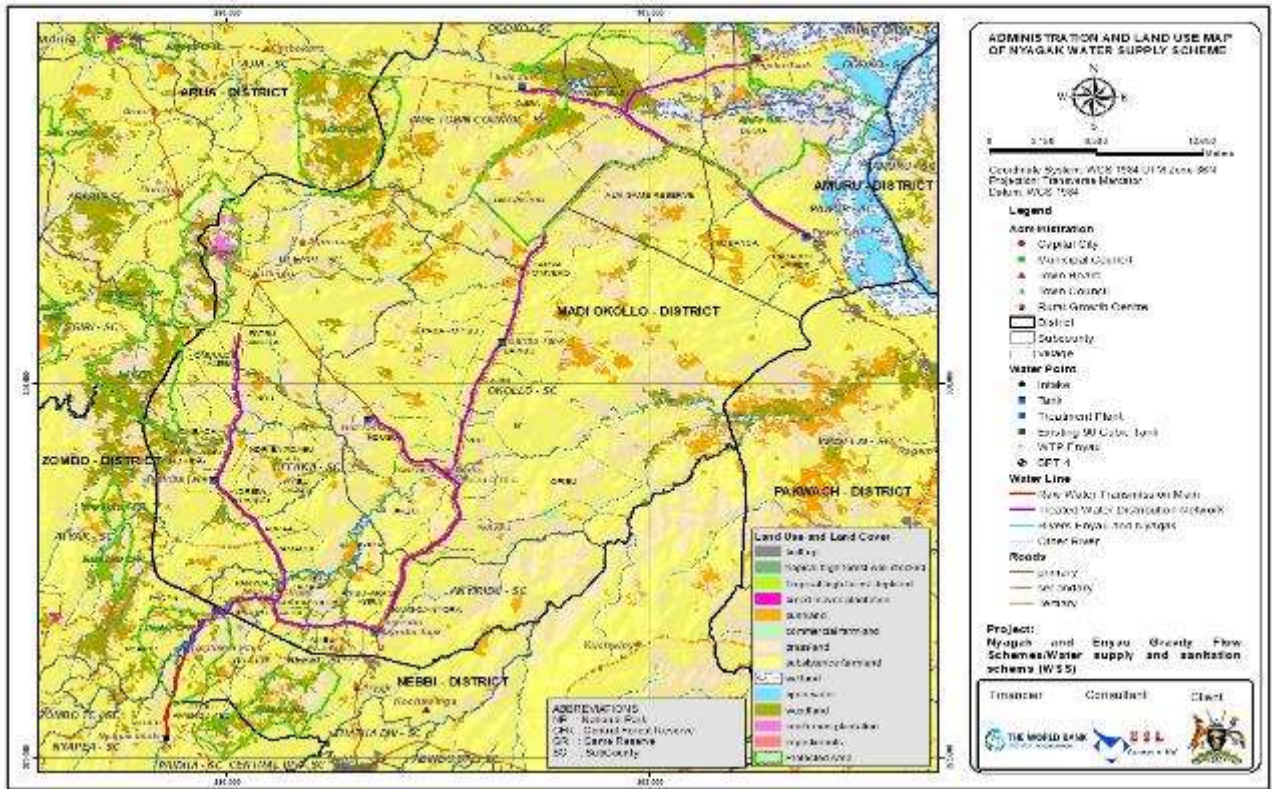


Figure 11: Land cover characteristics along Nyagak water supply scheme

4.1.2 Topography of the Project Area

The topography of the project area is in such a way that the land scape gently slopes east wards enabling gravity flow of water from the intake in zombo to the lower areas of Inde Town Council, Pawor and Ogoko sub-counties in Madi-Okollo district. In terms of elevation, the highest point is at the intake at 1087m above sea level and the lowest area is at the River Nile bank at 626 meters. There exists some scattered hills such as the Ndiriba and Goli Hills at 1016m and 1011m respectively. It's the reason such elevated areas were identified to host some of the water distribution tanks within the project area. Figure below presents a map showing the topography of the project area.

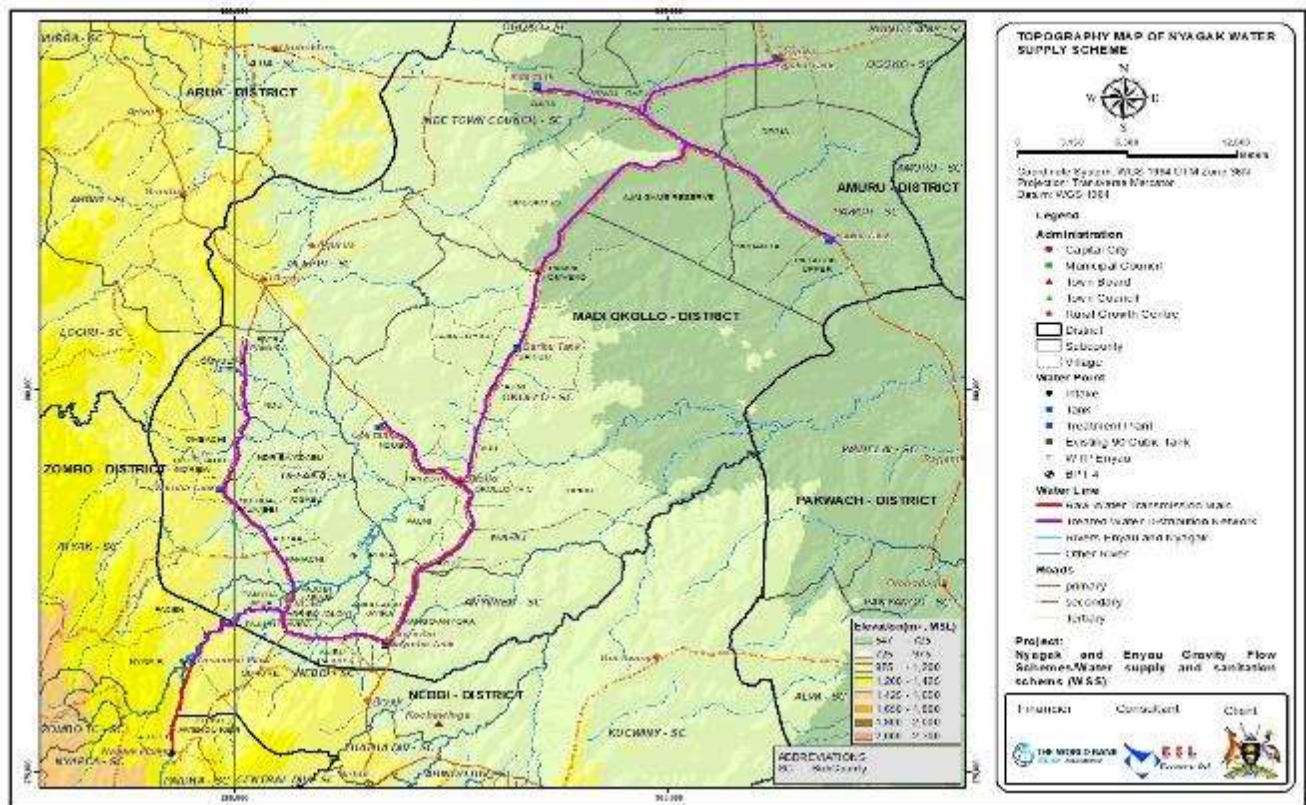


Figure 14: The topography of Nyagak Water Supply Scheme project area

4.1.3 Geology of the project area

Zombo, Madi-Okollo and Nebbi districts are underlain by the Precambrian rocks of basement complex. The rocks are composed largely of granulite facies grade rocks which generally form enclaves in the gneiss complex. On hill tops grey granite and gneiss are left exposed in many places. These granites and gneiss are intensively metamorphosed and deformed. Figure 4.8 below presents the geological overview of the project area.

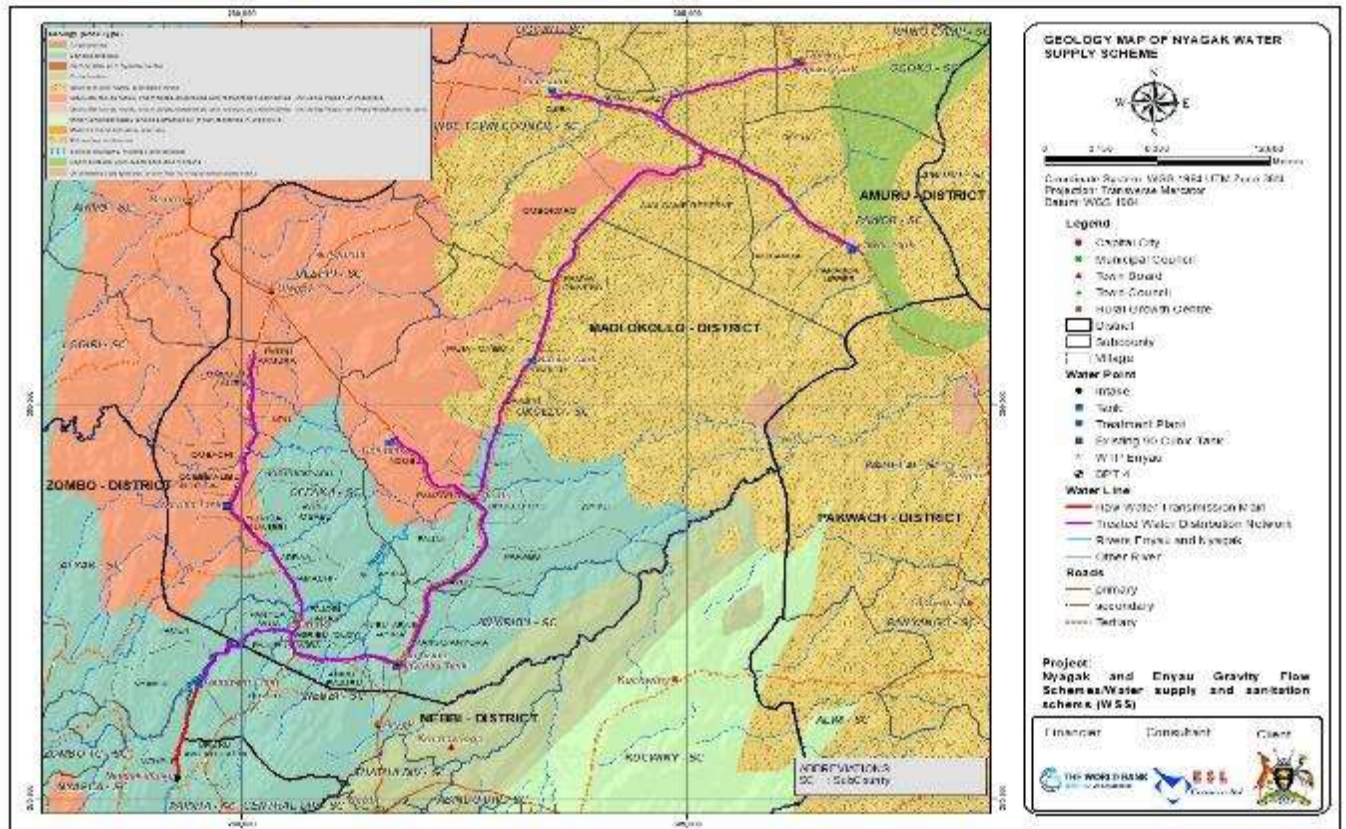


Figure 15: Geology of the project area

4.1.4 Soils of the project area

The prevailing soil type in the Zombo, Madi-Okollo and Nebbi catchments belongs to the group of Ferrallitic soils (Lateritic or Ferrosols). Other soil types are the Vertisols and Lithosols. The prevailing soil texture is a mixture of sandy clay loams and sandy loams.

Ferrallitic (Lateritic or Ferrosols)

Ferrallitic (Lateritic or Ferrosols) are well drained soils, intensely weathered rock, rich in iron and aluminium. During dry spells the soils become droughty because of the low water storage capacity. Soils are low in pH, low in phosphorous and low in natural fertility. The soil profile is primarily red and patchy yellow-red. The bulk of all cycling plant nutrients is contained in the upper 10 to 50 cm soil layer. If the process of 'nutrient cycling' is interrupted, e.g. after introduction of low input sedentary subsistence farming, the root zone will rapidly become depleted of plant nutrients. Maintaining soil fertility by manuring, mulching and/or adequate (i.e. long enough) fallow periods and prevention of surface soil erosion are important management requirements.

Vertisols

The vertisols are alluvial soils with low permeability. Most of the physical and chemical properties are agronomically favorable. However, the chemical properties normally show a potassium deficiency and slight salinity. The pH values in the topsoil show signs of high alkalinity which would be cause for concern if these soils were to be irrigated for commercial agriculture. Figure Below presents the nature of soil types in the Nyagak project area.

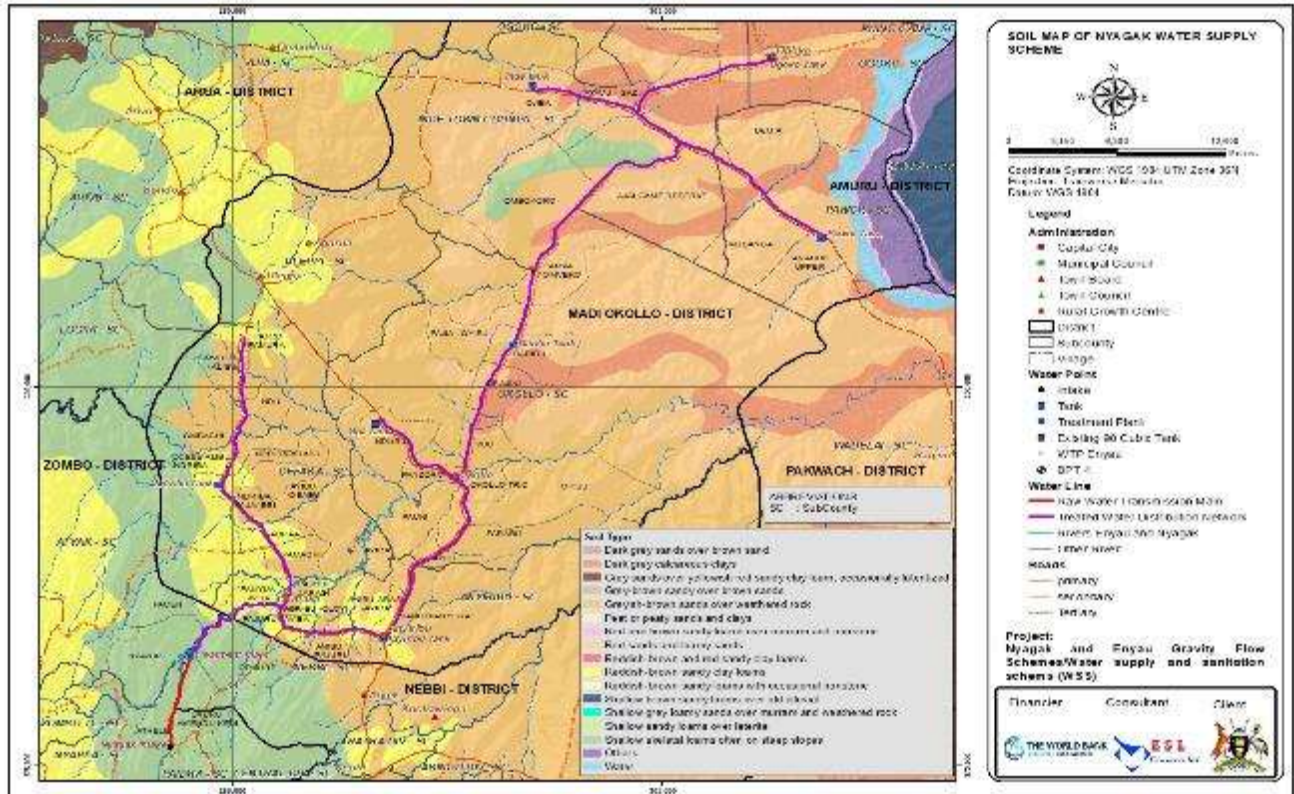


Figure 16: Nature of soil types with in the Nyagak WSS project area

4.1.5 Climate

Zombo, Nebbi and Madi Okollo districts exhibit a purely tropical climate due to her location within the tropical rainfall zone of Eastern Democratic Republic of Congo. The dry and sub-humid climate is associated with orographic rainfall and hail/thunderstorms. Rainfall is bimodal in nature with peaks in May and October. The first short and usually unreliable rainfall is from late March – May, while the second and more reliable rains falls in the July – October period. Dry spells are experienced in June – July and December – early March. Temperature is generally high except in Okoro and parts of Padyere County. Generally, the high-altitude areas of Zombo receive more rainfall compared to the low-lying areas of Nebbi and Madi-Okollo.

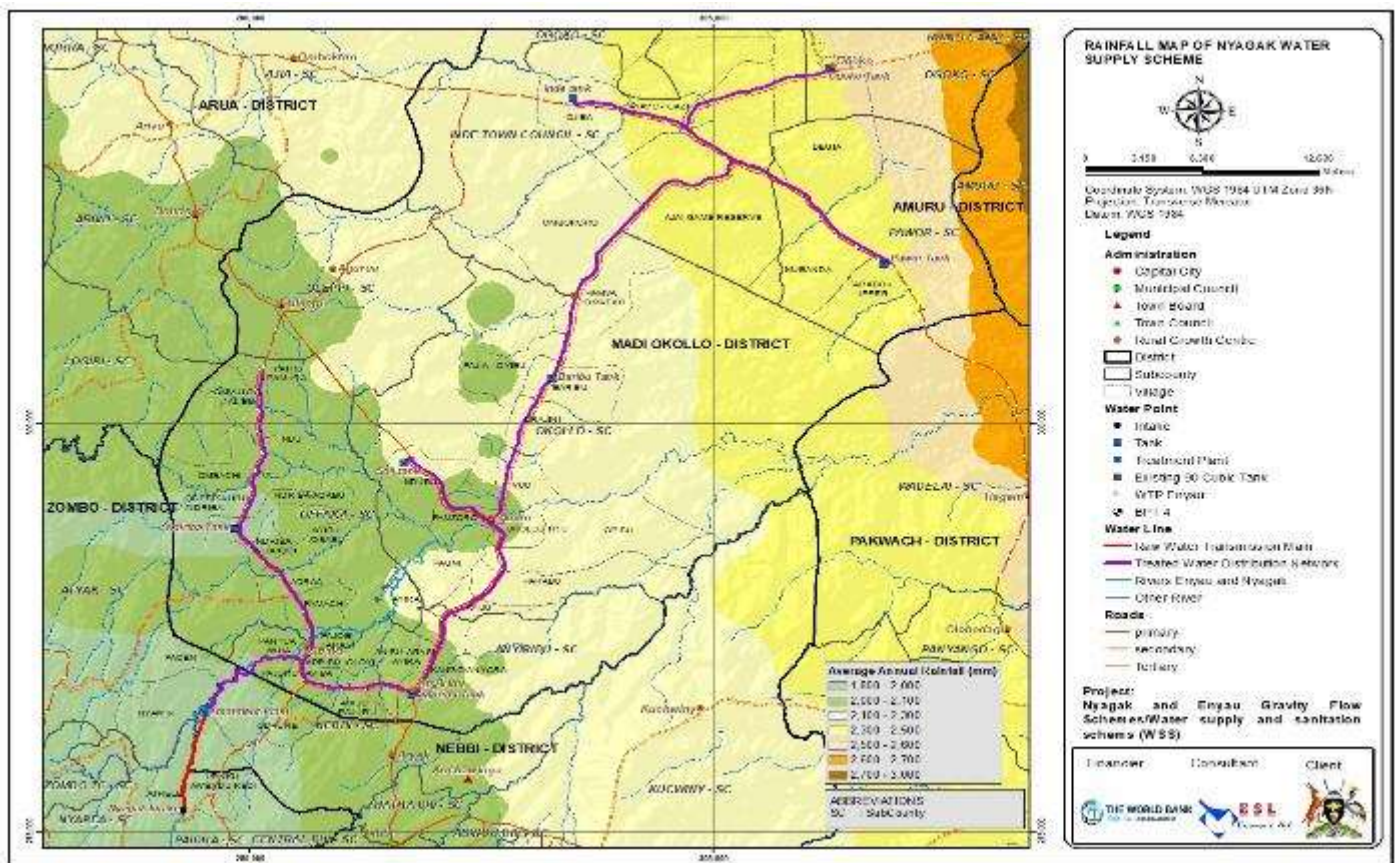


Figure 17: rainfall pattern within the project area

4.1.6 Noise

Baseline noise conditions were investigated along various segments of the proposed Nyagak water supply infrastructural routes using an Extech 407730 Sound Level Meter. Generally average noise levels along the entire project area are low and within the acceptable limits for both areas defined as commercial or residential.

This is because the proposed water distribution routes traverses sparsely populated areas with low human activities and thus no receptors from the communities were identified. However, project workers shall be the main receptors of any changes in the baseline noise levels. Both the Raw water transmission main and clean water distribution network pass through remote villages (wilderness) surrounded with bushes, thickets and gardens. Several parts of the corridor are either gardens or land under fallow. Therefore, most of the baseline noise levels along the water distribution corridor are between 40-50 dB (A). Table 4.1 below presents some of the baseline noise levels taken at some selected points along the project

sites and Table 4.2 shows the Standards for Maximum Permissible Noise Levels for various environments.

Table 4.1 Noise levels recorded along the Transmission Corridor

Area Sampled	Minimum (dBA)	Maximum (dBA)	Average (dBA)	Source of baseline noise conditions	Coordinates	Nema Standard (dBA)	Comments	Overall rating
Intake Athele village, Nyapea subcounty Zombo district	47.3	52.1		Wind and background noise from the Nyagak III hydropower construction works	E: 276283 N: 276449	60	Normal	Low
500 meters east of the water treatment plant (Uruku village)	Lo	Lo		Natural process such as wind	E: 282353 N: 278175	60	Normal	Very low
At the area around the water treatment plant (Uruku village)	Lo	Lo		Natural process such as wind	E: 282301 N: 227641	60	Normal	Very Low
At the junction to Ndiriba and Anyiribu	Lo	41.3		Natural processes such as wind	E: 285564 N: 282957	60	Normal	Low
At Anyiribu water tank (Kango village)	45.3	48.6		Traffic from Nebbi-Arua high way	E:283367 N:288727	60	Normal	Low
Within Ajai Wild life Reserve (Ombokoro village)	Lo	Lo		Natural process	E:314907 N:304629	60	Out of normal range	Very low
At Inde water tank (Ojiba village)	Lo	41.5		Natural processes such as wind and birds	E: 319849 N: 297426	60	Out of normal range	Very low
At Pawor Trading centre Parabok village)	42.3	45.8		Traffic from the road especially motorcycles	E: 309804 N: 314540	60	Normal	Low

NB. Noise reading of Lo indicates it was below 40decibels and could not be taken by the machine used

Table 4.2 Standards for Maximum Permissible Noise Levels for various environments

For General Environment		
Facility	Noise Limits dB(A)	
	Day	Night
A. Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes for higher learning, conference rooms, public library, environment or recreational site	45	35
B. Residential building	50	35
C. Mixed residential (with some commercial and entertainment)	55	45
D. Residential + Industry or small scale production + Commerce	60	55
E. Industrial	70	60
Construction site		
(i) Hospitals, schools, institutions for higher learning, homes for the disabled, etc.	60	50
(ii) Buildings other than those prescribed in (i)		
From a factory or workshop		
Acceptable noise limit dB(A)	Duration (Daily)	Duration (weekly)
85	8 Hours	40 Hours
88	4 Hours	20 Hours
91	2 Hours	10 Hours
94	1 Hours	5 Hours
97	30 Hours	2.5 Hours
100	15 Hours	1.25 Hours
103	7.5 Minutes	37.5 Minutes
106	3.75 Minutes	18.75 Minutes
109	1.875 Minutes	9.375 Minutes
Accelerating vehicles		
Vehicle Category in dB(A)		Maximum sound level
Vehicle Category		
1	Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver's seat	78
2	Vehicles intended for carriage of passengers and equipped with not more than nine seat including the driver's seat and having maximum permissible mass of more than 3.5 tonnes- (a) With an engine power of more than 150KW (b) With an engine power of less than 150KW	80 83
3	Vehicles intended for carriage of passengers and equipped with more than nine seats including driver's seat: Vehicles intended for carriage of goods- (a) With maximum permissible mass not exceeding 2 tonnes (b) With maximum permissible mass exceeding 2 tonnes but not exceeding 3.5 tonnes	79 80
4	Vehicles intended for the carriage of goods and having a maximum permissible mass exceeding 3.5 tonnes- (a) With an engine power of less than 75KW (b) With an engine power of not less than 75KW but less than 150KW	81 83

	(c) With an engine power of less than 150KW	84
Mines and quarries		
	Facility	Limit value in dB(C)
1	For any buildings used as a hospital, school, convalescent home, old age home or residential building	109 dB(C)
2	For any building in area used for residential and one or more of the following purposes: Commerce, small scale production, entertainment, or any residential apartment in area that is used for purposes of industry, commerce, or small scale production, or any building used for the purpose of industry, commerce or small scale production.	14dB(C)

Time frame:

Day	6.00am	-	10.00pm
Night	10.00pm	-	6.00am

Source: *The National Environment (Noise Standards and Control) Regulations, 2003*

4.1.7 Drainage and water resources

4.1.7.1 Drainage and hydrology

The entire project area along the Nyagak WSS drains either east wards in both Zombo, Nebbi and Madi-Okollo districts and all water is finally discharged into River Nile. The project area is gently sloping descending gradually towards the Nile. The highest point lies west of the intake going up to a height of 1608 above sea level and the lowest point is at the eastern boundary of Ajai wild life reserve at 624m along the Nile in Madi-Okollo district.

The various segments of Nyagak WSS cut across 29 rivers/streams most of which are permanent in nature. All these streams are part of the wider catchment of the Albert Nile in both Zombo, Nebbi and Madi-Okollo districts. Some of these are narrow with a riparian width of not more than 30 meters, while others are wide (beyond 50 meters). During construction, the contractor will have to ensure civil works across such streams don't interfere with the integrity of the water resources. Table 4.3 below presents a list and other details of all stream crossings.

Table 4.3: List of streams intercepted by the Nyagak WSS

Crossing Point	River Name			Length of Crossing	Administration		
		Centre_X	Centre_Y		Village	Sub County	District
1	Nyagak	276440	276734	12.50	Athele	Nyapea	Zombo
2	Nyagak	276495	276874	26.00	Athele	Nyapea	Zombo
3	Nyagak	276416	277559	7.00	Athele	Nyapea	Zombo
4	Nyagak	276363	277532	21.00	Athele	Nyapea	Zombo

Crossing Point	River Name			Length of Crossing	Administration		
		Centre_X	Centre_Y		Length(m)	Village	Sub County
5	Nyagak	276340	277691	19.00	Athele	Nyapea	Zombo
6	Nyagak	276494	277812	20.00	Uruku Awendu Kedi	Paidha	Zombo
7	Nyagak	276411	278072	12.50	Athele	Nyapea	Zombo
8	Nyagak	276480	278178	20.00	Athele	Nyapea	Zombo
9	Nyagak	276485	278237	17.00	Athele	Nyapea	Zombo
10	Mora	282510	285640	17.00	Adribu /Oloyi	Anyiribu	Madi Okollo
11	Nyagak	283413	286879	13.50	Pamachi	Offaka	Madi Okollo
12	Akedo	283379	287330	7.00	Pamachi	Offaka	Madi Okollo
13	Aji	281673	290833	10.39	Ayibu/Osabu	Offaka	Madi Okollo
14	Ora	280487	297040	9.20	Ombachi	Offaka	Madi Okollo
15	Chodiri	280844	298203	10.00	Ombachi	Offaka	Madi Okollo
16	Idzia	280600	300958	12.50	Omvuloo / Alibu	Offaka	Madi Okollo
17	Adia	284665	283823	8.00	Pajuru / Aviba	Anyiribu	Madi Okollo
18	Ozo	284808	283848	16.45	Anibu /Pajuru	Anyiribu	Madi Okollo
19	Orunga	285312	283830	9.00	Anibu /Pajuru	Anyiribu	Madi Okollo
20	Olido	286983	284070	8.00	Anibu /Pajuru	Anyiribu	Madi Okollo
21	Ora	293199	293713	70.00	Pauni	Okollo	Madi Okollo
22	Julu	293516	294790	9.00	Vuu	Okollo	Madi Okollo
23	Julu	293504	294949	9.00	Vuu	Okollo	Madi Okollo
24	Julu	293495	295103	10.00	Vuu	Okollo	Madi Okollo
25	Aigbo	293907	297228	85.00	Vuu	Okollo	Madi Okollo
26	Rabiya	294285	298346	9.00	Vuu	Okollo	Madi Okollo
27	Zakizava	303701	317887	8.00	Ajai Game Reserve	Inde Town Council	Madi Okollo
28	Linya	300008	319234	11.00	Ajai Game Reserve	Inde Town Council	Madi Okollo

Crossing Point	River Name			Length of Crossing	Administration		
		Centre_X	Centre_Y		Length(m)	Village	Sub County
29	Gazi	304488	319578	30.00	Ojiba	Inde Town Council	Madi Okollo

4.1.7.2 Wetlands and riparian habitats

Nyagak WSS will also affect some wetlands although majority of them will be riparian habitats along the affected streams identified under table 4.3 above. Therefore, these wetlands can be classified as open streams, seasonal and permanent wetlands. Plant species of seasonal wetlands included *Echinochloa pyramidalis* Least Concern (LC), *Loudetia simplex* Not Evaluated (NE), *Cyperus* spp., *Fimbristylis dichotoma* (LC), *Cissampelos mucronata* (NE), *Leersia hexandra* (LC) and *Polygonum salicifolium* (LC). *Cyperus papyrus* (LC), *Phragmites mauritiana* (LC), *Phoenix reclinata* (LC) were among the many species of permanent wetlands. In these wetland areas were also found patches of swamp forest vegetation and the species here included *Phoenix reclinata* (LC), *Albizia zygia* (LC), *Maesopsis eminii* (LC), *Macaranga schweinfurthii* (LC) and *Alchornea cordifolia* (LC) (Plate 4.1). Swamp forest species were *Phoenix reclinata* (LC), *Acacia polyacantha* (NE), *Blighia unijugata* (LC), *Albizia grandibracteata* (LC) and others Refer to Annex 5; List of plant species identified in the project area detailing conservation value. Table 4.4 below present a list of wetlands affected by the Nyagak water scheme.

Table 4.4: Some of the wetland resources identified along the Nyagak water scheme

Name of wetland	Type of wetland	Coordinates of Crossing		Distance (m)	Coordinates of Crossing		
		Start_X	Start_Y		Village	Sub County	District
Ombachi	Seasonal	280531	299040	60	Ombachi	Offaka	Madi - Okollo
Omvuloo/ Alibu	Seasonal	280531	299040	59	Omvuloo / Alibu	Offaka	Madi - Okollo
Pauni	Permanent	293249	293675	85	Pauni	Okollo	Madi - Okollo
Ojiba	Permanent	298912	319432	1883	Ojiba	Inde Town Council	Madi - Okollo
Ajai Game Reserve	Permanent	304053	319084	117	Ajai Game Reserve	Inde Town Council	Madi - Okollo
Ajai Game Reserve	Permanent	303968	319114	115	Ajai Game Reserve	Inde Town Council	Madi - Okollo

Ajai Game Reserve	Permanent	303968	319114	186	Ajai Game Reserve	Inde Town Council	Madi - Okollo
Ajai	Permanent	310905	312681	109	Degia	Ogoko	Madi - Okollo



Plate 4.11: The swamp ecosystem in Ajai Wild Life Reserve

4.1.7.3 Water quality characteristics of selected water points on river Nyagak sources

In order to understand the characteristics of the existing water sources in river Nyagak, the ESIA team assessed its baseline water quality on two selected water points (Upstream and downstream). Baseline water quality was analysed at National Water and Sewerage Corporation (NWSC) to determine the physio-chemical and bacteriological characteristics of the sources. Specifically, the samples were analysed for the parameters as presented in table 4.5 below. Table 4.6 below presents a summary of the results. Detailed results of the laboratory tests for each sample and parameters tested is presented in Annex 3 against permissible standards

Table 4.5: Maximum permissible standards for selected parameters for potable water

Parameter	Units	National Standards for untreated Portable water (Maximum permissible)
Turbidity	NTU	25
PH	-	6.5-8.5
Alkalinity: Total as CaCO ₃	mg/L	500
COD	Mg/l	Not specified
Electrical Conductivity (EC)	uS/cm	2500
Hardness: Total as CaCO ₃	mg/L	600

Parameter	Units	National Standards for untreated Portable water (Maximum permissible)
Total Dissolved Solids (TDS)	mg/L	1500
Total Suspended Solids (TSS)	mg/L	0
Bacteria: Faecal coliforms	CFU/100mL	0

Table 4.6: Water quality assessment for river Nyagak

Name of sample	Coordinates at which sample was taken	Hydrological and or key particulars of the water source	Water quality results
Nyagak river (upstream)	E: 276430 N: 276055	Sample was taken about from River Nyagak about 300 meters upstream of the intake in Athele village, Nyapea subcounty, Zombo district	<p>The water sample showed complying physical chemical characteristics with exception of TSS as provided for by National Standards for Untreated Portable Water.</p> <p>The water sample showed uncomplying bacteriological characteristics as provided for by the National Standards for untreated Portable Water</p>
Nyagak river (downstream)	E: 277645 N: 282630	Sample was taken from River Nyagak about 6.4km downstream of the intake in Omier Central Forest Reserve, Nebbi district.	<p>The water sample showed complying physical chemical characteristics with exception of TSS and turbidity as provided for by National Standards for Untreated Portable Water.</p> <p>The water sample showed uncomplying bacteriological characteristics as provided for by the National Standards for untreated Portable Water</p>

4.1.8 Ambient Air quality

4.1.8.1 Particulate Matter

This section presents findings from the Particulate matter assessments in Table below. Findings indicate that the particulate matter was in permissible range at the time of assessment.

Table 4.7: Ugandan Air Quality Standards for Particulate Emissions

Emission	Averaging period	Ugandan Air Quality Standards for Ambient Air
Particulate matter (PM ₁₀)	1 year	60 µg/m ³
	24 hour	100 µg/m ³
Particulate matter (PM _{2.5})	1 year	40 µg/m ³
	24 hour	60 µg/m ³

Table 4.8: WHO Air quality guidelines for particulate matter for 24hr concentrations

	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	Basis for the selected level
Air Quality Guideline (AQG)	50	25	Based on the relationship between 24- hour and annual PM levels.

Table 4.9: Particulate emissions recorded in selected sites within Nyagak WSS project area

DATE	TIME	Latitude	Longitude	PM2.5(ug/m3)	PM10(ug/m3)
1/11/2022	12:44:18	2°29'54.642"	30°59'21.696	21.6	31.9
1/11/2022	13:03:08	2°33'5.442	31°0'8.052"	25.5	40.9
9/11/2022	13:15:12	2.81790°	31.30659°	24.3	35.2
9/11/2022	13:25:06	2.81790°	31.30659°	34.5	52.8
1/11/2022	12:44:18	2°29'54.642"	30°59'21.696	21.6	31.9

4.1.8.2 Air Quality

The earth's atmosphere contains a number of gases such as Oxygen (21%), Nitrogen (78%), Water vapour (1-3%), Carbon dioxide (0.03%), Hydrogen, Nitrogen, Ozone, etc. in a relatively fixed ratio. The balance in distribution of the above gases may change due to man induced activities and the concentration of different gases may change accordingly. Dust and vehicular emissions may change the concentration of suspended solid particles in the air and may cause drastic changes in the levels of Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM), which is hazardous to human being and plants. Sulphur dioxide (SO₂), Oxides of Nitrogen (NO_x), and RSPM are the four major air pollutants, which cause concern to environment and other living beings.

The WHO ambient air quality guidelines set the following standards; Nitrogen Dioxide (NO₂) 5 ppm ceiling limit (a level that should not be exceeded during any part of the work experience), Carbon monoxide (CO) 10 ppm Permissible Exposure Limit (the maximum amount or concentration of a chemical that a worker may be exposed to) for 8 hours, Hydrogen Sulphide (H₂S) 20 ppm ceiling limit and 1000 ppm for methane (CH₄).

Volatile organic compounds (VOCs) are organic compounds characterized by their tendency to evaporate easily at room temperature.

Familiar substances containing VOCs include solvents, paint thinner, and nail polish remover, as well as the vapours associated with fuels such as gasoline, diesel, heating oil, kerosene, and jet fuel. The category also includes many specific toxic substances, such as benzene, butadiene, hexane, toluene, xylene, and many others. OSHA adopted a Permissible Exposure Level (PEL) of 0.75 ppm and an action level of 0.5 ppm for VOCs. Therefore, the ESIA team carried out air quality assessment at selected points along the transmission corridor to benchmark baseline air quality conditions prior to the implementation of the project. Air quality assessment was undertaken using a MultiREA Lite Gas monitor. This gas monitor has the ability to detect the concentrations of oxygen, carbon dioxide, Hydrogen sulphide, methane and Volatile organic compounds in a given environment at a particular time.

Table 4.10 below presents the results of the air quality assessment which were similar of all the 5 receptors sampled. The results indicate that ambient average oxygen concentrations at all sampled points was 20.8 percentage volume. Gas emissions of carbon monoxide, Hydrogen Sulphide, LEL methane and VOCs and H₂S were all not detected while analysing (reflecting the low population density, absence of heavy industry, and low traffic levels). The possible sources of air contaminants within the project area are small and are likely to result from traffic, Grain milling machines and a number of rural households where wood and kerosene are the main fuel for cooking and lighting.

Table 4.10: Air quality results recorded at selected sites within Nyagak WSS project area (standards from WHO ambient air quality guidelines 2021)

National Environment (Draft Air Quality Standard) for Ambient Air	Carbon Monoxide CO (PPM) 10	Carbon Dioxide CO ₂ (%) 7	Sulphur dioxide SO ₂ 10 mins - 500 µg/m ³	Nitrogen Oxide NOx (40 µg)	Hydrogen Sulphide (Ppm)
Sample Location					
Intake N 2°29'54.642" E 30°59'21.696	ND	0.03	ND	ND	ND
Water Treatment Plant N 2°33'5.442 E 31°0'8.052"	ND	0.03	ND	ND	ND
Pawor SC N 2.81790° E 31.30659°	ND	0.05	ND	0.01	ND
Pamve/Omveko N 2.81790° E 31.30659°	ND	0.04	ND	0.05	ND

4.2 Biophysical environmental

4.2.1 Flora

4.2.1.1 Overview of the general vegetation description

The original general vegetation was described by Langdale-Brown et al (1964) described as Combretum-Acacia- Hyparrhenia and Vitellaria-Hyparrhenia dissoluta savanna consisting of mixed deciduous broad-leaved trees and both annual and perennial grasses, which changed overtime due to the effects of tree cutting for fuel and periodic clearing for cultivation.

During the survey, it was observed that the vegetation is highly modified. The savannah woodland is now a grassland with scattered woody species of which most of them are small trees due to overutilization. Invasive plants like Chromolaena odorata, Parthenium hysterophorus and Xanthium strumarium were common. Along the river line pure stands of Pennisetum purpureum, unid grass and unid 1) were sited. A wide area of the river was cleared almost up to the river bank leading to water siltation. The cultivation mainly had Manihot esculenta, Musa spp and Sesamum indica as vegetable.

4.2.1.2 Data collection methods

Literature search

Desk reviews of relevant literature were done before the field surveys. Information relevant to vegetation and flora was sought to identify conservation issues. These included presence of unique, threatened, rare and species of conservation concern and habitats known to occur in and around the study site. The vegetation classification as described by Langdale-Brown et al. (1964) was also reviewed.

Sampling

Imaginary belt transects were laid to cover areas of the proposed sites for the construction of the intake, treatment plant, reserve tanks and some parts of the pipeline. The pipeline was covered mainly using opportunist sampling especially for the trees and in the general vegetation description of the wide range. The plant species encountered were listed. The dominant plant species encountered were registered as the most common at each point. The others were listed in the checklist for the project area.

Frequency

The present absent method was used to determine the frequency of species in the study area. Opportunistic sampling was also used to capture as many species to cater for the pipeline. The generated species checklist was checked against lists of species of conservation concern like the IUCN list, National red list and List of trees of National

importance by National Forest Authority (NFA). These lists were checked but with caution because not all Ugandan species have been assessed for red listing (Appendix 5).

Species classification

Some of the plants were identified in the field sport on and those that were not identified in the field were collected for identification at the Makerere University Herbarium (MHU).

Table 4.11: Description of the sites surveyed

R. Nyagak Water Supply System				
Way Point	UTM	Altitude	Description	Common species
Way point	UTM	Location	Description	Dominant species
344	276424 276315 1071m	Water Intake, Zombo District	Disturbed wooded grassland (Fallow) with scattered homestead	<i>Musa</i> spp., unid 1, <i>Pennisetum purpureum</i> , <i>Chromolaena odorata</i> , <i>Setaria sphacelata</i> , <i>Hyparrhenia filipendula</i> , <i>Albizia zygia</i> , <i>Combretum molle</i>
831	277993 282385 1028m	Water Treatment Plant	Post cultivation Next to Omier Central Forest Reserve – with pine plantation and heavily encroached with settlements elsewhere	<i>Vitellaria paradoxa</i> , <i>Lonchocarpus laxiflorus</i> , <i>Ficus mucoso</i> , <i>Sterculia setigera</i> , <i>Tamarindus indica</i> , <i>Grewia trichocarpa</i> , <i>Hyparrhenia filipendula</i>
393	279147 293514 1046m	Main transimission through Offaka Ndiriba Tank – Nyagak	Vitellaria-Acacia-Hyparrhenia grassland	<i>Vitellaria paradozxa</i> , <i>Sterculia setigera</i> , <i>Vachellia hockii</i> , <i>Lonchocarpus laxiflorus</i> , <i>Hyparrhenia rufa</i>
354		Anyrivu Reservoir water tank	Settlements	<i>Sorghum vulgare</i> <i>Sesamum indicum</i> , <i>Tamarindus indica</i> , <i>Lannea schweinfurthii</i>
	288820 297609 958 m	Goli Tank- Nyagak	Combretum-Acacia-Hyparrhenia	<i>Vitellaria paradoxa</i> , <i>Combretum molle</i> , <i>Vachellia hockii</i> , <i>Kigelia africana</i> , <i>Hyparrhenia dissoluta</i>
358	301526 313549 706 m	Entering Ajai Wildlife Reserve	Wooded grassland	<i>Combretum molle</i> , <i>Terminalia glaucescens</i> , <i>Loudetia arundinacea</i>
	276441 275857 1131m		Wooded grassland with scattered woody species	<i>Combretum ghasalense</i> , <i>Vitellaria paradoxa</i> , <i>Terminalia brownii</i> , <i>Ficus sur</i> , <i>Combretum collinum</i> ,

R. Nyagak Water Supply System				
Way Point	UTM	Altitude	Description	Common species
				<i>Loudetia arundinacea</i> , <i>Hyparrhenia dissoluta</i> .
	277431 276910 1120 m		Disturbed savannah with scattered homesteads	
	278724 279427 1065 m	River Nyasum – fast flowing river	Woodland	<i>Ficus brachypoda</i> , <i>Tamarindus indica</i> , <i>Albizia coriaria</i> , <i>Toddalia asiatica</i> , <i>Hyparrhenia filipendula</i> , <i>Hyparrhenia Tylosema fassoglensis</i> , <i>Luffa cylindrical</i>
	967 m	Anyrivu Reservoir Water Tank	Plantation of Teak. Original vegetation: Vitellaria-Hyparrhenia grassland	<i>Tectona grandis</i> , <i>Vitellaria paradoxa</i> , <i>Lannea schimperi</i> , <i>Hyparrhenia dissolute</i> , <i>Andropogon gayanus</i>
	296284 302802 810 m	Paribu Reservoir Water Tank, next to Paribu Primary School	Disturbed Wooded Hyparrhenia grassland/Cultivation	<i>Vitellaria paradoxa</i> , <i>Sterculia setigera</i> , <i>Sclerocarya birrea</i> , crops (Simsim and Sorghum)
	306057 316107 663 m	Ogok Reservoir Water Tank	Wooded grassland	<i>Ficus brachypoda</i> , <i>Lannea barteri</i> , <i>L. schweinfurthii</i> , <i>Toddalia asiatica</i> , <i>Capparis erythrocarpos</i> , <i>Securidaca longipedunculata</i> , <i>Lonchocarpus laxiflorus</i> , <i>Hyparrhenia spp.</i>
	297417 319717 714 m	Inde Tank, -Next to Ogoko Seed Sec. School Inde Trading Centre	Hyparrhenia wooded grassland	<i>Hyparrhenia filipendula</i> , <i>Euphorbia candelabrum</i> , <i>Combretum molle</i> , <i>Combretum collinum</i> , <i>Sterculia setigera</i>
	304428 319845 673m	Ogoko, Tank – Nyagak	Hyparrhenia wooded grassland	<i>Hyparrhenia cymbaria</i> , <i>Lonchocarpus laxiflorus</i> , <i>Steriospermum kunthianum</i> , <i>Ficus brachypoda</i> , <i>Lannea schweinfurthii</i> ,
	311788 311412 648m	Pawor Tank – Nyagak	Echinochloa grassland	<i>Echinochloa pyramidalis</i> , <i>Leersia hexandra</i> , <i>Setaria sphacelata</i> , <i>Chloris gayana</i> , <i>Hyparrhenia dissoluta</i> .

4.2.1.3 Results and discussion

A total of 240 plant species belonging to 156 genera and 52 families were recorded from the surveyed project area. Among these, herbs registered the highest number of 138 herbs, trees were 59, shrubs were 34 and 10 were lianas. Most species are registered as Least Concern (LC) due to their wide distribution Kalema, J. & Beentje H. (2012). The most frequent woody species that were almost in all plots were: *Vachellia hockii* (*Acacia hockii*), (*Vitellaria paradoxa* & *Tamarindus indica* both IUCN red listed), *Combretum molle*, *C. collinum*, *Terminalia brownii* and *Ficus* spp. The most common herbaceous species were: *Chromolaena odorata* (invasive bush forming herb) as the most common, *Loudetia arundinacea*, *Hyparrhelia dissoluta* and *Hyparrhenia filipendula*. Species of conservation concern in the sense of IUCN red list (Global and National) were recorded (Table 4.12).

Table 4.12: Species of conservation concern

No.	Family	Name	IUCN Red list Global/National
	Anacardiaceae	<i>Pseudospondias microcarpa</i>	VU LC
	Fabaceae	<i>Tamarindus indica</i> L.	NE VU
	Sapotaceae	<i>Vitellaria paradoxa</i>	VU VU
	Moraceae	<i>Milicia excelsa</i> (Welw.) C.C.Berg.	NT EN

Vegetation systems along the proposed project sites



4.2.2 Herpetofauna

4.2.2.1 Overview

The study area was at selected points representing the proposed project infrastructure. These include Water Intake area, Water Treatment Plant for raw water, Water Tanks to supply surrounding communities and along the pipeline routes with their immediate surroundings.

4.2.2.2 Data collection methods

Visual Encounter Surveys (VES) Day Surveys

Visual Encounter Surveys are a well-known and robust method for surveying herpetofauna. VES is similar to the Timed Constrained Count (TCC) method described by Heyer et al., (1994). VES are used to document presence of amphibians and are effective in most habitats and for most species that tend to breed in lentic habitats. They generate encounter rates of species in their habitats in a unit hour. The method comprises moving through a habitat, turning logs or stones, inspecting retreats and watching out for and recording surface-active species. The data gathered using this procedure provide information on species richness of the habitat. This was the main method used throughout the survey.

Dip-net sampling

A standardized dip-net (Fig. 1.3) was used to scoop through aquatic habitats to sample for aquatic species and for tadpoles. Specimens of aquatic species or tadpoles caught by this method, if not identifiable in the field were preserved for later identification.



Plate 11: Dip-net used for sampling aquatic herpetofauna and tadpoles

Local Knowledge

Visual Encounter Surveys were supported by Local Knowledge (LK). Local people were interviewed using a method known as Local Knowledge (LK) to establish the herpetofauna, particularly reptile species known to be present in a project site. This was treated as secondary data and used to build the species checklist.

Species Identification

Identification of herpetofauna followed Schiøtz, (1999), Spawls et al., (2002, 2006) and Channing & Howell (2006)). The AmphibiaWeb (2022), Frost (2022) and The Reptile Database (Uetz et al., (eds.) 2022) was also used. The conservation status of the herpetofauna was reported using the IUCN Red Listing (IUCN 2022) and the Ugandan Red List (WCS 2016). Validation of voucher specimens collected from their field or their photos was carried out in the lab at Makerere University. Table 4.13 below shows the way points sampled for herpetofauna representing the key localities and habitats for the Nyagak Gravity Flow Scheme (GFS).

Table 4.13: Geo-referenced Sites in Selected Localities of Nyagak GFS.

Way Point	UTM	Altitude	Description
344	36 N 276424 276315	1071 m	Nyagak Water Intake, Zombo District
831	36 N 277993 282385	1028 m	Water Treatment Plant -Next to Omier Central Forest Reserve – with pine plantation and heavily encroached with settlements elsewhere
393	36 N 279147 293514	1046	Ndiriba Tank –Nyagak
354	36 N 288742 283430	967 m	Anyrivu Reservoir Water Tank
392	36 N 288820 297609	958 m	Goli Tank – Nyagak GFS
392	36 N 288820 297609	958 m	Goli Tank – Nyagak GFS
358	36 N 301526 313549	706 m	Entering Ajai Wildlife Reserve
361	36 N 304090 317427	669 m	Junction to Ogoko Tank = 45km – did not do – for Alex because of muddy road – thru a big wetland, had tamark across the wetland remember
362	36 N 303797 318884	665 m	Big wetland – GAZI – linked up with River Nile, tamark road being constructed through – we almost reached but trailers stuck in the road made us come back in Gariya Village, Yarchi Parish, Ogoko Sub County
394a	36 N 311788 311412	648	Pawor Tank – Nyagak GFS – In Mubanda Village, Panduku Parish, Pawor Sub County
365	36 N 297417 319717	714 m	Inde Tank, -Next to Ogoko Seed Sec. School and Inde Trading Centre

4.2.2.3 Results (Amphibians)

Amphibian species richness and distribution

A total of 25 amphibian species belonging to one Order Anura, 10 families and 13 genera were recorded during the study and have been identified (Tab. 14).

Table 4.14: Amphibian Species of Surveyed Locations in Selected areas of Nyagak GFS

Order	Species	Common name	Listing
Hyperoliidae	<i>Afrixalus quadrivittatus</i>	Four-lined Spiny Reed Frog	LC/LC
Pyxicephalidae	<i>Amietia nutti</i>	Nutti's River Frog	LC/LC
Arthroleptidae	<i>Arthroleptis cf. poecilonotus</i>	Mottled Squeaker	LC/LC
Arthroleptidae	<i>Arthroleptis cf. schubotzi</i>	Schubotz's Squeaker	LC/LC
Hemisotidae	<i>Hemisus guineensis</i>	Guniea Piglet Frog	LC/LC
Dicroglossidae	<i>Hoplobatrachus occipitalis</i>	Crowned Bullfrog	LC/LC
Microhylidae	<i>Phrynomantis microps</i>	West African Rubber Frog	LC/LC
Hyperoliidae	<i>Hyperolius cinnamomeoventris</i>	Cinnamon-bellied Reed Frog	LC/LC
Hyperoliidae	<i>Hyperolius kivuensis</i>	Kivu Reed Frog	LC/LC
Hyperoliidae	<i>Hyperolius viridiflavus</i>	Common Reed Frog	LC/LC
Hyperoliidae	<i>Kassina senegalensis</i>	Senegal Land Frog	LC/LC
Arthroleptidae	<i>Leptopelis oryi</i>	Oryi's Tree Frog	LC/LC
Arthroleptidae	<i>Leptopelis viridis</i>	Green Tree Frog	LC/DD
Phrynobatrachidae	<i>Phrynobatrachus cf. acridoides</i>	East African Puddle Frog	LC/LC
Phrynobatrachidae	<i>Phrynobatrachus cf. bullans</i>	Bubbling Puddle Frog	LC/DD
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i>	Mababe Puddle Frog	LC/LC
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Natal Dwarf Puddle Frog	LC/LC
Ptychadenidae	<i>Ptychadena anchietae</i>	Anchietae's Ridged Frog	LC/LC
Ptychadenidae	<i>Ptychadena nilotica</i>	Nile Grass Frog	LC/LC
Ptychadenidae	<i>Ptychadena oxyrhynchus</i>	Sharp-nosed ridged Frog	LC/LC
Ptychadenidae	<i>Ptychadena porosissima</i>	Grassland Ridged Frog	LC/LC
Bufo	<i>Sclerophrys maculata</i>	Flat-backed Toad	LC/LC
Bufo	<i>Sclerophrys regularis</i>	African Common Toad	LC/LC
Pipidae	<i>Xenopus mulleri</i>	Muller's Clawed Frog	LC/DD
Pipidae	<i>Xenopus victorianus</i>	Victoria Clawed Frog	LC/LC

The most amphibian rich surveyed site was the transmission line between the road junction in Ajai WR to Ogoko Tank (20 species), followed by the transmission line between the road junction in Ajai WR to Goli Tank (19 species), while the transmission line between the Water Intake and line between Anyirivu and Goli Tanks had 15 species each and the Water Intake area, lines between road junction in Ajai WR to Pawor and Goli Tanks had 13 species each

(Fig. 4.11). The most species poor sites were the area around Anyirivu and Inde Tanks (1 species each), Ndiriba Tank (2species), Water Treatment Plant (3 species) and Goli Tank (4 species).

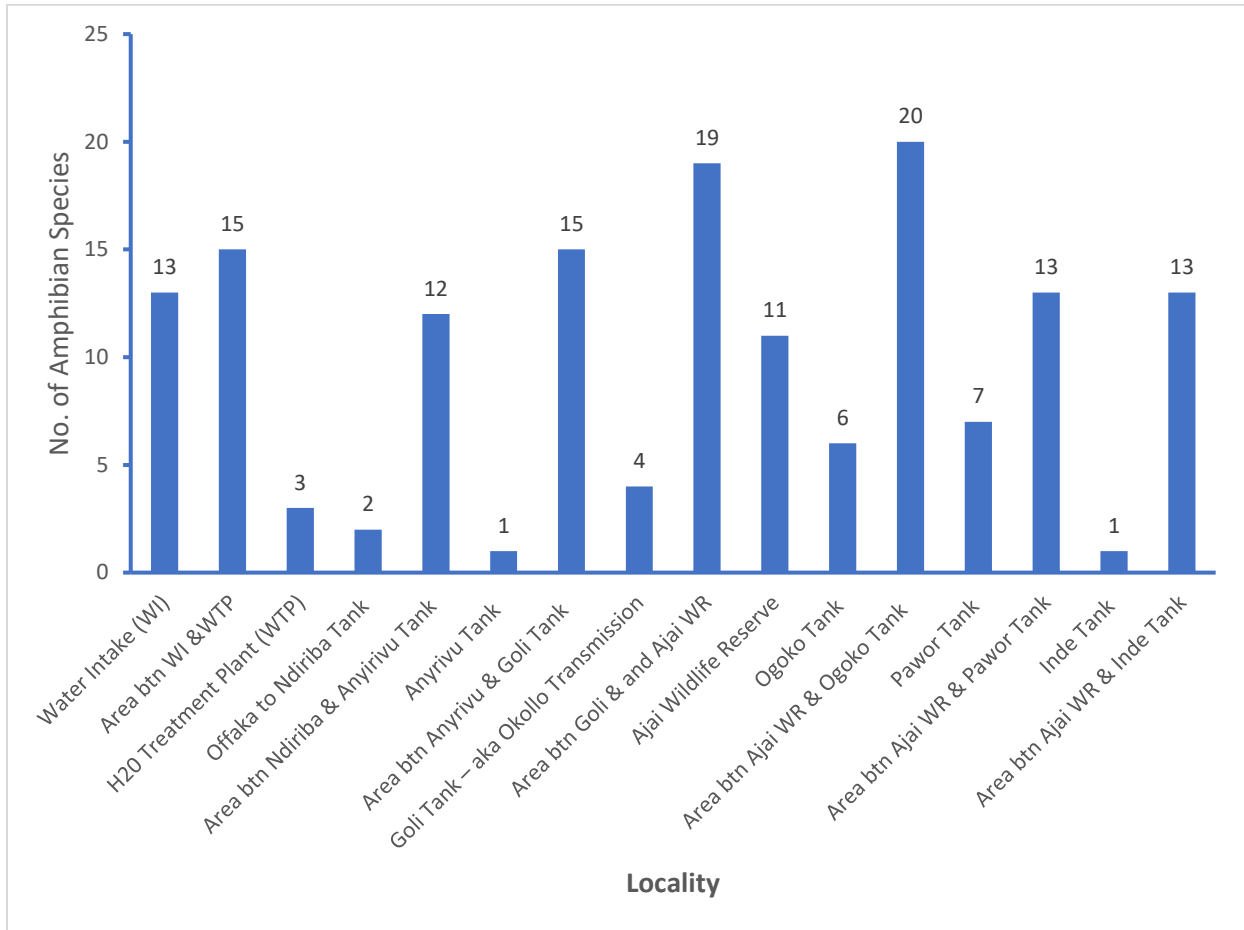


Figure 18: Amphibian Species Richness of Nyagak GFS Surveyed Sites

The commonest species were *Ptychadena nilotica* (Nile Grass Frog), recorded in 12 out of the 16 sites surveyed, followed by *Afrivalus quadrivittatus* (Four-lined Spiny Reed Frog) and *Hyperolius viridiflavus* (Common Reed Frog) (11/16 each), *Phrynobatrachus natalensis* (Natal Dwarf Puddle Frog) 10/16), *Hoplobatrachus occipitalis* (Crowned Bullfrog) and *Sclerophrys regularis* (African Common Toad) (1/16 sites each) while *Sclerophrys maculate* (Flat-backed Toad) was recorded in eight out of the 16 sites.

The least common species were *Arthroleptis cf. poecilnotus* (Mottled Squeaker) and *Arthroleptis cf. schubotzi* (Schubotz's Squeaker) recorded in one and two sites respectively, followed *Phrynomantis microps* (West African Rubber Frog), *Ptychadena porosissima* (Grassland Ridged Frog) and *Xenopus mulleri* (Muller's Clawed Frog), each recorded in only three sites out of the 16 surveyed.

Species of Conservation Concern

There were no species of Conservation Concern globally and nationally. The Arthroleptid - *Leptopelis viridis* - Green Tree Frog is globally listed as of Least Concern (LC) but nationally as Data Deficient (DD) – needing more research to be able to analyse its status adequately.

4.2.2.4 Results (Reptiles)

A total of 26 reptilian species belonging to two Orders - Chelonia and Squamata, 12 families and 16 genera were recorded during the study and have been positively identified (Table 4.15 below).

Table 4.15: Reptilian Species of Surveyed Locations in Selected areas of Nyagak GFS

Order	Family	Species	Common Name	IUCN Status
Chelonia	Pelomedusidae	<i>Pelomedusa neumanni</i>	Neuman's Marsh Terrapin	LC/LC
Chelonia	Testudinidae	<i>Knixys belliana</i>	Bell's Hinge-back Tortoise	NE/VU
Squamata	Agamidae	<i>Agama finchi</i>	Malaba Rock Agama	LC/LC
Squamata	Agamidae	<i>Agama lionotus</i>	Kenyan Rock agama	LC/LC
Squamata	Chamelionidae	<i>Chamaeleo gracilis</i>	Gracile Chameleon	LC/LC
Squamata	Chamelionidae	<i>Chamaeleo laevigatus</i>	Smooth Chameleon	LC/LC
Squamata	Gekkonidae	<i>Hemidactylus brookii</i>	Brook's Gecko	LC/LC
Squamata	Gekkonidae	<i>Hemidactylus mabouia</i>	Tropical House Gecko	LC/LC
Squamata	Gekkonidae	<i>Lygodactylus guttularis</i>	Chevron-throated Dwarf Gecko	LC/LC
Squamata	Lacertidae	<i>Nucras boulengeri</i>	Boulenger's Scrub Lizard	LC/LC
Squamata	Scincidae	<i>Lygosoma sundevalli</i>	Sundevall's Writhing Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis brevicollis</i>	Short-necked Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis maculilabris</i>	Speckled Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis perroteti</i>	Orange-flanked Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis quinquetaeniata</i>	Five-lined Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis striata</i>	Common Striped Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis varia</i>	Variable Skink	LC/LC
Squamata	Varanidae	<i>Varanus niloticus</i>	Nile Monitor Lizard	LC/LC
Squamata	Colubridae	<i>Philothamnus battersbyi</i>	Battersby's Green Snake	LC/LC
Squamata	Colubridae	<i>Hapsidophrys smaragdina</i>	Emerald Snake	LC/LC

Order	Family	Species	Common Name	IUCN Status
Squamata	Colubridae	<i>Psammophis mossambicus</i>	Olive Sand Snake	LC/LC
Squamata	Colubridae	<i>Psammophis sudanensis</i>	Northern Stripe-bellied Sand Snake	LC/LC
Squamata	Elapidae	<i>Naja subflava</i>	Forest Cobra	LC/LC
Squamata	Viperidae	<i>Bitis arietans</i>	Puffadder	LC/LC
Squamata	Viperidae	<i>Bitis gabonica</i>	Gaboon Viper	VU/VU
Squamata	Pythonidae	<i>Python sebae</i>	African Rock Python	NT/VU

The most reptilian species rich sites were – transmission line between the road junction in Ajai WR to Pawor Tank (22 species), line between Anyirivu to Goli Tank and transmission line though Ajai WR (21 species each), while the road junction in Ajai WR to Ogoko Tank had 19 species recorded and line between Water Intake and Water Treatment Plant has a richness of 15 species. The species poor sites were areas around Ndiriba and Pawor Tanks (2 species each), while the Water Treatment Plant, Anyirivu and Goli Tanks had three species recorded each.

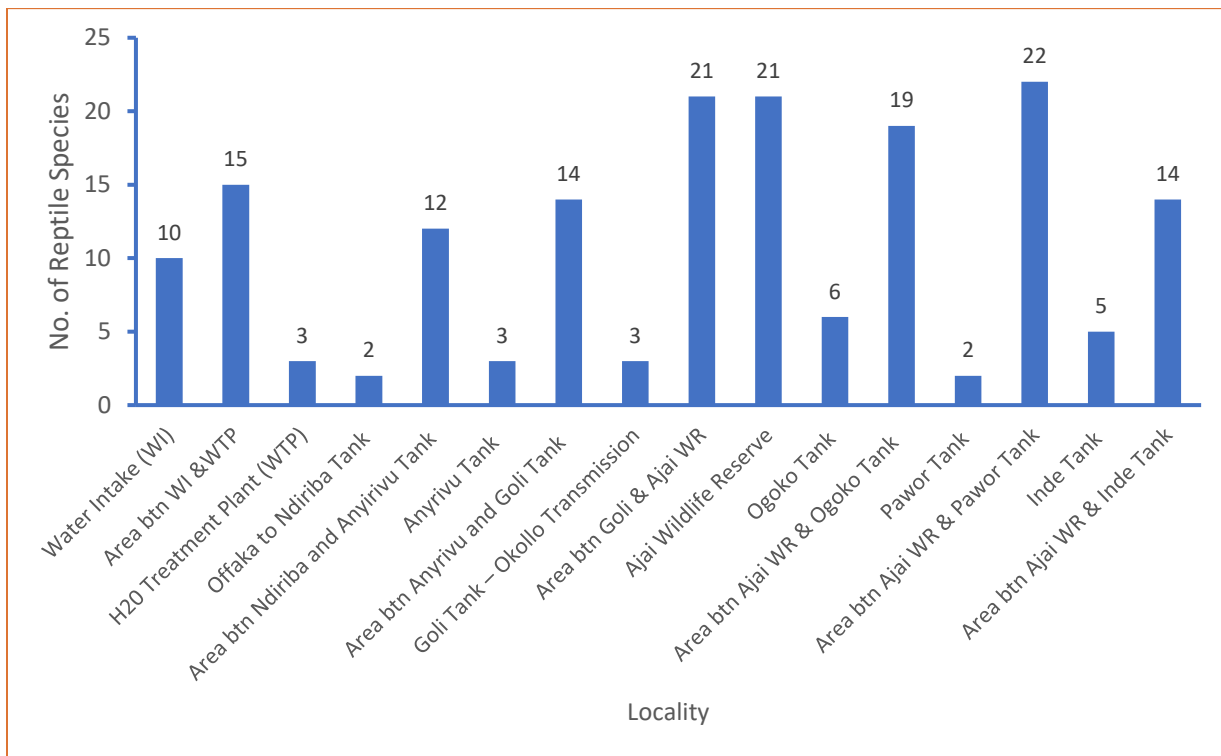


Figure 19: Reptilian Species Richness of Nyagak GFS Surveyed Sites

The commonest species were *Agama finchi* (Malaba Rock Agama) recorded in 13 out of the 16 sites surveyed, followed by *Trachylepis quinquetaeniata* (Rainbow Skink) (12/16 sites), *Agama lionotus* (Kenyan Rock agama) (11/16 sites), *Trachylepis maculilabris* (Speckled Skink) and *Naja subflava* (Forest Cobra) (10/16 sites each, while *Varanus niloticus* (Nile Monitor) was recorded in nine out of the 16 sites surveyed for reptiles.

The least common species were *Hapsidophrys smaragdina* (Emerald Snake) recorded on only two out of the 16 sites surveyed, then by *Knixys belliana* (Bell's Hinge-back Tortoise), *Trachylepis brevicollis* (Short-necked Skink) and *Bitis gabonica* (Gaboon Viper) (3/16 sites each). *Chamaeleo laevigatus* (Smooth Chameleon), *Nucras boulengeri* (Boulenger's Scrub Lizard) and *Trachylepis varia* (Variable Skink) were recorded in four out of the 16 sites surveyed.

Species of Conservation Concern

The species of conservation concern in this area were *Knixys belliana* - Bell's Hinge-back Tortoise, which is globally not well assessed i.e. Not Evaluated (NE) and nationally considered as Vulnerable (VU). The others are *Bitis gabonica* - Gaboon Viper globally listed as Vulnerable (VU) and nationally considered so (VU), while *Python sebae* – the African Rock Python is globally listed as Nearly Threatened (NT) and nationally as Vulnerable (VU). The rest of the reptile species are globally and nationally listed as of Least Concern (LC).

4.2.3 Mammals

4.2.3.1 Data collection methods

Visual Encounter Surveys (VESs)

VESs involved walking along transects searching for surface-active species of medium sized and large mammals. This method involves looking out for indirect signs of mammalian presence such as scat, foot prints and burrows or roosts in case of bats. This survey method is commonly used to determine the species richness of an area, to compile a species list and to estimate relative abundances of species within an assemblage.

Local interviews

These involved interviewing the local community members familiar with the areas of study about sighted mammal species.

4.2.3.2 Results

From the surveys conducted, in total 21 species (Table 4.16) were recorded for the ecosystem. All species except Cane rat *Thryonomys gregorianus* were recorded from interviews with people from the local community. The exceptions listed here were recorded either from direct observation of their presence and foot prints.

Table 4.16: Species of mammals recorded for the Nyagak Ecosystem

Order	Mammals	IUCN Status
Bovidae	Water buck <i>Kobus ellipsiprymnus</i>	LC
Bovidae	Common Bush Duiker <i>Sylvicapra grimmia</i>	LC
Bovidae	Bushbuck <i>Tragelaphus scriptus</i>	LC
Cercopithecidae	Baboon <i>Papio anubis</i>	LC
Cercopithecidae	Vervet Monkey <i>Chlorocebus pygerthrus</i>	LC
Cercopithecidae	Red tail monkey <i>Cercopithecus ascanius</i>	LC
Erethizontidae	Porcupine <i>Hystrix cristata</i>	LC
Herpestidae	Banded mongoose <i>Mungos mungo</i>	LC
Herpestidae	Marsh Mongoose <i>Atilax paludinosus</i>	LC
Hyaenidae	Spotted Hyaena <i>Crocuta crocuta</i>	LC
Lagomorpha	Bunyoro rabbit <i>Poelagus marjorita</i>	LC
Manidae	Tree pangolin <i>Manis tricuspis</i>	VU
Megadermatidae	Yellow winged bat <i>Lavia frons</i>	LC
Muridae	African grass rat <i>Arvicanthis nilotis</i>	LC
Mustelidae	Spot necked Otter <i>Lutra maculicollis</i>	NT
Procaviidae	Tree hylax <i>Dendrohyrax dorsalis</i>	LC
Sciuridae	Striped ground squirrel <i>Xerus erythropus</i>	LC
Suidae	Bush pigs <i>Potamochoerus porcus</i>	LC
Thryonomyidae	Cane rat <i>Thryonomys gregorianus</i>	LC
Viverridae	Genet <i>Geneta genetta</i>	LC
Viverridae	African civet <i>Civettictis civeta</i>	LC

Conservations status

For all mammal species encountered, one species is near threatened (Spot necked Otter *Lutra maculicollis*) and one species is vulnerable (Tree pangolin *Mani's tricuspis*)

4.2.4 Birds

4.2.4.1 Overview

Birds of Uganda

Generally, Uganda has 1007 bird species, of which 7 are Endangered, 11 Vulnerable and 26 Near-threatened. 190 species are listed in the East Africa Regional Red List (Bennun and Njoroge 1996). The categories of birds according to their habitat include forest specialists (FF), forest generalists or forest edge species (F), forest visitors (f), species restricted to wetlands/open waters (W), water bird non-specialist, often found near water (w) and grassland species (G) (Caswell, *et al* 2005, Bennun and Njoroge 1996).

Conservation value of birds

Given the significance of birds for conservation planning and environmental assessments, there is a need for a better ecological understanding of the role of avian community structure in conservation decision-making. Thus, they are widely used in conservation and population trends in farmland are one of the 15 'Quality of Life' indicators. In addition, small land birds in particular have often been proposed as potential indicators for the presence of other unrelated taxa or as environmental change indicators to be integrated into broader monitoring schemes. Furthermore, they are frequently included in evaluation studies for overall biodiversity conservation (Gregory et al. 2004; Kati and Sekercioğlu 2006).

Birds as biodiversity indicators

Birds are good indicators of general biodiversity i.e. areas very rich in bird species have been found to also be rich in other biodiversity. Birds have been found useful as bio-indicators because they are:

- Wide spread, they occur in all habitats (forest, grassland, water, cultivation)
- Relatively large, conspicuous- easily surveyed with simple methods like observations, use of calls to record presence or absence
- Mostly active during the day (compared to many mammals and amphibians)
- Specialized in their habitats in some cases e.g. forest or water bird specialist. The disappearance of such specialist species in an ecosystem can be used to assess the health of that particular ecosystem or the extent of degradation.

Refer to Annex 7 (c) for classification of birds according to their habitat requirements.

4.2.4.2 Data collection methods

Timed Species Counts (TSC)

Given the need for rapid assessment, a method that gives the researcher the opportunity to flush out all observable species was employed. This method involved developing a species list in which all species positively identified are listed in the order seen or heard within a period of an hour, but for this survey 30 minutes will be used. The observer walks around the survey point in a radius of 100meters flushing out shy and cryptic birds. The species recorded between 0-5,5-10,10-15, 15-20, 20-25 and 25-30 minutes were given scores of 6, 5, 4, 3, 2 and 1 respectively (Pomeroy 1992).

TSC is good for quick assessment of species richness and abundance of an area and is thus good for inventorying areas in environmental assessments. It involves the researcher looking for vantage points without any obstructions, and recording all the birds heard and seen with the help of binoculars. Field identifications was done with the help of a field guide to the birds of East Africa by Stevenson and Fanshawe (2002). Table 18 below presents the survey points where sampling was carried out.

Table 18: Biodiversity survey points where birds survey points were carried

UTM of Way Points Surveyed	Vegetation / Land use Description
36N 276826, 275822	Settlements with few trees and grasses
36N276515, 276291	Camp site area still under construction
36 N 279345, 279990	Nyagak Water Intake, Zombo District Dominated by mixed cultivations of banana, maize and beans.
36 N 278002, 277588	
36 N 278066, 277224	
36 N 276424, 276315	
36 N 276464, 276229	
36 N 276441, 275857	Pipe crossing from the intake
36 N 277431, 276910	Along the road
36N 278165, 282357	
36N278380, 282191	
36 N 278724, 279427	River Nyasum – fast flowing river
36N 2777743, 282329	Treatment plant
36 N 278738, 279462	Settlements and cultivations mixed with thickets and grasslands
36 N 278743, 279472	
36 N 279129, 279942	
36 N 278383, 282185	Small stream crossing
36N 288739, 283429	Booster Tank Madi Okollo sub-county offices, Settlements alongside mixed cultivations
36 N 278249, 282383	Riparian Vegetation
36 N 277993, 282385	Water Treatment Plant -Next to Omier Central Forest Reserve – with pine plantation and heavily encroached with settlements elsewhere
36 N 288742, 283430	Anyrivu Reservoir Water Tank
36 N 288742, 283431	Riparian Vegetation
36 N 296284, 302802	Paribu Reservoir Water Tank, next to Paribu Priary School
36 N 301227, 313138	Riparian Vegetation
36 N 301526, 313549	Ajai Wildlife Reserve characterized by riverine type of trees where there are river crossings and the dry lands dominated by grassland thicket of acacia spp, lantana camara and other bushland species
36N301538, 313564	
36An306030, 316085	
36N304007, 319253	
36N306114, 320112	
36N303589, 318219	
36 N 306057, 316107	
36 N 306057, 316107	Junction to Pawor Tank = 40km – did not do – for Alex
36 N 304090, 317427	Junction to Ogoko Tank = 45km – did not do – for Alex because of muddy road
36 N 303797, 318884	Big wetland – GAZI – linked up with River Nile, tamark road being constructed through
36 N 304009, 319256	Riparian Vegetation

UTM of Way Points Surveyed	Vegetation / Land use Description
36 N 304508, 319575	Riparian Vegetation
36 N 297417, 319717	Inde Tank, -Next to Ogoko Seed Sec. School and Inde Trading Centre
36 N 288820, 297609	Goli Tank – Nyagak
36 N 279147, 293514	Ndiriba Tank – Nyagak
36 N 304428, 319845	Ogoko, Tank – Nyagak
36 N 311788, 311412	Pawor Tank – Nyagak
36 N 294885, 357786	Water Intake, Alternative A in Dondi, Otumbari Parish, Odupi Sub County
36 N 301322, 356588	Water Treatment Plant – in murram-rocky area. Formerly wooded savanna
36 N 294932, 357784	Water Intake, Alternative B
36 N 294688, 360304	Settlements and mixed cultivations

4.2.4.3 Results

Overall, 179 individuals were observed in the study area representing 45 species of birds; the observations were made from the proposed intake area to the Water Treatment Plant area, and thereafter to the tanks downstream along transmission pipelines.

The highest numbers of individuals observed were at Nyagak Water Intake area and Power House with 68 and 58 individuals respectively, followed by Ajai Wildlife Reserve (33 individuals), Water Treatment Plant and Goli Tank (28 individuals each). The least number of individuals were recorded at Anyirivu and Paribu Tanks with 23 and 23 individuals respectively, followed by Ndiriba Tank (14 individuals), Penstock area (16 individuals) and Pawor Tank (18 individuals). Birds having a wider home range, they were found in all survey areas (Table 4.19).

Species Diversity was highest in the Water Intake Area (32 species), followed Power House and Ajai Wildlife Reserve (20 species each), Ogoko and Goli Tanks (16 and 15 species respectively). Anyirivu and Paribu Tanks had the least diversity each with eight bird species, Ndiriba Tank had nine species and the Water Treatment Plant had 10 bird species recorded.

Ajai Wildlife Reserve is an Important Bird Area (IBA). It is home to about 122 bird species including the Pel's fishing owl (UWA, 2021). As such, the 20 species recorded during this study is a mere fraction of what one should be able to record over a long time, even if the survey is restricted to the pipeline and ROW. Sites around the areas to be built for Water Tanks tend to be small and as such the number of species recorded in such areas tended to have fewer bird species.

Table 4.19: Table showing Site Species Abundancy

Survey Site	Number of Individuals Observed	Number of Species Represented.
Nyagak Intake	68	32
Nyagak Power House	58	20
Nyagak Fore Bay	22	11
Nyagak Penstock	16	11
Water Treatment Plant	28	10
Ndiriba Tank	14	9
Anyrivu Tank	12	8
Paribu Tank	13	8
Ajai wildlife Reserve	33	20
Goli Tank	28	15
Ogoko Tank	25	16
Inde Tank	19	10
Pawor Tank	18	10

The most abundant and widely distributed species was the common bulbul 91% followed by the Black Bishop 74%, one forest visitors (Blue spotted wood dove) was observed, eight grassland specialists and two non-water specialists often found near water, that are usually found next to water but can as well survive where there is no water, five grassland specialists(Black Bishop, Helmeted Guineafowl, and the Red checked Cordon Blue) and one non-water specialist often found near water (African Pied Wagtail) and the African Marsh–Harrier (*Circus ranivorus*) the , that are usually found next to water but can as well survive where there is no water. Most of the species observed are those referred to as habitat generalists (Appendix 1). No Birds of international conservation concern were recorded. Most of the species observed are those referred to as habitat generalists (Appendix 7). No Birds of international conservation concern were recorded during this study.

4.2.5 Butterflies

4.2.5.1 Data collection methods

The adult butterfly fauna of the target areas was sampled systematically using sweep nets. An established transect line was walked at constant pace, recording all the butterfly species seen on wings. Individuals that were difficult to identify on wings were taken and stored for further processing identified using available field guides (e.g. Larsen, 1991; Kielland, 1990). Opportunistic observations were included to help build the species list. Each of the butterfly species was assigned to one of the ecological categories as described by Davenport (1996). The major categories considered included forest dependent species (F), forest edge/woodland species (f), open habitat species (O), widespread species (W), migratory species (M), and wetland species (S).

4.2.5.2 Results

A total of 89 species of butterflies (Appendix 7) were recorded from the different surveyed areas. For butterflies, five forest dependent butterfly species, nine forests edge/woodland species, 16 migrant species, 17 open habitat species, 40 widespread species and only two wetland species were recorded within the Project areas. From the butterflies' ecological preferences, over 45% of the total species recorded were those that are typically widespread: 19% of species were those typical of open habitats. The study did not record within the direct impact areas any globally or nationally threatened species of butterflies. No species of conservation concern in the sense of endemism, threat in IUCN context or rarity were recorded. Of all the butterfly species recorded by the surveys, only three species (*Eurema brigitta*, *Junonia oenone* and *Zizina antanossa*) have been evaluated for the IUCN Red List, while the other species have not yet been evaluated. The three species are all categorized as being of least concern.

4.2.6 Aquatic biodiversity

4.2.6.1 Data collection methods (Nyagak River)

Overview

Sampling was done at a point where Nyagak Gravity Flow Scheme will start from on River Nyagak at coordinates (36 N 276424, 276315). The point is located at high point of the river in Zobo District, where a plant extracting raw water will be located. Measuring of Physical Chemical Parameters (Temperature and Dissolved Oxygen (DO)) was undertaken. The water quality parameters (temperature and Dissolved Oxygen (DO)) were measured using HI 9147 oxygen probe.

Phytoplankton

The phytoplankton sampling was carried out at Nyagak Gravity Flow Scheme starts at Nyagak Water intake (GPS coordinates: 36 N276424, 276315). The concentration of Phytoplankton was determined based on cell density and bio volume using an Inverted Microscope and Modified Utermohl. Sedimentation Technique using (Hasle 1978) in terms of Cells /ml of water and converted to cells per Litre of water (Cells/L). Samples of water were collected using an integrated water column sampler to collect phytoplankton. A large plastic container (20 L) was filled using the integrated water sampler. The compound sampler was mixed and a pre-labelled 125-ml amber bottle was manually immersed into the container. The bottle was labelled with the date, station ID and sample type. The sample was immediately preserved with 2-ml Lugol's solution per 100-ml of sample (Vollenweider 1974) and stored in the dark cool place.

In the laboratory, Phytoplankton were counted using the inverted microscope procedure of Utermohl following standard procedures of Lund et al. (1958). Sub-samples were settled for at least 24 hours in a sedimentation chamber prior to counting. Replicate areas were enumerated at a magnification of not less than 500X. For enumeration of rare, large taxa, the entire chamber was subsequently scanned and counted at low magnification. Results were expressed as cells/ml of water and then converted to Cells/Litre of water using appropriate geometric formulae (Downing and Rigler, 1984) for all algal taxa.

Zooplankton

The zooplankton sampling for this survey was carried out at Nyagak Gravity Flow Scheme at Nyagak Water intake (GPS coordinates: 36 N276424, 276315). The total zooplankton volume was determined by the displacement volume method. In this method the zooplankton sample was filtered through a piece of clean, dried netting material. The mesh size of netting material was 20micron meter mesh size of the net used for collecting the samples. The interstitial water between the organisms was removed with the blotting paper. The filtered zooplankton was then transferred with a spatula to a measuring cylinder with a known volume of 75% ethanol. The displacement volume is obtained by recording the volume of fixative in the measuring jar displaced by the zooplankton. The settled volume was obtained by making the sample to a known volume in the measuring jar. The plankton was allowed to settle for at least 24 hours before recording the settled volume.

Fish biodiversity

Gill nets, hooks and cast nets were set for over one night in addition to interviews to local fishermen to identify the fish species in the rivers and streams as shown in the figure below.



Plate 4.13: Photo during fishing with gill nets

4.2.6.2 Results

Physical chemical parameters

Site	Temperature (°C)	Dissolved Oxygen DO (Mg/l)
R. Nyagak	26.9-27.0	6.23-8.7

Phytoplankton

The results from the laboratory analyses (Table 4.20) indicated that the blue greens, greens and diatoms are dominant. These results are consistent with previous ESIA findings on Rivers and streams in the West-Nile¹.

Table 4.20: Composition of Phytoplankton in R. Nyagak

Taxon	Number of Phytoplanktons per Litre of water (*percentage composition)
BLUE GREENS	
<i>Calothrix (sp)</i>	72 (16.8%)
<i>Oscillatoria (sp)</i>	53 (12.3%)
<i>Tolypothrix (sp)</i>	36 (8.4%)

¹ ESIA for upgrading of the 105Km Koboko-Yumbe-Moyo road, 2020

Taxon	Number of Phytoplanktons per Litre of water (*percentage composition)
<i>Microcystis (sp)</i>	62 (14.5%)
<i>Dismidium (sp)</i>	44 (10.3%)
GREENS	
<i>Zygnema (sp)</i>	53 (12.4%)
<i>Oedogonium (sp)</i>	57 (13.3%)
<i>Cladophora (sp)</i>	30 (7.0%)
<i>Spirogyra (sp)</i>	10 (2.3%)
FLAGELLATES	
<i>Uroglena (sp)</i>	8 (1.9%)
<i>Phacus (sp)</i>	3 (0.7%)

Zooplankton

The results from the laboratory analyses (Table 4.21) indicated that river zooplankton community consists mainly of Rotifera, Copepoda and Cladocera. The *Ascomopha sp* are the most prominent of the rotifers in all the three sections of the river sampled. These results are also consistent with the results of the previous ESIA's.

Table 4.21: Composition of Zooplankton in R. Nyagak

Taxon	Number of Phytoplanktons per litre of water
ROTIFERS	
<i>Ascomopha (sp)</i>	85 (24.6%)
<i>Proales(sp)</i>	72 (20.9%)
<i>Polyathra (sp)</i>	36 (10.4%)
<i>Lecane (sp)</i>	21 (6.1%)
<i>Euclaris (sp)</i>	35 (10.1%)
COPEPOD	
<i>Cyclops (sp)</i>	59 17.1%)
<i>Bosmina (sp)</i>	37 (10.7%)

Previous ESIA's (Kagga 2011, Kagga and Partners Ltd and Lahmeyer International GMB (2013), 2012) also indicated that River Nyagak zooplankton community consisted mainly of Copepoda, Cladocera (water fleas) and Rotifera taxonomic groups.

Fish species

From the gill nets set for a night and cast nets, 3 species were caught and were identified as Nile tilapia (*Oreochromis niloticus*), African catfish (*Clarias gariepinus*) and Labeo as shown in the Table 4.22 below;

Table 4.22: The fish species in R. Nyagak identified with gill and cast nets

Sites	Fish species	Weight (average and range)	Standard length (average and range) and photos
R. Nyagak	Nile tilapia (<i>Oreochromis niloticus</i>)	400g (300-500) g	10-15cm
	African catfish (<i>Clarias gariepinus</i>)	1000g (800g-1,200) g	20-45cm
	<i>Labeo sp</i>	300g (300-600) g	8-28cm



Plate 12: The fish species caught with gillnets and cast nets at R. Nyagak

From previous field investigations and Local Knowledge surveys, River Nyagak have 12 fish species. The ESIA's conducted by Kagga and Partners Ltd and Lahmeyer International GMB (2013) had consistent findings. For this ESIA review, information about the fish species was obtained through interaction with the fishermen and local authorities. The local authorities as well as the fishermen confirmed the existence of all along the whole length of the river as shown in the Table 4.23 below;

Table 4.23: Fish species reported from interviews with local leaders and fishermen

Local Name	Scientific name	English/common name	IUCN red List status (2017)
Adel	<i>Clarias gariepinus</i>	Mud fish	Least concern (LC)
Lara	<i>Barbus sp.</i>	Barbel fish	Least Concern (LC)
Ngasiya	<i>Hydrocynus forskalii</i>	Tiger fish	Least concern (LC)
Dala	<i>Barbus altianalis</i>	Ripon barbell	Least concern (LC)
Nyai	<i>Clarias sp.</i>	Catfish	Least concern (LC)
Okebu/Ngogo	<i>Protopterus aethiopicus</i>	African lungfish	Least concern (LC)

Local Name	Scientific name	English/common name	IUCN red List status (2017)
Osogoro/Ozogoro	<i>Oreochromis niloticus</i>	Nile Tilapia	Not assessed (NA)
Okuwu	<i>Clarias liocephalus</i>	Smoothhead catfish	Least concern (LC)
Karuka	<i>Barbus jacksonii</i>	Jackson's barbel	Least Concern (LC)

All the species that were recorded are native to Uganda and the region and none of them was of critical conservation concern, according to the IUCN red list status (Table 4.23).

Discussions

This study clearly indicates that the aquatic biodiversity of R. Nyagak is relatively rich and steps will have to be taken to protect and conserve the rivers biodiversity. All of the fish recorded depend on shallow shaded habitats at the edge of the rivers for feeding, breeding and hiding from predators at some point in their life cycle. Protection and conservation of these habitats will therefore be important to minimize the impacts of the project on aquatic flora and fauna/fish diversity and aquatic resource use. However, it's important to note that none of the fish species is rare or endangered.

The fact that water will be extracted upstream may have some minimal or negligible impacts on the aquatic biodiversity and ecosystem dynamics of the river since water volumes are not likely to significantly reduce in addition to water depth. According to the feasibility study consultant (Alliance Consultants Ltd), the minimum discharge of river Nyagak is 2.44m³/second while the mean discharge is 5.04m³/second. Nyagak WSS will abstract 0.0348 m³/s which is just 1.42% of the minimum river flow and 0.69% of the mean flow. Therefore, the impact of this abstraction will not slow down the speed of water and will not significantly reduce the depth of this stream. Hence concerns that the river could be colonized by new riverine species that prefer shallow running waters will not occur.

5 SOCIAL ECONOMIC BASELINE ENVIRONMENT

5.1 Overview

As highlighted in section 1.5.4, data collection on social economic baseline was done through a combination of methods such as transect drives to generate primary data, secondary data review and stakeholder consultation. Knowledge of existing social conditions is essential to understanding project affected communities, potential benefits to recipient communities and likely challenges during project implementation. The social assessment used qualitative methods and several techniques in data collection, including, key informant interviews (Stakeholder consultations), questionnaires, focus group discussions and case study reviews. These were vital in establishing the social baseline information and subsequent assessment of potential social impacts. The choice of the sample points was predetermined and was done based on areas identified as affected by the proposed water infrastructure, and therefore potential exposure to environmental and social impact of the project.

5.2 Social economic Baseline

The table below shows the primary data obtained from the consulted sub-counties and villages along the proposed transmission line intended to be distributed with water.

Characteristics	ANYIRIBU		OFFAKA		OKOLLO		PAIDHA		PAWOR		Total	
	Number	%age	Number	%age	Number	%age	Number	%age	Number	%age	Number	%age
Gender of Respondent												
Female	29	25.22%	29	40.28%	0	0.00%	14	32.56%	28	100.00%	100	30.30%
Male	86	74.78%	43	59.72%	72	100.00%	29	67.44%	0	0.00%	230	69.70%
Age group of Respondent												
18-30 years	43	37.39%	14	19.44%	15	20.83%	0	0.00%	14	50.00%	86	26.06%
31-50 years	72	62.61%	43	59.72%	57	79.17%	29	67.44%	14	50.00%	215	65.15%
51++ years	0	0.00%	15	20.83%	0	0.00%	14	32.56%	0	0.00%	29	8.79%
Marital Status of Respondent												
Married	86	74.78%	72	100.00%	58	80.56%	43	100.00%	28	100.00%	287	86.97%

Single	29	25.22%	0	0.00%	14	19.44%	0	0.00%	0	0.00%	43	13.03%
HH with PWDs												
1-2'	0	0.00%	29	40.28%	0	0.00%	43	100.00%	0	0.00%	72	21.82%
None	115	100.00%	43	59.72%	72	100.00%	0	0.00%	28	100.00%	258	78.18%
Education level of Respondent												
Primary	43	37.39%	29	40.28%	0	0.00%	0	0.00%	28	100.00%	100	30.30%
Secondary	29	25.22%	43	59.72%	57	79.17%	29	67.44%	0	0.00%	158	47.88%
Tertiary/College	0	0.00%	0	0.00%	15	20.83%	0	0.00%	0	0.00%	15	4.55%
University	0	0.00%	0	0.00%	0	0.00%	14	32.56%	0	0.00%	14	4.24%
Illiterate	43	37.39%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	43	13.03%
School-going Children in the HH												
1-3'	29	25.22%	43	59.72%	15	20.83%	14	32.56%	28	100.00%	129	39.09%
4-6'	72	62.61%	29	40.28%	43	59.72%	14	32.56%	0	0.00%	158	47.88%
7-10'	0	0.00%	0	0.00%	14	19.44%	15	34.88%	0	0.00%	29	8.79%
None	14	12.17%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	14	4.24%
Whether Respondent can write/read												
Yes	72	62.61%	58	80.56%	72	100.00%	43	100.00%	28	100.00%	273	82.73%
NO	43	37.39%	14	19.44%	0	0.00%	0	0.00%	0	0.00%	57	17.27%
Religious Affiliation of Respondents												
Roman Catholic	43	37.39%	72	100.00%	72	100.00%	43	100.00%	28	100.00%	258	78.18%
Anglican	43	37.39%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	43	13.03%

Pentecostal	29	25. 22 %	0	0.0 0%	0	0.0 0%	0	0.0 0%	0	0.0 0%	29	8.7 9%
Tribe of Respondent												
Alur	0	0.0 0%	0	0.0 0%	0	0.0 0%	43	100. 00 %	28	100. 00 %	71	21. 52 %
Lugbara	115	100. 00 %	15	20. 83 %	14	19. 44 %	0	0.0 0%	0	0.0 0%	144	43. 64 %
Madi	0	0.0 0%	57	79. 17 %	58	80. 56 %	0	0.0 0%	0	0.0 0%	115	34. 85 %
Vulnerability Status of Respondent												
Vulnerable	15	13. 04 %	29	40. 28 %	0	0.0 0%	28	65. 12 %	0	0.0 0%	72	21. 82 %
Not Vulnerable	100	86. 96 %	43	59. 72 %	72	100. 00 %	15	34. 88 %	28	100. 00 %	258	78. 18 %
Household Size of Respondent												
1-4'	14	12. 17 %	29	40. 28 %	0	0.0 0%	0	0.0 0%	0	0.0 0%	43	13. 03 %
5-10'	57	49. 57 %	43	59. 72 %	72	100. 00 %	30	69. 77 %	28	100. 00 %	230	69. 70 %
11 & Above	44	38. 26 %	0	0.0 0%	0	0.0 0%	13	30. 23 %	0	0.0 0%	57	17. 27 %
Land Ownership Status of Respondent												
Owner	86	74. 78 %	72	100. 00 %	72	100. 00 %	43	100. 00 %	14	50. 00 %	287	86. 97 %
Licensee	15	13. 04 %	0	0.0 0%	0	0.0 0%	0	0.0 0%	0	0.0 0%	15	4.5 5%
Tenant	0	0.0 0%	0	0.0 0%	0	0.0 0%	0	0.0 0%	14	50. 00 %	14	4.2 4%
Other	14	12. 17 %	0	0.0 0%	0	0.0 0%	0	0.0 0%	0	0.0 0%	14	4.2 4%
Type of House Owned by Respondent												
Permanent	0	0.0 0%	29	40. 28 %	42	58. 33 %	29	67. 44 %	0	0.0 0%	100	30. 30 %
Semi-Permanent	15	13. 04 %	0	0.0 0%	0	0.0 0%	14	32. 56 %	0	0.0 0%	29	8.7 9%
Temporary	100	86. 96 %	43	59. 72 %	30	41. 67 %	0	0.0 0%	28	100. 00 %	201	60. 91 %

Utility Service Owned by Respondent												
Solar Energy	43	37.39%	43	59.72%	58	80.56%	43	100.00%	14	50.00%	201	60.91%
Telephone Line	0	0.00%	15	20.83%	14	19.44%	0	0.00%	0	0.00%	29	8.79%
None	72	62.61%	14	19.44%	0	0.00%	0	0.00%	14	50.00%	100	30.30%
Primary Income Source of Respondent												
Farming	100	86.96%	72	100.00%	58	80.56%	43	100.00%	28	100.00%	301	91.21%
Casual Labour	15	13.04%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	15	4.55%
Service provision (hotel, mm, salon, transport)	0	0.00%	0	0.00%	14	19.44%	0	0.00%	0	0.00%	14	4.24%
Secondary Income Source of Respondent												
Brick Making	0	0.00%	29	40.28%	0	0.00%	0	0.00%	0	0.00%	29	8.79%
Farming	0	0.00%	29	40.28%	43	59.72%	0	0.00%	0	0.00%	72	21.82%
Casual Labour	29	25.22%	0	0.00%	14	19.44%	0	0.00%	0	0.00%	43	13.03%
Trading	0	0.00%	14	19.44%	15	20.83%	29	67.44%	14	50.00%	72	21.82%
Student	14	12.17%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	14	4.24%
Rent Collection	14	12.17%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	14	4.24%
Other	0	0.00%	0	0.00%	0	0.00%	14	32.56%	0	0.00%	14	4.24%
None	58	50.43%	0	0.00%	0	0.00%	0	0.00%	14	50.00%	72	21.82%
Monthly Income level of Respondent in UGX												
<100,000	44	38.26%	0	0.00%	0	0.00%	0	0.00%	28	100.00%	72	21.82%
100,001-300,000	42	36.52%	29	40.28%	15	20.83%	14	32.56%	0	0.00%	100	30.30%

300,001-500,000	29	25.22 %	0	0.00 %	43	59.72 %	0	0.00 %	0	0.00 %	72	21.82 %
500,001-800,000	0	0.00 %	43	59.72 %	0	0.00 %	0	0.00 %	0	0.00 %	43	13.03 %
800,001-1,500,000	0	0.00 %	0	0.00 %	14	19.44 %	29	67.44 %	0	0.00 %	43	13.03 %
Total	115	100 %	72	100 %	72	100 %	43	100 %	28	100 %	330	100 %

5.2.1 Demographic Information

5.2.1.1 Population

According to the 2014 housing and population census Madi Okollo district which was a county in Arua district then had a total population of 138,677 people with 67,427 males and 71,250 females. According to population projections of the Uganda Bureau of Statistics, by 2020 the population was estimated to be 164,200 that is 80,600 males and 83,600 females. On the other hand, the population of Nebbi district was 385,220 comprised of 184,507 males and 200,713 females while that of Zombo was 240,368 with 115,411 males and 124,957 females based on the 2014 NPHC. The population of Anyiribu, Offaka, Ogoko, Okollo and Pawor sub counties in Madi Okollo district, Nyapea in Zombo district and Nebbi sub county in Nebbi district which are the project affected sub counties was disaggregated as presented in the table below

Table 5.1: Population of affected sub counties

Sub county	Male	Female	Total	Average H.H size
Anyiribu	3,835	4,112	7,947	5
Offaka	9,041	9,893	18,934	4.7
Ogoko	9,488	9,519	19,007	5.5
Okollo	9,142	9,919	19,061	4.7
Pawor	4,610	5,011	9,621	5.1
Paidha	7,399	8,078	15,477	5
Nyapea	9,826	10,762	20,588	4.4
Nebbi	11,805	12,392	24,197	5.2
Total	65,146	69,686	134,832	

Source: NPHC 2014

The scheme is expected to serve a population of more than 134,832 persons because the above number has increase over the past eight years post census.

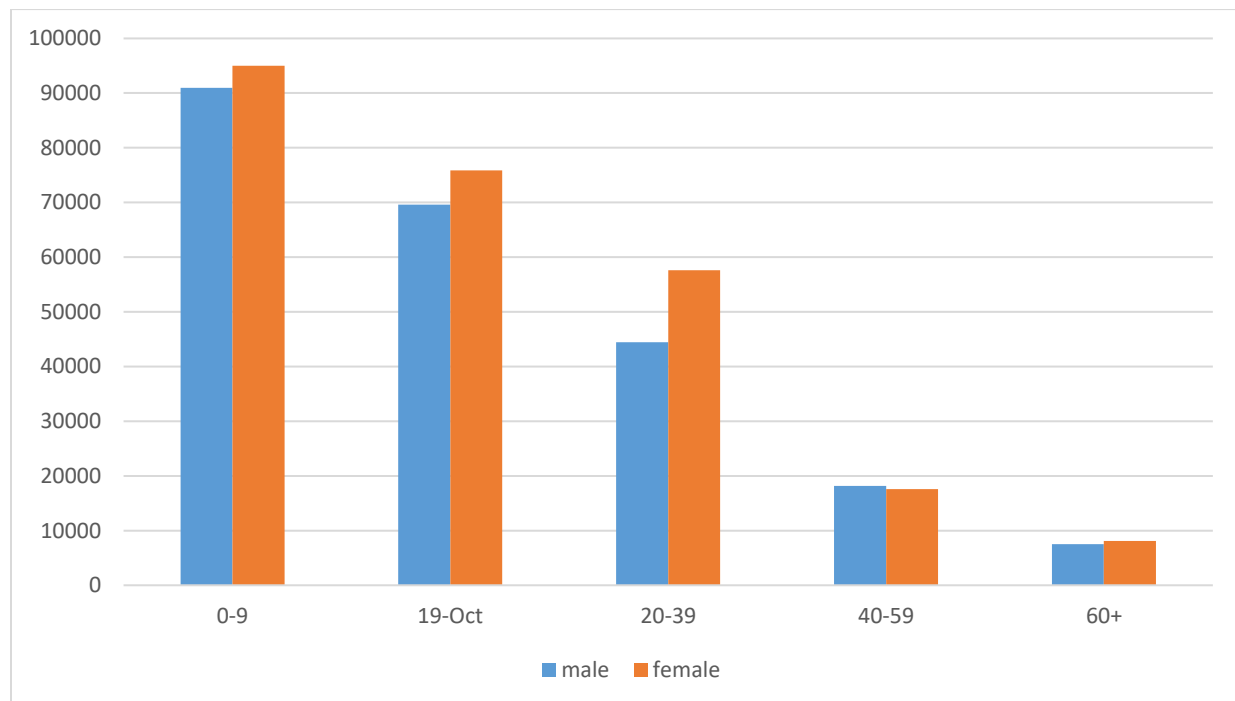
5.2.1.2 Average Household size

Based on the above population table, the project area has an average household size of 4.9 which is slightly higher than the national average household size of 4.7. The relatively large household size implies a relatively large household size in the project area, which is associated with less wealth and high poverty levels according to the 2015 National Household survey reports (UBOS, 2015).

Source: Primary Data

5.2.1.3 Age structure

Because Madi Okollo district was carved from Arua barely two years ago, the age structure has been taken to be similar to that of its mother district (figure 5.1). Arua district generally had a young population with 59.6% of its population aged 19 and below while the elderly constituted only 3.9% for the same period.



Source: UPHC 2014

Figure 20: Age structure of Madi-Okollo district

The implications of a growing population for sustainable economic development are many. For instance, it requires investment in social services (education and health) as a priority, that is, more schools / class rooms and health units are required to cater for the growing population. The dependency ratio is high since every working person has a number of people to look after which limits their capacity to save and invest.

5.2.2 Settlement patterns

The nature of settlements in the project area was observed to be varied depending on location. For instance, in Paidha Sub County where the intake for the scheme is located, settlements were very sparse with households located far apart. Some clustered settlements were noted at Awed Kedi trading centre. On the other hand, in Madi Okollo district, the settlements too were sparse although concentrations in main towns such as Okollo, Ndriba, Inde and Pawor. The existence of Ajai wildlife Reserve has to a great extent influence settlement patterns in the sub counties of Pawor, Okollo and Ogoko. Sparsely distributed population present a big challenge to leadership in terms of planning for and extending services to such population. Very often than not services end up serving few numbers lower than would be the case if settlements were fairly distributed or clustered.

5.2.3 Ethnicity and religion

Ethnicity in the project site comprised mainly of three tribes namely the Lugbara, Alur and Madi. The fact that the largest part of the project network is located within Madi Okollo district, it was noted that majority of the population in this district were Madi. This implies that Madi should be the main language of communication about project activities.

Based on the socioeconomic baseline data obtained during the indicated four main religious sects in the project area namely, Catholics, Protestants, Muslims and born-again Christians in the proportions of 72%, 13%, 9% and 6% respectively. A number of worship places were seen along the proposed alignment hence days of worship at these worship centers were noted to enable planning for activities in order to minimize disruption during days of worship.

The household survey recorded 13% of the respondents had no formal education, while 47.8% was recorded for those who attained primary level. Other levels included university, tertiary and secondary levels as detailed in the figure below.

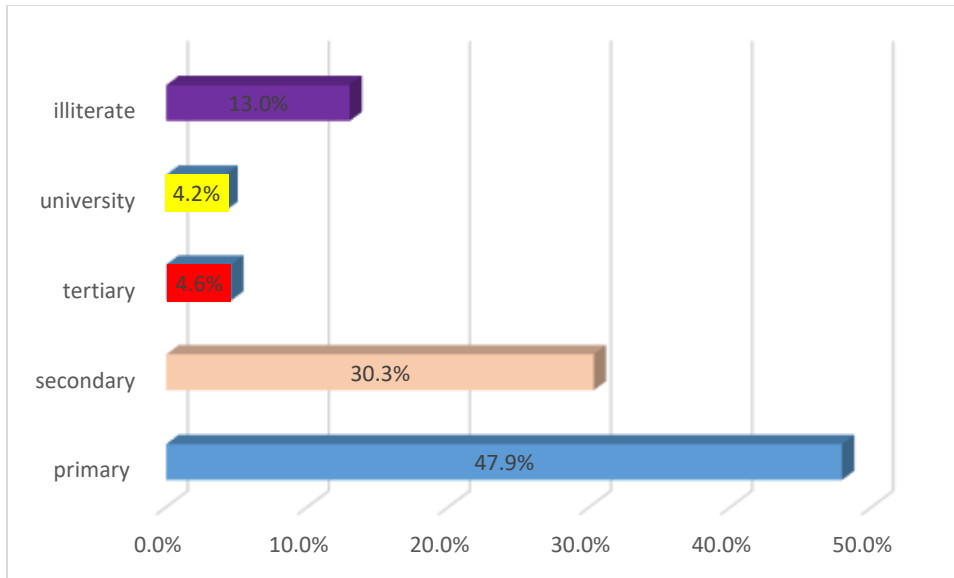


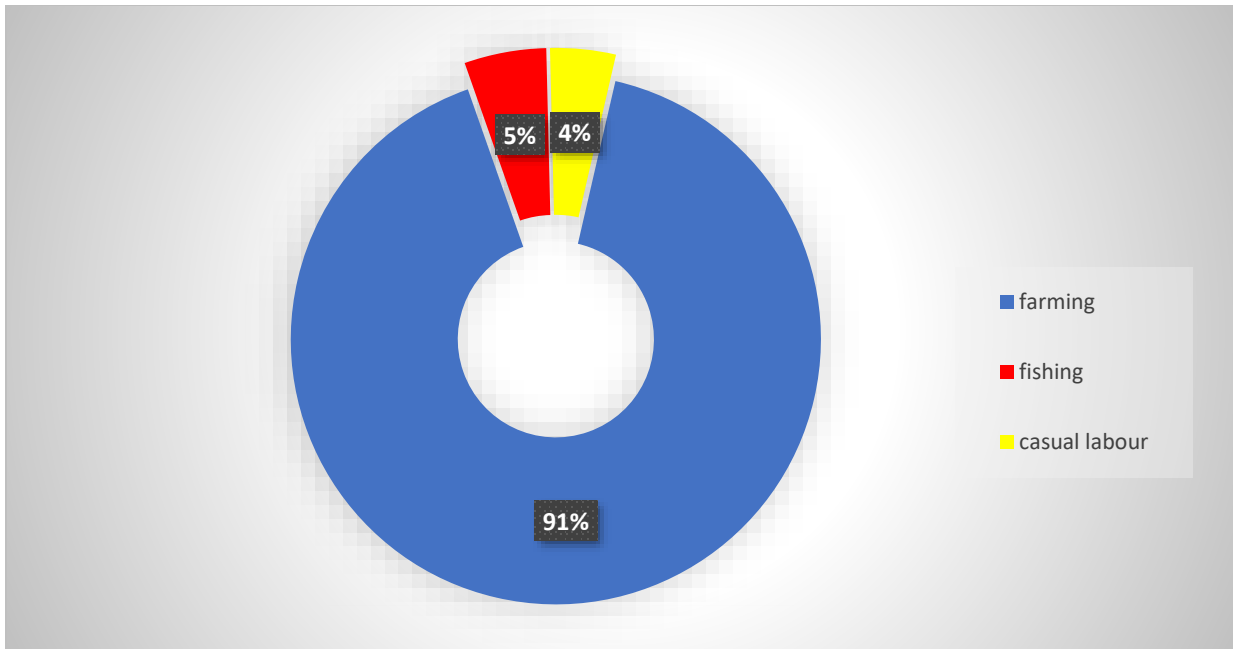
Figure 11: Literacy levels among respondents

This indicates that the literacy level is significantly lower than the national level statistics which stand at 73.2%. The low literacy levels have a bearing on the project communication strategy which has to utilize several IEC materials when sending out messages about the project.

Seventy-one percent of sampled households had a school going member majority of whom were at primary and preprimary levels represented by 43% and 25% respectively. The numbers for those in secondary, tertiary and university levels were significantly low which trend suggests the high school dropout rates.

5.2.4 Economic status

The study established that subsistence farming was the main source of livelihood in the project area and 91% of households alluded to this. This was distantly followed by fishing and casual labour at 5% and 4% respectively as illustrated by the figure 5.2 below.



Source: Household Survey 2022

Figure 22: Economic activities along the proposed area

5.2.4.1 Crop farming

Generally, it was observed that farmers have vast land holdings and farming systems are mixed and subsistence in nature. Although the area was observed to be flat and vast, which would be convenient for large scale and mechanized farming existing patterns are still rudimentary. The main types of crops produced as food crops include, cassava, millet, maize, sorghum, pigeon peas, sunflower, beans and vegetables. Cash crops mainly include; Cotton, sun flower, rice, sim-sim, and soya beans. Farming was noted to be on subsistence scale were most of what is produced being consumed at household level. It is also worth noting that farming patterns in Madi Okollo involve localized seasonal migration patterns.

During community engagements in Atiak village in Kalowang parish Nebbi district it was reported that most settlements/households around trading centers had gardens a little far from residences which necessitates temporary relocation during the planting, weeding and harvest seasons. As a consequence some parents leave their homes behind during these periods manned by children who usually indulge in risky behavior in absence of parental guidance.

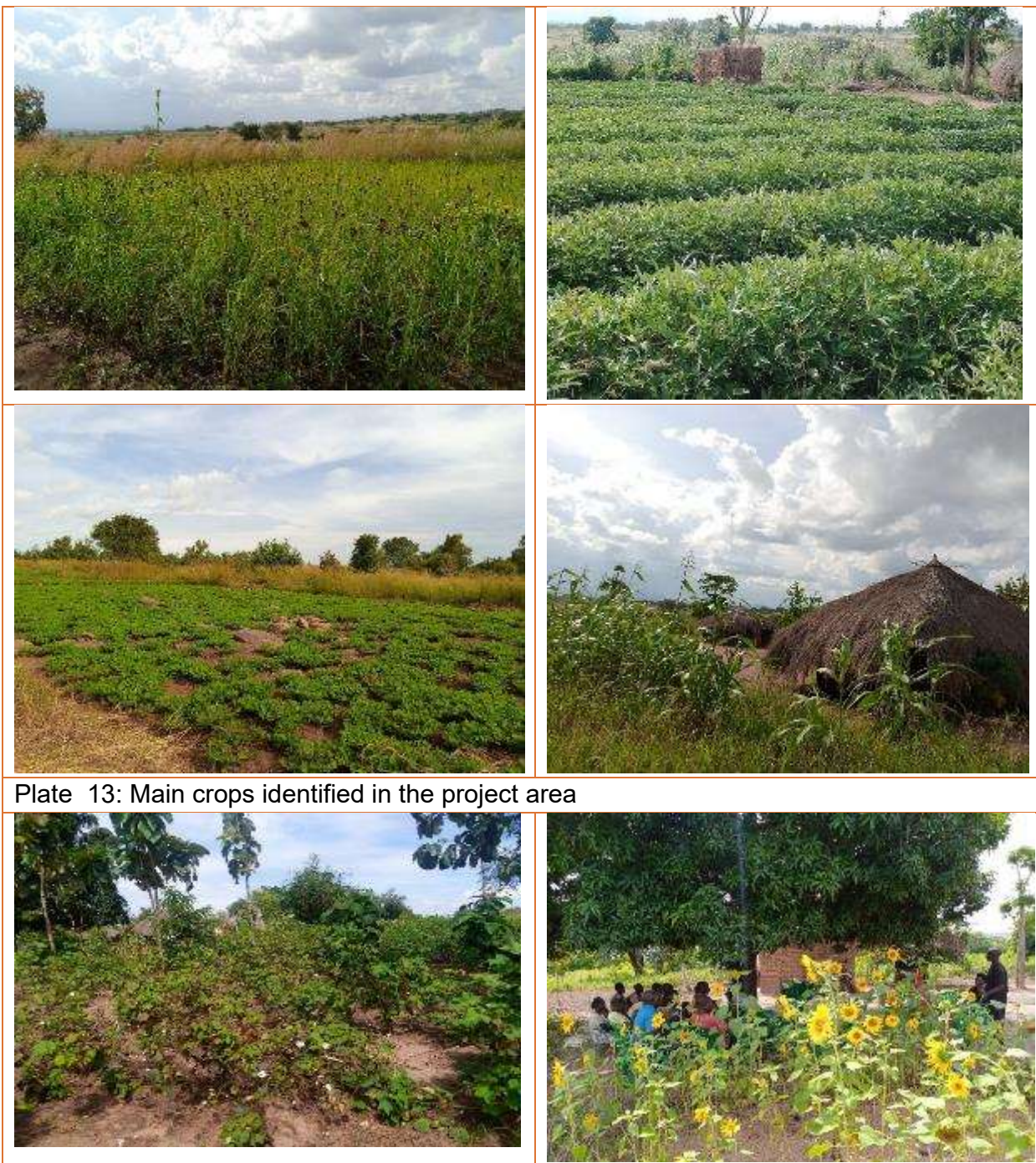


Plate 13: Main crops identified in the project area



Plate 14: Other main crops identified in the project area

Source: Field studies

As noted above, fishing was reported to be a significant source of livelihood. Specifically, sub counties of Pawor and Ogoko had a number of households involved in this activity due to proximity to River Nile. Although the findings above represent 5% of households' interaction with community members indicated that majority of households are engaged in this activity although it is not the primary source of income.

5.2.4.2 Processing and Marketing of agricultural produce

A number of mobile cassava mills were observed with along the proposed water transmission line in both Madi Okollo and Zombo districts. The presence of such mills in the communities (within some community members' households and town centers) provide a hint on the food processing initiatives within the community and the choice of cassava as a major food crop given the properties of being kept for longer times when dried.

As far as marketing of agricultural produce is concerned, weekly village markets were the main trading avenues. Such include the Pawor market which is active every Tuesday and Friday. Also agricultural produce was sold in the local trading centers and road side market stalls.

Regarding nonfood products, two coffee processing plants were observed in Paidha. These are Kawacom and Okoro Coffee Grower's Cooperative.

5.2.4.3 Animal rearing

Animal keeping was said to be an importance life support activity in the region. A number of households especially in Okollo, Ogwoko and Pawor were noted to have significant animal numbers probably because of availability of vast areas for grazing. In fact, it was noted that owning animals is considered as an indication that one is wealthy and the household head or his male children can easily find suiters because they are believed to have the potential to look after them. Animals are also important in serving cultural functions such as paying dowry

and appeasing ancestors. The interviews revealed that Ox ploughing is vital in crop production for land opening. Animals kept included cattle, goats, sheep, poultry and rabbits. Below are some of the animals identified as contributing to household welfare during the ESIA study.



Plate 15: Some of the animals kept in the project area

5.2.4.4 Household income

To further understand the affected people in terms of economic strength, the survey attempted to establish estimated incomes of sampled households. It was established that 52.12% of the households' income is below the national per capita income of 882 USD (Approximately 300,000 Uganda shillings per month) according to the third national development plan 2020/2021-2024/2025. The income ranges have been summarised in the table 5.2 below.

Table 5.2: Monthly income of surveyed household

Monthly income from primary source	Number of respondents	Percentage
<100,000	72	21.82%
100,001-300,000	100	30.30%
300,001-500,000	72	21.82%
500,001-800,000	43	13.03%
800,001-1,500,000	43	13.03%
Total	330	100%

Source: Household survey

It was also established that many household members are not involved in any income generating activity which strains the few working household members. Several reasons were given for some household members not working which included; some members were too young to work, lack of employment opportunities, too old or physically incapacitated. Other reasons for not working included sickness and retirement because some respondents were above the Ugandan working age.

5.2.4.5 Secondary economic activities

Like stated above, the main secondary income generating activity was reported to be fishing, salaried work mainly for civil servants, animal keeping, brick making, business and provision of casual labour. Through observations, the ESIA team recorded the kind of businesses engaged in which comprised of motorcycle or *boda boda* operators, roadside markets, charcoal burning, retail shops, Mobile money agents, motorcycle repair workshops, drug shops and hair salons.





Plate 16: Economic activities in the project area

5.2.5 Water and sanitation

5.2.5.1 Water Sources

According to the National water supply atlas, in Madi-Okollo, access rates vary from 38% in Pawor Sub-County to 95% in Uleppi Sub-County. Madi-Okollo has 427 domestic water points which serve a total of 111,979 people – 111,979 in rural areas. 79% of water points have been non-functional for over 5 years and are considered abandoned. Access is 69% while rural functionality stands at 81%. The summary below provides the rural population served with access and functionality of the different water points;

Table 5.3: Summary of access to safe water in Madi-Okollo

Sub-county	Rural/ Urban	Population	Population served	Access	Functionality
Okollo	Rural	22,084	20,633	93%	70%
Ogoko	Rural	23,004	12,406	54%	70%
Anyiribu	Rural	9,777	8,139	83%	94%
Pawor	Rural	12,077	4,506	37%	50%
Offaka	Rural	23,809	16,678	70%	96%
Uleppi	Rural	10,812	10,227	95%	72%
Ajai	Rural	33,815	23,612	70%	86%
Kululu	Rural	55,353	23,712	43%	96%
Ariwa	Rural	35,999	15,300	43%	96%
Odravu	Rural	63,353	38,106	60%	98%
Vurra	Rural	55,094	52,339	95%	90%
Udupi	Rural	47,848	32,371	68%	91%
Kochi	Rural	61,934	30,518	49%	98%
Uriama	Rural	28,870	23,624	82%	95%

Source: National water supply atlas.

It's important to note that access to clean water and distribution of water points is not even throughout the affected community. For example, most schools in Offaka sub-county with boreholes also use river water and valley ponds. Students at Affaka Secondary School fetch from Aji stream while Adraa Agricultural College uses more of Aji stream and Osua valley ponds than the borehole. Sub counties that lie along the banks of River Nile i.e. Ogoko and Pawor, sub county leadership indicated that they have a challenge with boreholes that are sunk since they keep sinking because of the soil types and within a few years they are rendered useless.

It was also reported that very often boreholes do not yield as expected and where they do the water is salty. The above factors combined still compel most households to get water from the river. In fact, the existing water scheme was reported to have challenges in Pawor hence the low rates of access to clean water as compared to other sub counties.



Plate 17: Existing piped water source in Pawor



Plate 18: A borehole in Panzoro village

5.2.5.2 Sanitation

Even with the numerous campaign for improvement of sanitation at public, institutional and household level, it is still a major challenge. Local leadership engaged during key informant interviews said that sanitation conditions were appalling. For instance, the Sub County Chief of Ogoko said the ownership of pit latrines among households is still low because of the loose soils that keep collapsing after a short while. In fact, he reported that there are ongoing campaigns advising people to excavate circular pits instead of the conventional rectangular ones. The communities have not yet fully embraced this shape of latrines.

In other sub counties the situation is not any different from that in Ogoko. It should be noted that low sanitation rates pose a challenge to the health of both humans and animals because majority of water sources are open hence prone to contamination through runoff.



Plate 19: A public notice encouraging people to stop open defecation in Aleju village

On a positive note it was reported that during and after the COVID-19 pandemic, hand washing practices improved and the practice has been upheld mainly at health centers, institutions of learning and sub county headquarters,

5.2.6 Transport

The fact that the district is a new administrative unit, it inherited roads from Arua district. All roads in the district area earth surfaced roads. Status of the roads is fair as most of them were in motorable condition during the time of the ESIA study. The road connectivity was good although a number of roads were in bad state especially when it rained. During the ESIA study, some project villages were not accessible despite the team trying several times. This was because the study was undertaken during a rainy season.

The only mode of transport that exists is road. Road transport mode consists of motor vehicles, motor cycles for the motorized means while bicycles and pedestrians constitute the non-motorized means. During the field study it was noted that there were no regular public taxis serving the district. In fact, residents indicated that movement by public means is by use

of trucks that carry merchandise to the different bi weekly markets. Socially, absence of regular means indicates that communities within the project area are less mobile either because all required services are within reach or because they are economically constrained hence have resigned to live by what is within their boundaries. Table 5.4 below presents a list of roads that will be crossed by the proposed Nyagak WSS.

Table 5.4: List of roads crossed by the proposed Nyagak WSS

Road name	Type of Road	Coordinates at crossing point		Administration at point of crossing		
		Easting	Northing	Village	Subcounty	District
Rhino camp-Ogoko-Inde	tertiary	308248	320650	Degia	Ogoko	Madi-Okollo
Rhino camp-Ogoko-Inde	tertiary	311395	321666	Degia	Ogoko	Madi-Okollo
Rhino camp-Ogoko-Inde	tertiary	303527	318018	Ajai Game Reserve	Inde Town Council	Madi-Okollo
Karuma-Packwach-Nebbi-Arua-Koboko-Uganda	primary	291247	294991	Panzoro	Okollo	Madi-Okollo
Karuma-Packwach-Nebbi-Arua-Koboko-Uganda	primary	293064	293916	Panzoro	Okollo	Madi-Okollo
Karuma-Packwach-Nebbi-Arua-Koboko-Uganda	primary	293658	291671	Opibu	Okollo	Madi-Okollo
Karuma-Packwach-Nebbi-Arua-Koboko-Uganda	secondary	288845	283395	Kango/Anyor a	Anyiribu	Madi-Okollo
Pakwach-Inde-Ocoko	secondary	312910	310977	Parabok Upper	Pawor	Madi-Okollo
Pakwach-Inde-Ocoko	secondary	307996	315094	Ajai Game Reserve	Inde Town Council	Madi-Okollo
Pakwach-Inde-Ocoko	secondary	305259	316699	Ajai Game Reserve	Inde Town Council	Madi-Okollo
Pakwach-Inde-Ocoko	secondary	300737	318989	Ayavu - Gazi	Inde Town Council	Madi-Okollo
Pakwach-Inde-Ocoko	secondary	298740	319419	Ojiba	Inde Town Council	Madi-Okollo
Okullo - Inde	tertiary	299323	305288	Ajai Game Reserve	Inde Town Council	Madi-Okollo
Okullo - Inde	tertiary	306060	316102	Ajai Game Reserve	Inde Town Council	Madi-Okollo
Ullepi-Offaka-Anyirubu	tertiary	286047	283797	Anibu /Pajuru	Anyiribu	Madi-Okollo
Ullepi-Offaka-Anyirubu	tertiary	282370	289582	Adraa	Offaka	Madi-Okollo
Ullepi-Offaka-Anyirubu	secondary	280092	297779	Omvuloo / Alibu	Offaka	Madi-Okollo
Paidha - Otheko - Ofaka	secondary	283062	284237	Pajuru / Aviba	Anyiribu	Madi-Okollo

5.2.7 Health

Regarding health care, a number of health facilities were recorded in the project area. Okollo health centre IV was the supreme public facility within Madi Okollo district. Other facilities included Ogoko H.C III. Pawor H.C III, Ofakka HC III, Akino H.C III, Inde H.C III and Nyapea H.C III

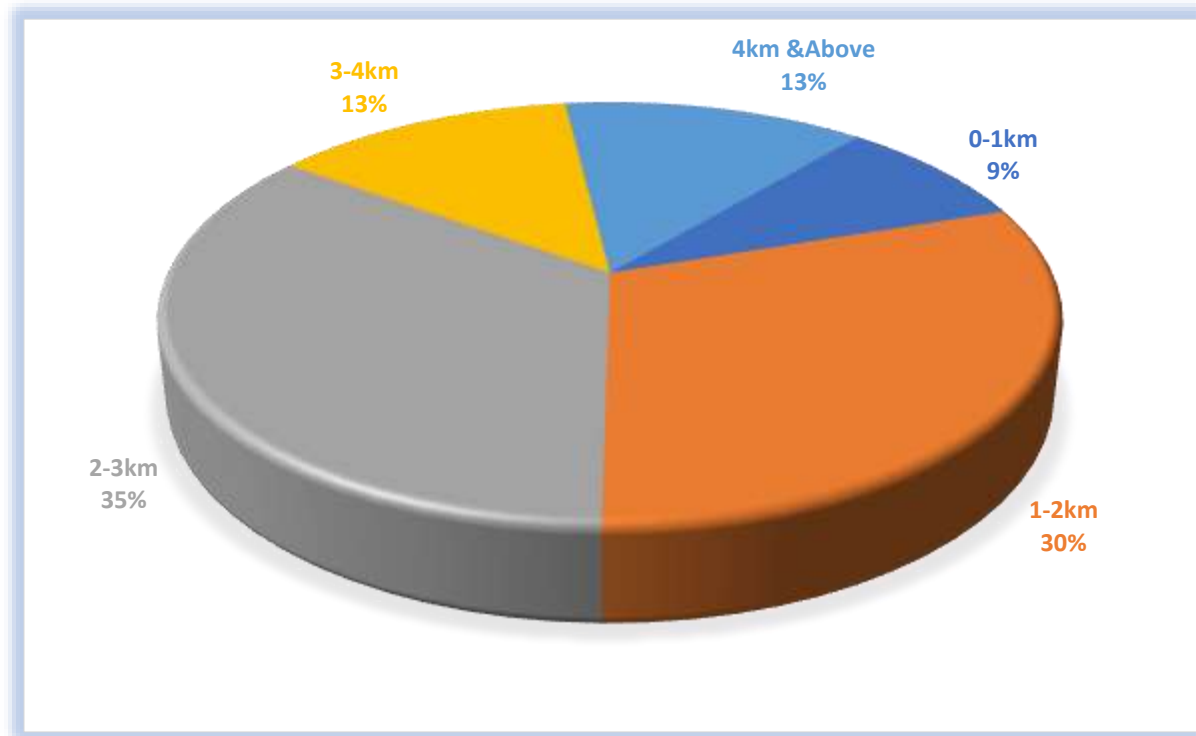
It was noted that some of these health centers are as far as 8km from the population they are supposed to service which makes access limited. Because of the above limitation as cited by area resident, the existing public health facilities are supplemented by private clinics and drug shops.



Plate 20: Inde Health Centre III

According to FGDs and K.I conducted with area leadership and resident, majority of the households obtain medical services from the government health facility, while the rest access medical services from nearby drug shops and private clinics within the centers. Complicated medical cases are referred to Okollo health centre IV and if further attention is required the cases are forwarded to Nebbi Hospital or Arua regional referral hospital. Prevalent diseases reported by respondents for having been recorded in the past three months in the project area were malaria (78%), respiratory diseases like cough, asthma and flu cough (6%),

intestinal worms (11%) and water related diseases (5%). The prevalence of other diseases in the area was low and these included Tuberculosis, syphilis, HIV and skin infections. Figure 5.3 below presents the distances of households from a public health facility.



Source: Field survey

Figure 22: Distance of households from a public health facility

During the interviews and FGDs, there was general concurrence that the health facilities and services offered from there were in appalling situation. Such a situation was qualified by inadequate medicines resulting from infrequent stocks from national medical stores, shortage of medical workers and long distance to health facilities. It is such perceptions about the conventional health services within the area that lead the communities not to use the facilities.

5.2.8 Educational Institutions

Educational institutions of different levels were observed to be existent in the project area including Nursery and Kindergarten schools, primary schools, secondary school and vocational training colleges. However, their distribution was uneven. Primary schools were more or less well distributed with all sub counties having more than one school.



Plate 21: Some of the schools recorded within the project area

On the other hand, the distribution of secondary schools left a lot wanting. For instance, Pawor Sub County did not have a public secondary school until recently when Pawor seed secondary school was established. In Ogoko Sub County, the existing secondary school Inde secondary was the only secondary school. Other schools included Offaka secondary school and Okolo secondary among others. Two technical institutions namely Inde and Adraa agriculture school are the only institutions of higher learning reported in the area.

The fact that secondary schools and institutions are far makes it a challenge in terms of access which limits chances of parents who cannot afford boarding fees from sending their children to school beyond primary level. In lali village for example it was reported that Okollo the nearest government school was 24 km away. As such parents can only send children if they are able to pay boarding fees. The development of the proposed water system will impact these schools in different ways. Where school property is affected, the process will be catered for under the RAP before construction commences.

West Nile had estimated water coverage in schools at 61% which is relatively lower. Water is an important component of menstrual management. Safe water coverage in school is still low

thus presenting a constraint to girls and women of menstrual age to access water for their menstruation. The SNV/IRC report (2012) indicated that on average, 11% of the time a girl pupil will miss learning due to menstrual periods. The study also indicates that 60% of the girl pupils absented themselves from schools during their menstruation according to the study.

The project objectives are to improve water supply and sanitation facilities in the project areas and to bring about reduction in water and sanitation related diseases. The sanitation situation in schools is not appropriate, given that only a few schools meet the recommended pupil stance ratio of 40:1. Majority of the schools in West Nile are far above the national average pupil stance ratio of 70:1. Poor hygiene and sanitation facilities in schools are important factors for high school dropout rates for girls at this level and this is reflected in lower enrolment rates for girls/women in post primary schools institutions, tertiary and universities leading to gender inequality in education.

5.2.9 Power/ Electricity

5.2.9.1 Energy for Lighting

Apart from Okollo and Inde town councils both of which do not cover a distance of a Kilometer each, the rest of the areas traversed by the proposed water project are rural. Because the area is rural access and use of clean energy is not fully embraced. In the project area households mainly rely on rudimentary sources of energy for lighting. The main sources of energy for lighting were hand held candles. Some households reported having solar. Use of paraffin contributes to indoor pollution through the smoke and soot that is emitted. Solar was noted to double as an energy source for small businesses like shops and bars.



Plate 22: A powerline in Alibu village



Plate 23: solar panels charging in Vvu

5.2.9.2 Energy for Cooking

Firewood was the dominant form of energy used by majority of households. The second commonly used source of energy for cooking is charcoal. Charcoal was recorded only in rural

growth and town centers along the proposed water network. The use of one energy source is not exclusively but rather the two are used concurrently in the centers.

The above consumption trend will subsequently be detrimental to the ecosystem in terms of climate change by way of increased environmental degradation and increased cases of respiratory illnesses due to utilization of unclean energy. Given that the project area is largely rural and sparsely populated, the energy crisis has not yet set in although if nothing is done now, the crisis will set in soon.

5.2.10 Physical Cultural Resources (PCR)

Worship centers, graves and communal burial grounds were the PCR recorded in the project area. Burial grounds are areas where family members remember their departed ones and it is one of the safeguarded identities in the cultural setting of a given ethnicity. Most of these were non-recognizable because they were earth graves and some had been washed away. Effort will be made to ensure that all burial grounds along the proposed route for the proposed water transmission and distribution pipes will not affect identified burial grounds. However details what may be affected will be captured during the RAP study and specifics will be detailed in the RAP report. The proposed project largely traverses rural areas which culturally do not have central burial areas hence chances of encountering some burial grounds exist.

5.2.11 Communication

Households mainly receive general information from radios at 62% followed by community meetings/religious gatherings at 28%. The other fairly common sources of information for households was noted to be mobile phones at 8% and groups were recorded to be the least source of information for communities at 2%. These findings indicate that radio and community meetings are the most viable avenues for conveying public information about project related activities. In addition, it was established that at least a member in 52% of all households that participated in the survey owned a mobile phone however majority were challenged by bad network reception and lack of reliable sources of power for charging. To further assess the level of information flow among community members, the survey established that some knowledge of the proposed project existed among community members the main source friends and some community member who were said to have interacted with the design team during the feasibility study.

Madi Okollo district had all the mobile telecommunication networks in Uganda are available and can be accessed. However all networks are intermittent in most areas though the Airtel and MTN networks were fair. Telecommunication network has also facilitated money transfer to finance business transactions through the various mobile money platforms they offer. Voice of Madi (107.5) the only radio station in the district was locate near Inde Technical Institute in

Ogoko Sub County. In addition there are 5 Radio stations in Arua which are also listened to in Madi Okollo and these include; Arua One FM 88.7, Voice of Life FM 100.9, Pacis FM 90.9/94.5, Nile FM 94.1 and Access FM 96.3. They have greatly improved listening culture, mass mobilization and entertainment as well as dissemination of policy and development programs that come at the cost. Television and print media accessed in the project area is so limited. Though a variety communication medium were established to be existent in the project area, the project needs to strategies more on radio given the advantage of wider and faster coverage.

5.2.12 Poverty

West Nile has high poverty incidences of 59.1% (UBOS Multidimensional poverty Index Report 2022) despite having the highest multidimensional differences between the two poverty measures in 2016/17 and 2019/20 (ranging between 34% – 42%), West Nile among Karamoja, Acholi, Lango, Kigezi, Bunyoro and Tooro registered the highest Poverty incidences and intensity.

A number of people categorized as vulnerable were identified to be in the project area and these included people with disability, the elderly, orphans and vulnerable children, widows and widowers, women because of the patriarchy nature of Ugandan societies, the youth, the poor and the landless. Evidently extreme poverty was the principal driver of vulnerability among the project host community. According to Owori 2020, 50-70% of the population in West Nile region was categorized as poor with levels among women reported as being higher. Consequently, the poverty and livelihood analyses should guide entry points for the district during implementation of projects. Similarly, MWE should mainstream issues of marginal groups and devise way of how such groups will benefit from the project.

5.2.13 Housing

As per National Household survey of 2012/2013 Northern region had the highest percentage of owner-occupied dwellings (over 90%). According to the NPHC, counties that now form Madi Okollo district had on average 64.4% temporary dwellings, 33.3% semi-permanent and only 2.6% were permanent.



Plate 21: A home stead in Mubanda village Pawor

Similar to the general district statistics the project area was observed to have mainly temporary structures which are one of the indicators for measuring poverty. In fact the few permanent and semi-permanent structures noted were in trading centers.

5.2.14 Land tenure

Like in many rural Districts of Uganda, land in west Nile, land is mainly communally owned and governed by the customary system of land tenure. Under this tenure arrangement, land ownership is vested in the lineage and is allocated by a father to his sons, who in turn, assign it to their wives and children for cultivation. Women therefore tend to be excluded from owning land, although they are allowed the right of use. While in theory, it sounds as if no single individual or household owns land under such tenure ship arrangement, in practice; the ownership is actually vested in the users.

In every community, it is clear which portion of land belongs to which household, and usually the head of the household is recognized as the owner. It is also the head of the household (land owner) who has the responsibility to rent or sell out potion of such land in case of need; though this is usually done after consultation with and the consent of the larger members of the lineage is obtained. From the household survey conducted during the ESIA assessment,

99 women out 330 people interviewed along the water transmission line owned land. Figure 5-5 below presents land ownership segregated by gender

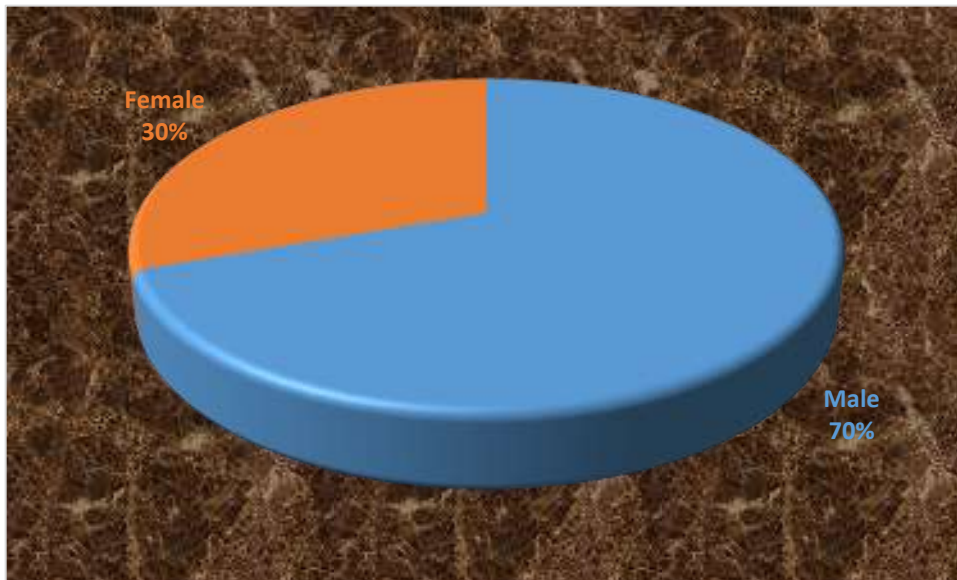


Figure 5-5: Distribution of Respondents who own land by Sex in Zombo and Madi-Okollo Refugee Hosting Communities

Under this system, each clan has a designated “land chief” responsible for speaking on behalf of the community. During community meetings it was established that the different areas have elders or chiefs who govern use and control of land. For example in Odure where the treatment plant for the scheme is located, it was reported that the chief allocates who uses which area during the planting season.

5.2.15 Gender

The study was keen about profiling roles of women and men in the project area. At a household level, it was established that men are more likely to be responsible for; buying or acquiring assets as compared to women. Women were more involved in domestic activities participating in household chores as compared to men. Though farming was noted as an activity in which all family members participate, marketing of agricultural produce was a women dominated activity.

According to the Water and Sanitation Gender Strategy 2018-2022, women and children are the most affected by lack of sanitation and inadequate safe water supply. They bear the burden of carrying water for long distances at the expense of other economic activities and education in case of the children. It is further stressed in the strategy that 1 in every 3 women risks shame, disease, harassment and attack due to lack of a safe sanitation place. During the ESIA study it was established that Ariwa sub county was the worst hit in terms of water shortage.

In fact, during a community meeting, one of the elderly females stated that the fertility rate of young women had reduced due to the fact that most women of child bearing age spent a lot of time looking for water. She added that during the long dry spells, women wake up as early as 4a.m to look for water, which not only strains them but also puts them at many more risks including sexual harassment.

They added that this trend did not only affect women but also the girl child given that most roles are divided based on gender and that of water provision is largely placed on the women and girls.

Based on the above analysis, the success and effective use of water and sanitation facilities therefore depends on the involvement of women and men, boys and girls in selecting the location of such facilities, and taking responsibility for management, operation and maintenance.

Although this is the desired scenario, realistically, the selection of the location remains largely a domain of men given that they are the landowners. Women are mainly active in the management and maintenance roles which are equally important because proper siting per say my not guarantee sustainability.

Women lack control over land, the crops their labour produces, livestock and other productive resources, yet they are responsible for meeting family needs. They only have access to the land. However, decisions on what to produce and in what quantity remain the domain of men. Women complain bitterly of men wasting time and family resources on drinking. In West Nile women have more family responsibility than men, for example, being responsible for paying school fees, nurturing children and taking care of all household needs. Surprisingly this was echoed as a culturally acceptable practice where men are treated as kings.

The gender dynamics within the wider community were also investigated through considering activities in which the larger community participates. Sports were mainly defined as a male dominated activity with men and boy's participation standing at 52% and 32% respectively. Both men and women participated in attending community meetings although the percentage of men still outweighed that of women in all meetings held during consultations.

These findings show that men have more control over community resources whereas women are more involved in activities at household level. This means that men have to be consulted widely on where community resources are likely to be affected because they are the decision takers. Other gender-based roles are expounded on included, working outside for income, owning land, livestock and other assets all of which were dominated by men. Interestingly, marketing agricultural produce was said to be an area dominated by women yet men controlled the proceeds from the same sales.

5.2.16 HIV/AIDs

Based on the Uganda Population-Based HIV Impact Assessment UPHIA 2016–2017 report, the Nest Nile prevalence stands at 3.1% which is lower than the national average of 5.2 according TASO. During the implementation stage, the contractor should develop a

comprehensive HIV management plan that will help contain the disease bearing in mind the knowledge attitude and practices of the PAPs.

5.2.17 Security

According to African Center for the Constructive Resolution of Disputes (ACCORD) report 2019, Madi-Okollo is entangled in the border dispute with Vurra County in Arua district, Terego and Yumbe districts.

In Zombo district, conflict over land was also reported to exist between the tribal conflicts between Paid and Avori in Athele and Ngawir villages. During the ESIA study, these communities were not consulted based on warning about the flaring tempers between the two sects despite both belonging to the Alur ethnic group. Project activities will not directly affect any of the sub counties mentioned above. The above status notwithstanding caution should be exercised to ensure safety of the work force during the construction period.

5.2.18 Water and sanitation related diseases

In West Nile, it is estimated that 75% of the overall disease burden derives from inadequate sanitation and hygiene and about 90% of the deaths are directly attributable to inadequate water, poor sanitation and unhygienic practices. In other words, they would be entirely preventable through basic water, sanitation and hygiene interventions. With estimates indicating that only 12% of healthcare facilities have basic sanitation services, the need to provide Water, Sanitation and Hygiene (WASH) services is acute, especially in maternity and primary-care environments. In schools, the lack of proper WASH facilities leads to absenteeism and dropouts of adolescent girls. Of concern is the absence of means for girls to manage menstruation, which deters them from attending classes. Similarly, inadequate sanitation and hygiene facilities in the workplace mean that women are unable to manage menstruation, risking work absenteeism and depriving society of their full participation.

5.2.19 Gender Based Violence and Violence against Women

Compared with a national average of 51%, the 2016 Uganda Demographic and Health Survey showed that 64% of women ages 15–49 in the refugee-hosting West Nile sub-region reported having experienced physical, sexual, or emotional violence perpetrated by their current or most recent spouse or partner. In response to the 2018 National Violence Against Children Survey, one in four girls and one in 10 boys reported having experienced sexual violence. In the most recent survey i.e. National Survey on violence in Uganda: Module 1- Violence against women and girls (UBOS 2021), 30.6% of women in West Nile experience GBV while 55% of women experience physical violence and 56.7% emotional abuse. According to police statistics, since 2014 to 2021, the police in West Nile recorded 5, 372 cases of GBV. According to Police, alcohol consumption, unfriendly cultural norms, lack of trust among couples, poverty, land wrangles and widow inheritance fuel violence in homes in the sub-region. According to Child Protection Assessment in Refugee host districts Report (2022), Child labour in West Nile Stands at 18%. The most common types of economic work where children are engaged include farm work, construction, house helpers, brick making, and charcoal burning.

6 STAKEHOLDER CONSULTATION

6.1 Introduction

The Stakeholder engagement and consultation process was undertaken as per the requirements of the National Environment (Environmental and Social Impact Assessment) Regulations 2020. Under sub-regulation (1) of regulation (16) of the National Environmental and social Impact Assessment regulations (2020) and best international practice, the project developer is required to undertake relevant stakeholder consultations during the ESIA process as detailed below. The developer shall, in carrying out the consultations under regulation 16;

- (a) Choose the mode of consultation, taking into account the nature and location of the project and the key issues to be consulted on;
- (b) Give advance notice of the proposed consultation, with a minimum notice of seven days;
- (c) Hold meetings with relevant stakeholders, communities likely to be affected by the project and the public to explain the project, its likely benefits, likely negative impacts and proposed mitigation measures, and to receive their oral or written views;
- (d) Where the consultations involve holding meetings, ensure that the venues of and time for the meetings are convenient to the relevant stakeholders, communities likely to be affected by the project and the public; and
- (e) Ensure that the comments received during consultations are recorded, made publicly available and taken into account during the environmental and social impact study.

Source: Extracted from the National Environment (Environmental and Social Assessments) Regulations 2020

6.2 Public participation objectives

Meaningful consultation by communities (especially targeted groups) and stakeholders that are likely to be affected by or benefit from the proposed water scheme will continue to be sought throughout the project life cycle, commencing as early as possible. The objective of such stakeholder consultation was to ensure that communities contribute to the development of management plans and provide feedback on the activities preceding the proposed project. Consultations were conducted in order to solicit broad community support to the project (especially a category a project or one that is highly sensitive to climate and social risks) and to ensure that affected people endorse the proposed mitigation/risk reduction and management measures. Stakeholder's consultation sought to create awareness about the project and obtain their perceived positive and negative social and environmental impacts. Specifically, consultations were undertaken in order to;

- i. Explain the project and create awareness;
- ii. Ensure Compliance with both national regulations and international best practice
- iii. Obtain baseline environmental and social conditions in the proposed project area based on local knowledge;

- iv. Obtain perceived economic, social and environmental benefits so that they can be enhanced during project implementation and operation;
- v. Capture perceived potential negative environmental and social impacts so that they can be mitigated;
- vi. Provide equal opportunity to stakeholders to get involved in project planning;
- vii. Manage Expectations and Concerns: by providing a mechanism for stakeholders to engage with the Project about their concerns and expectations and provide a mechanism for receiving, documenting and addressing comments received;
- viii. Build trust with the stakeholders.

6.3 Stakeholder identification

Identification of stakeholder groups started with investigating groups/agencies that present threats and opportunities associated with the proposed Nyagak WSS project. This was based on some key questions below:

- a) Who will the project benefit/ affect?
- b) Who are key players in development and implementation of the project?
- c) What key resources will be impacted?
- d) Who is most dependent on resources likely to be affected?
- e) Who possesses claims on resources to be affected – including legal jurisdiction and customary use?
- f) Are several government sectors and ministry departments involved?
- g) Which agencies license certain aspects or resources to be affected (forestry, wetlands, wildlife areas)?
- h) Are there major events or trends currently affecting the stakeholders (e.g. development initiatives, migration, population growth)?

The ESIA team particularly targeted officials of the district of, Zombo, Nebbi and Madi-Okollo and all the eight affected sub counties of Nyapea, Paidha, Nebbi, Anyiribu, Offaka, Okollo, Ogoko and Pawor. A stakeholder engagement plan was prepared to guide the ESIA study clearly identifying stakeholders and their probable interest. These included; directly affected and indirectly affected community members, local leaders, district leadership and Government Agencies.

6.4 Stakeholder mobilization

Consultation of government agencies and district officials were done through formal meetings held with the respective agencies and district leadership. A letter of introduction for this purpose was issued by Ministry of Water and Environment the client. To date the different national agencies consulted included, Ministry of Water and Environment and Uganda Wildlife Authority. Agencies such as Ministry of Gender Labour and Social Development, National Environment Management Authority, National Forestry Authority, Ministry Of Water

and Environment and Directorate of Water Resources Development will be consulted in due course. At District level key stakeholders from relevant departments such as that of production, Natural resources and Community development, planning and engineering were mobilized.

At community level, mobilization was through different structures as highlighted below. At the District, the CAO was notified about the intention of the ESIA team to conduct consultations with affected communities. A contact person from the water department was then allocated by the office of the CAO to guide the team and to liaise with leadership of the four sub counties. At the Sub County, the leadership was notified about the project and their views sought.

At village level, identified villages and their representatives were mobilized through L.C I leaders. Local leaders from the identified villages would then select a central meeting place where village members and their leaders convened. Meetings were held with local leaders, representatives of the youth, women, the old and disabled, potential water users, land owners and users among others. Below is a pictorial view of some of the stakeholder meetings conducted during the ESIA study



Plate 22: Meeting held with Ogoko Sub county leadership



Plate 23: Meeting with Madi-Okollo LC5 & RDC illustrating the project design



Plate 24 Meeting with Sub-county Chief Nyapea



Plate 25: Meeting with UWA officials at UWA offices in Ajai wildlife reserve



Plate 26: Meeting with Paidha Sub county Chief

Plate 27: Meeting with L.C III Offaka Sub county



Plate 28: meeting held with Pamura community

Plate 29: meeting held with Baribu and Drajini communities



Plate 30: Meeting held with Panzoro Community members

Plate 31: Meeting held with Atyak (Odhere) community members



Plate 32: Meeting held with Aleju/Lanyi community members



Plate 33: Meeting held with Vuu community members



Plate 34: Meeting held with Alindi and Agelemu community members



Plate 35: Meeting held with Ojiba community members



Plate 36: Meeting held with Anyavu and Gazi community members



Plate 37: Meeting held with Ndubu community members

6.5 Methods of engagement

Stakeholder engagement during the ESIA study involved different methods. These included formal meetings, key informant interviews, focus group discussions and public meetings as illustrated in the table 5.1 below.

Table 5.1: Summary of stakeholders identified and consulted during the ESIA process

Activities	Stakeholder	Purpose of Information sharing/disclosure
Awareness/sensitization meetings by the ESIA team	PAPs, Land owners, beneficiaries and communities	General overview of project and implications
Focus groups	Women Youth Elderly Persons with disability Area leaders Other interest groups	General overview of project and implications Disclosure of mitigation measures and grievance mechanism Identification of views and expectations
Village meeting / public consultation	All PAPs Indirectly affected people Beneficiaries Communities	General project overview Identification of views and expectations Disclosure of mitigation measures Acquisition of information for input into ESIA
Formal meetings	Government bodies Local government	Overview of project and implications Disclosure of mitigation measures Acquisition of information for input into ESIA
Key informant interviews	Local government Government officers Local and political leaders Cultural Leaders	Overview of project and implications Baseline data Feedback on the project proposals

6.6 Stakeholder consultation findings

Findings from the National, district, sub counties and community have been summarized as presented below. Detailed minutes of the ESIA study have been appended to the report.

Table 6.2: Summary of villages consulted during the ESIA study

Sub County	Key Contact Person	Meeting Dates	Village
Pawor	0774282674 L.C.1 (Arudraku Alex)	9/11/2022	Degia
	0785317908 Mobilizer (Aromborach Jackline)	9/11/2022	Mubanda
	0787157611 Mobilizer (Achora .J.)	9/11/2022	Parabouk Upper
Ogoko	0782631277 L.C I Vice Chairperson Michael Andama	10/11/2022	Anyavu/Gazi

Sub County	Key Contact Person	Meeting Dates	Village
	0789083549 L.C I Chairperson Mustafa	10/11/2022	Ojiba
	0774282674 L,C I Chairperson Alex Arudraku		Ombokoro
		10/11/2022	Ajai Game Reserve
Okollo	0787144538 L.C I Chairperson Yasin Akiri	8/11/2022	Patru/Pamura
	0773406757 L.C I Chairperson Amin Bin Asuman		Omvuloo/Alibu
			Ndu
			Ombachi
	0775798215 L.C I Chairperson Onva Patrick		Ocebe-Alibu/Ndriba/Ndriba- Adabu
		12/11/2022	Ayibu/Osabu
		12/11/2022	Ndriba/Ibbi
	0770407442 L.C.1 (Baalounzi Simon)	12/11/2022	Adraa/Pamachi
	0770363001 L.C.1 (Asea Caristop)	12/11/2022	Ayira/Oyeku
	0787584837 L.C.1 (Awguandia Bruno)	12/11/2022	Ayiju
	0787796992 L.C.1 (Onzima Albert)	12/11/2022	Pauni
	0777450491 L.C.1 (Ariaka David Benyo)	10/11/2022	Parabu/Opibu
	0786250030 L.C.1 (Agbara Charles)	8/11/2022	Okollo Tr.C
	07773733116 L.C I Chairperson Feni Kennedy	8/11/2022	Panzoro
		8/11/2022	Ndubu
		10/11/2022	Vuu
		10/11/2022	Baribu/Drajini
		9/11/2022	Osabu/Anyora
	0782100311 Youth Leader (Abbas Hassan)	9/11/2022	Pamva/Omveko
Offaka	0770407442 L.C I Chairperson Baalounzi Simon	12/11/2022	Adraa
	Iriku Robert L.C I Chairperson	12/11/2022	Abali Angazi
	0772707541 L.C I Chairperson Aziku Christopher	12/11/2022	Ndriba/ Ocebu
Nebbi	0756705398 Vice Chairperson Oyubi Michael	11/11/2022	Odhure (Atyak)
Paidha	0777494070/0753331655 Mobilizer (Olamu Richard Acwee	11/11/2022	Alindi/Agelemu
Nyapea	0781488191 L.C.1 (Kissa William	11/11/2022	Aleju/Lanyi
			Athele
			Uruku Awendu Kedi
			Pajobi Arasi
	0775482606 L.C.1 (Anguonzi Zaid)	12/11/2022	Adribu/Oloyi
Anyiribu	0784253289 L.C.1 (Candia Stephen)	12/11/2022	Pajuru/Ovibu

Sub County	Key Contact Person	Meeting Dates	Village
	0784202596 L.C.1 (Lemaku Moses)	11/11/2022	Anibu/Pajuru
	0761300844 L.C.1 (Okumu Patie)	12/11/2022	Anibu-Arasi-Ayira
			Kango/Anyora

Findings from all the 32 community meetings held across the eight sub counties were diverse and some unique to the areas where the meetings were held. More than 50 villages were consulted in the 32 meetings. Below is a summary of key themes that emerged and details are provided in the minutes attached as Annex 1 to the report.

Table 6-3: summary of findings

Date of engagement	Location / Village	Issues raised	Response
<ul style="list-style-type: none"> 12/11/2022 	<ul style="list-style-type: none"> Adraa and Pamachi village 	<ul style="list-style-type: none"> The community members wanted to know how much the water would cost after implementation 	<ul style="list-style-type: none"> We cannot dictate that for now but once the project is implemented and handed over to NWSC they will be able to inform the community and the water will be affordable
		<ul style="list-style-type: none"> The community members asked if they would be employed by the contractor during the construction 	<ul style="list-style-type: none"> A few community members will be given jobs because the contractor will have a limited number of people they can work with. Also, task the community leaders to talk to the contractor to offer their people jobs
		<ul style="list-style-type: none"> The community raised an issue of some people not benefiting because they will offer land for the pipes and still pay for the service 	<ul style="list-style-type: none"> This is an expensive project and the government is borrowing money to extend service to its people so with this, everyone is benefiting and if we meet a lot of resistance the area will be denied services and they will be taken to the next village so we hope we don't meet this because one person can deny the whole community this service

		<ul style="list-style-type: none"> The community wanted to know if institutions will be supplied with this service 	<ul style="list-style-type: none"> Noted we shall let the ministry know that the people expressed to have water in the following areas
		<ul style="list-style-type: none"> They also expressed the need to know why centres should be served when the people in the villages are the ones in need of the water 	<ul style="list-style-type: none"> It will first cover the small area and then later move to the villages because the project might become too expensive for the government if all is done at once
		<ul style="list-style-type: none"> They also wanted to know if the tank will supply the whole area 	<ul style="list-style-type: none"> Yes, the tank has the capacity to serve the entire area
		<ul style="list-style-type: none"> The community wanted to know if the graves that might be destroyed during implementation will be compensated 	<ul style="list-style-type: none"> Yes, the graves will be paid and also the cost of relocating them will be catered for
		<ul style="list-style-type: none"> The community thanked us for informing them about the project because they are water-stressed and if possible work should commence as early as possible 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> The community members also raised a concern about the water being free of charge 	<ul style="list-style-type: none"> Noted and we shall inform the ministry but the payment made at the end of the day is supposed to be for maintenance
<ul style="list-style-type: none"> 11/11/2022 	<ul style="list-style-type: none"> Agelemu (Alindi, Alik) village 	<ul style="list-style-type: none"> Some community members raised a concern about the perception people have about tap water being dangerous and causing diseases like typhoid 	<ul style="list-style-type: none"> Noted, we shall tell the Ministry of Water and Environment to conduct more sensitization to dismiss the myths
		<ul style="list-style-type: none"> An inquiry was made by the community on whether labourers 	<ul style="list-style-type: none"> A request for work in local communities is very common, but since we are not the

		<p>will be brought by the contractor because they need their local people employed</p>	<p>ones that come to implement, we may not be sure once the contractor comes, task the leaders, especially from the sub-county, district to request the contractor to employ some people contractor to employ some people</p>
		<ul style="list-style-type: none"> The community raised an issue about the workers engaging with their girls, leaving them pregnant and going back to their regions 	<ul style="list-style-type: none"> As parents keep questioning girls, pieces of training will be carried out to talk about all these impacts and how they can be prevented
		<ul style="list-style-type: none"> The community wanted to know how long the project will take and when it will begin 	<ul style="list-style-type: none"> The designs have been completed we are carrying out assessments, and we shall come back to record the landowners these are all processes that take time but we have secured funds with the world bank which gives a time frame so all this will be done in the shortest time possible
		<ul style="list-style-type: none"> The community members also wanted to know what would be done supposing the pipeline gets to their community and yet there is no compensation 	<ul style="list-style-type: none"> The design ties to avoid structures, but if they get affected they will value and compensate
		<ul style="list-style-type: none"> An inquiry was made on whether water will be distributed at their places of worship like churches and if not could be included in the project 	<ul style="list-style-type: none"> The scheme will first serve where there are concentrations of people but at a later stage, it will spread to other institutions, but distribution will be discussed at a later stage

<ul style="list-style-type: none"> 10/11/2022 	<ul style="list-style-type: none"> Anyavugazi village 	<ul style="list-style-type: none"> An inquiry was made on why the water is being extracted from Nyagak yet the Nile is nearer 	<ul style="list-style-type: none"> The Project is a gravity flow scheme, which means the water will move on its own and not be pumped, Nyagak is higher than the Nile so that's why the only way water can flow is by gravity
		<ul style="list-style-type: none"> The community raised an issue about what could be done Supposing one of the community members refuses the pipeline to pass through their land 	<ul style="list-style-type: none"> This is why we are here to tell you about the project and how it will be implemented. This project will be for the people so we don't anticipate anyone will refuse. It's only the people where the tanks will be put that will be compensated
		<ul style="list-style-type: none"> The community members who anticipate that the pipes will pass into their land freely asked if they would get taps in their homes 	<ul style="list-style-type: none"> The water will be provided in major centers where many people can access it. Once NWSC takes over the project then one can demand a tap at their home
		<ul style="list-style-type: none"> The community members also asked how far the line was from the roadside 	<ul style="list-style-type: none"> The line will be close to the road and not exactly in the reserve. The next team which will have the surveyor will be able to show where exactly the line will pass so until then we cannot be sure
		<ul style="list-style-type: none"> The community raised a concern about the pipes having to pass through UWA land and there are projects that are stopped due to this fact and asked if the project will not be affected by that 	<ul style="list-style-type: none"> UWA and M.W.E are government bodies and this will be resolved between them to ensure water is accessed by people
		<ul style="list-style-type: none"> The community inquired if labour will be given to locals if construction 	<ul style="list-style-type: none"> We shall try our level best to take on a few people but we will not be able to employ

		<p>commences or if the ministry will bring its own people and if it's the locals, will they be paid or not</p>	<p>everyone and the experts will be brought from other regions for example the engineers and whoever works will be paid</p>
		<ul style="list-style-type: none"> Community members raised concern about them already paying 200 Uganda shillings at some water sources and they are not interested in this pipe passing in their homes 	<ul style="list-style-type: none"> One thing you should put in mind is one person cannot deny the whole district service so we have to keep talking to you until you are convinced
		<ul style="list-style-type: none"> The community stressed an issue of payment of casual laborers being different from the skilled laborers yet the work done is the same. 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> The community stated about them having institutions like health centers, churches, and schools and what the ministry is planning is to put water in centers with this, how will the others access water can't each institute get its own water source? 	<ul style="list-style-type: none"> We shall let the M.W.E know, we just gave an example but all this will be considered and all we are emphasizing is they will not take it to people's homes
		<ul style="list-style-type: none"> The community stressed views about different companies showing up to sensitize and do not implement the projects so they asked if this will be the same issue 	<ul style="list-style-type: none"> No, it's not but the project takes some time for construction to begin because of the protocol
		<ul style="list-style-type: none"> An inquiry was made on who will monitor the pipes once implementation is done in case of leakages 	<ul style="list-style-type: none"> NWSC will monitor all networks which is why they get a fee from you for maintenance

<ul style="list-style-type: none"> 11/11/2022 	<ul style="list-style-type: none"> Areju, Lanyi village 	<ul style="list-style-type: none"> An inquiry was made on whether the water that will be supplied will be free of charge 	<ul style="list-style-type: none"> The water is not free a small fee will be paid which will be used to maintain the pipes and taps
		<ul style="list-style-type: none"> The community wanted to know if they will be paid supposing the pipelines get to pass through their structures and gardens 	<ul style="list-style-type: none"> There is no compensation for this project the design will try as much as possible to avoid properties and in case the pipes pass through property, it will be valued and compensated
		<ul style="list-style-type: none"> They also mentioned that they are water stressed and do not have clean safe water so they end up utilizing water from River Nyagak 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> The community wanted to know if the labour will be required or the contractor will bring them from the other regions 	<ul style="list-style-type: none"> Yes, for mainly casual work but not everyone will be employed the contractor will pick a few and your leaders should be able to help request for the vacancies available but experts will be brought from other regions by the contractor
		<ul style="list-style-type: none"> An inquiry was made on where the pipes will exactly pass 	<ul style="list-style-type: none"> In our next sitting, we shall have the surveyor who will show us where exactly the pipes will pass
		<ul style="list-style-type: none"> The community wanted to know if the water will be treated before distribution 	<ul style="list-style-type: none"> Yes, it will be treated from a treatment plant which will be established
		<ul style="list-style-type: none"> The community raised a concern about them suffering from waterborne diseases like bilharzia because of the contaminated 	<ul style="list-style-type: none"> Noted

		<p>water they use on a daily</p> <ul style="list-style-type: none"> An inquiry was made on compensation not being considered so what would they do incase their plants get destroyed during the implementation phase 	<ul style="list-style-type: none"> This will depend on the type and kind of crops that will be found in the garden during implementation, they will be valued and compensated
<ul style="list-style-type: none"> 11/11/2022 	<ul style="list-style-type: none"> Atyak (Odhure) 	<ul style="list-style-type: none"> The community wanted to know if the pipes will be placed in their respective homes at a free cost because their homes are far away from the centers 	<ul style="list-style-type: none"> Well, for now, the project is looking at distributing water in general centers where a number of people can access clean safe water and this can only be done at a later stage when the project is handed over to NWSC and it will not be free but rather costly.
		<ul style="list-style-type: none"> The community members raised a concern on labour where they pointed at issues of being idle and later engaging in crime yet if employed by the contractor all this will be avoided because they will be busy trying to earn a living 	<ul style="list-style-type: none"> This issue has been raised in most villages and to be honest, not everyone will get employed because a few people will be picked since the contractor will move with the technical team they need and also your leaders will
		<ul style="list-style-type: none"> An inquiry was made on what will be done if the landowner denies passage of the pipe and how this will be resolved 	<ul style="list-style-type: none"> We are here to inform you about the project so that you see the need for it in the village, such landowners will be talked to and convinced but put in mind that one person cannot deny the whole village clean safe water
		<ul style="list-style-type: none"> The community expressed the need to know when the project will commence because 	<ul style="list-style-type: none"> The project started some time back which is why you kept seeing different groups collecting

		<p>the elders have to meet with the contractors once on ground</p>	<p>different information and carrying out different studies for instance a team came and conducted the feasibility study to know if the area is suitable for the project and we are here to conduct an ESIA (Environmental and Social Impact Assessment) so it's in phases and once the contractor is on ground you will surely notice because construction will be taking place which is not a long time from now</p>
		<ul style="list-style-type: none"> The community wanted to know if the people in centers can get their personal taps 	<ul style="list-style-type: none"> Yes they can but after the project has been handed over to NWSC through applications
		<ul style="list-style-type: none"> An Inquiry was made on who would be in charge of the collection of the money 	<ul style="list-style-type: none"> This information will be given to you once the project is handed over to NWSC who will be operating it
		<ul style="list-style-type: none"> The community wanted to know if this project is under the government or the district 	<ul style="list-style-type: none"> This is a government project
<ul style="list-style-type: none"> 12/11/2022 	<ul style="list-style-type: none"> Ayiju 	<ul style="list-style-type: none"> The community raised concerns about having piped water (the one being implemented by the ministry) and they should tell them how to use it 	<ul style="list-style-type: none"> Noted, we shall let the Ministry know about this and sensitization will be done once implementation is done.
		<ul style="list-style-type: none"> An inquiry was made on whether community land would be bought by the government 	<ul style="list-style-type: none"> The government is not paying for any land but is requesting landowners where the project design will pass to offer them a small portion of land where these pipes can be placed.

		<ul style="list-style-type: none"> Community members asked whether the government is giving water to people who are only staying where the line will pass 	<ul style="list-style-type: none"> No, this water will flow through pipes to the main centers where all community members can access the water
		<ul style="list-style-type: none"> An inquiry was made on whether the water will be connected to their homesteads 	<ul style="list-style-type: none"> This can only happen at a later stage when water is being operated by NWSC an individual can request for a personal tap at home through application
		<ul style="list-style-type: none"> The community also wanted to know why M.W.E deceived the public about water which they later implemented and after, the points were closed, why and how? 	<ul style="list-style-type: none"> Noted, we will inform them about this and if they have any explanations, they will come through with them
		<ul style="list-style-type: none"> The community stressed an issue about graves and cemeteries and if they will be compensated 	<ul style="list-style-type: none"> Yes, the graves will be compensated and also be relocated to other safer places
		<ul style="list-style-type: none"> The community made emphasis on whether they would be employed by the contractor 	<ul style="list-style-type: none"> Yes a few people will be given jobs that do not need expertise but the leaders should ask the contractor to employ their people as soon as they are seen on ground
<ul style="list-style-type: none"> 10/11/2022 	<ul style="list-style-type: none"> Baribu village 	<ul style="list-style-type: none"> The community wanted to understand why the ministry won't compensate landowners if at all pipes will pass through their land, or property and only pay for where the tank will be 	<ul style="list-style-type: none"> The ministry will not compensate land because it is a small portion that it needs to make way for pipes and this being a service for the community they assume you need the water and the tank is compensated because it will be there and not moved but for the pipe once buried you can still

			use your land for other purposes.
		<ul style="list-style-type: none"> An inquiry was made on whether taps can be put in place for an individual 	<ul style="list-style-type: none"> Under this project we cannot but once handed over to NWSC one can request and apply for one.
		<ul style="list-style-type: none"> The community members wanted to know if the design could be changed if the water line passes their buildings 	<ul style="list-style-type: none"> We have tried as much as possible to avoid structures but where it is unavoidable it will be valued and compensated
		<ul style="list-style-type: none"> The community also wanted to know what happens to their crops if got in the garden during the implementation 	<ul style="list-style-type: none"> The project design avoids gardens as much as possible and it will also depend on the type of crops
		<ul style="list-style-type: none"> An inquiry was made on when the project will commence 	<ul style="list-style-type: none"> The project has already started and that is why you are seeing us here conducting an Environmental and Social Impact Assessment
		<ul style="list-style-type: none"> The community asked who would collect this money and why it would be collected 	<ul style="list-style-type: none"> Once the project is handed over to NWSC for operations, they will be able to communicate who will collect this money and it will be collected for the maintenance of pipes and taps
		<ul style="list-style-type: none"> The community wanted to know who will excavate where the pipes will pass 	<ul style="list-style-type: none"> It will be a few people from the village or district because not everyone can be employed
<ul style="list-style-type: none"> 9/11/2022 	<ul style="list-style-type: none"> Degia 	<ul style="list-style-type: none"> The community wanted to know if the landowners will be compensated 	<ul style="list-style-type: none"> Another team will come and measure the exact points and one thing is they don't compensate land they just request you to let them bury the pipe in your land so the services can be

			extended to people, but all this will be explained in detail then the abstraction point will be in the river
		<ul style="list-style-type: none"> The community wanted to know if the labour will be required or the contractor will bring them from the other regions 	<ul style="list-style-type: none"> Yes, for mainly casual work but not everyone will be employed the contractor will pick a few and your leaders should be able to help request for the vacancies available but experts will be brought from other regions by the contractor
		<ul style="list-style-type: none"> The community stressed a concern about them suffering and not having water to use 	<ul style="list-style-type: none"> Noted, and this is an issue which will be conveyed to the ministry
		<ul style="list-style-type: none"> An inquiry was made on where the pipes will exactly pass 	<ul style="list-style-type: none"> In our next sitting, we shall have the surveyor who will show us where exactly the pipes will pass
		<ul style="list-style-type: none"> The community also asked if there would be charges for this water 	<ul style="list-style-type: none"> Yes, there will be charges but it will be a small manageable fee
		<ul style="list-style-type: none"> An inquiry was made on how long it would take for the project to commence 	<ul style="list-style-type: none"> This will depend on the document that we have to prepare and hand over to NEMA
		<ul style="list-style-type: none"> The community wanted to know if we had contacted the district for easy follow up in case the project is not implemented 	<ul style="list-style-type: none"> Yes, we met the district leaders and they know we are here
		<ul style="list-style-type: none"> An inquiry was made on what the team that came earlier had taken away after drilling and why 	<ul style="list-style-type: none"> A team came to conduct a feasibility study so that they can know if the area is suitable for the project and the soil samples that were taken were tested to confirm whether the

			<p>areas where that tanks are can facilitate their capacity</p>
<ul style="list-style-type: none"> 12/11/2022 	<ul style="list-style-type: none"> Ndriba Adabu village 	<ul style="list-style-type: none"> The community wanted to know how much the water will cost 	<ul style="list-style-type: none"> We cannot dictate that for now but once the project is implemented and handed over to NWSC they will be able to inform the community but it will be a fair price
		<ul style="list-style-type: none"> The community members stressed concern about not having clean water in the area and yet water is life. The area only has some water sources like boreholes but at a distance 	<ul style="list-style-type: none"> Noted and we shall let the M.W.E know about it through the report we shall write to them
		<ul style="list-style-type: none"> The community also said they are suffering from a number of waterborne diseases due to lack of water such as bilharzia 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> The community asked how water will reach the other villages 	<ul style="list-style-type: none"> The project is a gravity flow scheme which means it will flow naturally.
		<ul style="list-style-type: none"> The community wanted to know if water can be extended for those that stay far away from the points 	<ul style="list-style-type: none"> Once implementation is done, operations will be handed over to NWSC and that is when community members can request for taps in their respective homes.
		<ul style="list-style-type: none"> An inquiry was made on when the project will commence 	<ul style="list-style-type: none"> The fact that we are here shows that the project has already started because we are conducting an ESIA

		<ul style="list-style-type: none"> The community expressed the need to know if the contractor would bring their own technicians or if they will work with the local community 	<ul style="list-style-type: none"> For the experts, they will have to be brought from other regions but for work that they can do, they will be given but also the chairman should demand for his people jobs once the contractors are on ground
		<ul style="list-style-type: none"> The community (landowners) wanted to know how the government will value their land that will be used during implementation 	<ul style="list-style-type: none"> Another team will come and measure the exact points and one thing is they don't compensate land they just request you to let them bury the pipe in your land so the services can be extended to people, but all this will be explained in detail then the abstraction point will be in the river.
<ul style="list-style-type: none"> 13/11/2022 	<ul style="list-style-type: none"> Odhure village 	<ul style="list-style-type: none"> The community wanted to know if the pipes will be placed in their respective homes at a free cost because their homes are far away from the centers 	<ul style="list-style-type: none"> Well, for now, the project is looking at distributing water in general centers where a number of people can access clean safe water and this can only be done at a later stage when the project is handed over to NWSC and it will not be free but rather costly.
		<ul style="list-style-type: none"> The community wanted to know if the people in centers can get their personal taps 	<ul style="list-style-type: none"> Yes they can but after the project has been handed over to NWSC through applications
<ul style="list-style-type: none"> 10/11/2022 	<ul style="list-style-type: none"> Ojiba 	<ul style="list-style-type: none"> An inquiry was made on whether the ministry will value where the pipes will pass or only where the tank will be 	<ul style="list-style-type: none"> No compensation for the pipe but where the tank will be the structure will be permanent so this person will be valued and paid, also pipes will be along the road and not in gardens or homes

		<ul style="list-style-type: none"> The community wanted to know who will be in charge of the money that will be collected 	<ul style="list-style-type: none"> Once the project is implemented, the M.W.E will hand over the operation processes to NWSC who will clearly address this issue
		<ul style="list-style-type: none"> The community asked if the water that was picked before will be the same water brought back to the community 	<ul style="list-style-type: none"> M.W.E is extracting water from River Nyagak and it will be treated and then distributed
		<ul style="list-style-type: none"> The community also wanted to know if the ministry will offer them casual work to be done since they are offering their land 	<ul style="list-style-type: none"> A few employees will be taken from the village since the contractor will have their own technical team
		<ul style="list-style-type: none"> An inquiry was made on whether the few people that attended the meeting would be the representatives for the rest of the project for the community 	<ul style="list-style-type: none"> We believe there are more people in the community and the reason we meet a few is that the few will be able to spread the project to the rest of the community this being an entry meeting, we have more and better mobilization will be done in the next meetings
		<ul style="list-style-type: none"> They wanted to know if they will be valued if the pipe passes through a house or fruit tree 	<ul style="list-style-type: none"> Under this project, they have tried to avoid the structures, but in case it happens, they will be valued and compensated
		<ul style="list-style-type: none"> The community suggested that casual workers be employed at every boundary and make sure they do not cross another village so everyone can benefit 	<ul style="list-style-type: none"> Labour laws do not allow this and contracts are all they use and cannot be terminated
<ul style="list-style-type: none"> 8/11/2022 	<ul style="list-style-type: none"> Okollo TRC 	<ul style="list-style-type: none"> An Inquiry was made on whether the water will only be distributed in towns 	<ul style="list-style-type: none"> The ministry is picking out towns because of the big population and the

		yet the pipes are passing in villages	test will get distributions
		<ul style="list-style-type: none"> The community expressed the need to know if every home will be provided with a pipe since the population is big 	<ul style="list-style-type: none"> No, pipes will not be distributed to every household but taps or water source points will be placed in centers where each and every one will be able to reach in order to get clean safe water
		<ul style="list-style-type: none"> The community wanted to know how much the water will cost 	<ul style="list-style-type: none"> We are not certain because this can only be told to you by N.W.S.C but not to worry because it will be affordable to each and everyone
		<ul style="list-style-type: none"> Community members also needed to know who would operate the repair taps and pipes once they are damaged given the fact that they are illiterate 	<ul style="list-style-type: none"> This project will be handed over to NWSC and they will be in charge once implementation is done.
		<ul style="list-style-type: none"> The community stressed the issue of when the project will commence because there are a number of people in the town in need of this water 	<ul style="list-style-type: none"> The project already commenced and different groups have been coming to collect different data from the different villages we are here to conduct an ESIA which will be handed over to NEMA and construction will begin.
		<ul style="list-style-type: none"> The community people reported that a group of people went to the village without informing the local leaders, concerns were raised by the local people and the work was put on hold 	<ul style="list-style-type: none"> The people that came were conducting a feasibility study and they were able to draft a design on how the water will flow
		<ul style="list-style-type: none"> The community expressed the need to know if the contractor would bring their own 	<ul style="list-style-type: none"> For the experts, they will have to be brought from other regions but for work that they can do, they

		<p>technicians or if they will work will the local community</p>	<p>will be given but also the chairman should demand his people jobs once the contractors are on ground.</p>
		<ul style="list-style-type: none"> The community (landowners) wanted to know how the government will value their land that will be used during implementation 	<ul style="list-style-type: none"> Another team will come and measure the exact points and one thing is they don't compensate land they just request you to let them bury the pipe in your land so the services can be extended to people, but all this will be explained in detail then the abstraction point will be in the river.
<ul style="list-style-type: none"> 12/11/2022 	<ul style="list-style-type: none"> Osabu, Anyora 	<ul style="list-style-type: none"> The community wanted to know how many feet the pipe will be because as they dig, won't the pipe be destroyed? 	<ul style="list-style-type: none"> About one and a half meters deep but also it follows the road and doesn't get to the gardens and properties
		<ul style="list-style-type: none"> An inquiry was made on where the labour would be got from 	<ul style="list-style-type: none"> About employment, we shall recommend and only 20 people might be required so a few will be taken at least from each village so not everyone will be employed by the contractor
		<ul style="list-style-type: none"> The community asked how water will reach some of them that stay far away from the main road since the main pipes are at the main road and needed water to be put in their homes 	<ul style="list-style-type: none"> Later if you request they will but for now, they will majorly place the water points at centers
		<ul style="list-style-type: none"> The community members wanted to know if the water will be at a cost 	<ul style="list-style-type: none"> A small fee will be required to maintain pipes, and taps and treat the water
		<ul style="list-style-type: none"> The community wanted to know why they are paying for 	<ul style="list-style-type: none"> We shall inform the ministry and this is a service for the

		water yet they are offering land for the pipes to pass through	people so the fee that is put is for maintenance
<ul style="list-style-type: none"> No8/11/2022 	<ul style="list-style-type: none"> Pamura village 	<ul style="list-style-type: none"> The community members wanted to know if the government will value their lost property and pay them after implementation for example crops in gardens 	<ul style="list-style-type: none"> There is no compensation in this project because the properties are avoided in the design and most of the pipelines are moving along the road
		<ul style="list-style-type: none"> The community expressed the need for security or a committee that will be in charge of the materials once on ground 	<ul style="list-style-type: none"> Yes, the contractor will have already secured storage for these materials and security measures will be put in place to avoid loss of the materials
		<ul style="list-style-type: none"> The community members wanted to know how long the project would take to be implemented 	<ul style="list-style-type: none"> Since the funds were secured from the world bank, the world bank always gives a timeline for projects so be rest assured that implementation will be done in the shortest time possible
		<ul style="list-style-type: none"> The community members said they are water stressed and share the available water sources with animals thus being contaminated 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> The community stressed a concern about the borehole NUSAF constructed which has been spoilt for over 10 years and wanted to know if another borehole will be constructed 	<ul style="list-style-type: none"> Noted and for now the ministry will provide tap water but we shall inform them so that they put it into consideration
		<ul style="list-style-type: none"> The community wanted to know if the government will provide them with seeds and schools 	<ul style="list-style-type: none"> No, this is M.W.E but we can forward your issues to them through the report

			we shall deliver to them
<ul style="list-style-type: none"> 9/11/2022 	<ul style="list-style-type: none"> Pamva, omveko 	<ul style="list-style-type: none"> The community wanted to know how many feet the pipe will be because as they dig, won't the pipe be destroyed? 	<ul style="list-style-type: none"> About one and a half meters deep but also it follows the road and doesn't get to the gardens and properties
		<ul style="list-style-type: none"> An inquiry was made on where the labour would be got from 	<ul style="list-style-type: none"> About employment, we shall recommend and only 20 people might be required so a few will be taken at least from each village so not everyone will be employed by the contractor
		<ul style="list-style-type: none"> The community asked how water will reach some of them that stay far away from the main road since the main pipes are at the main road and needed water to be put in their homes 	<ul style="list-style-type: none"> Later if you request they will but for now, they will majorly place the water points at centers
		<ul style="list-style-type: none"> The community raised concern about cost asking if they will be charged or not 	<ul style="list-style-type: none"> No, it will not be free but a small fee will be required to maintain pipes, and taps and treat the water
		<ul style="list-style-type: none"> The community wanted to know why they are paying for water yet they are offering land for the pipes to pass through 	<ul style="list-style-type: none"> We shall inform the ministry and this is a service for the people so the fee that is put is for maintenance
<ul style="list-style-type: none"> 8/11/2022 	<ul style="list-style-type: none"> Panzoro 	<ul style="list-style-type: none"> Some community members wanted to know if pipes will be extended to their homes because they stay quite far from the road 	<ul style="list-style-type: none"> Currently, we are here on behalf of M.W.E the intention is to provide where the safe water standpoints will be, that will be defined at a later stage by M.W.E when the implementation begins.
		<ul style="list-style-type: none"> An inquiry was made on whether the whole village will be able to receive 	<ul style="list-style-type: none"> Yes, water will be distributed to most of the villages

		<p>water yet the tank will be at goli and some houses are across River Ora</p>	
		<ul style="list-style-type: none"> • They wanted to know if there will be any kind of assistance to institutions like Archdeaconry training centre 	<ul style="list-style-type: none"> • We shall let the Ministry of Water and Environment Know about this
		<ul style="list-style-type: none"> • The community stressed an issue about the existing water project at the bridge where people from vuu village and the trading centre are supplied and they pay every end of the month so they asked if it will be the same issue with them 	<ul style="list-style-type: none"> • M.W.E will hand over the project to NWSC for operations and they will be able to communicate further on that.
		<ul style="list-style-type: none"> • The community raised a concern about them suffering from waterborne diseases like bilharzia 	<ul style="list-style-type: none"> • Noted
		<ul style="list-style-type: none"> • The community also stressed how the ndugu belt has no source of water however much it is drilled due to the sand in the area 	<ul style="list-style-type: none"> • Noted, we shall let the M.W.E know about this
<ul style="list-style-type: none"> • 10/11/2022 	<ul style="list-style-type: none"> • Parabu and Opibu 	<ul style="list-style-type: none"> • The community wanted to know if the available spoilt taps will be repaired to produce water 	<ul style="list-style-type: none"> • Those taps are not on this project and probably on a different line so they will not be repaired
		<ul style="list-style-type: none"> • The community expressed the need to know if the contractor would bring their own technicians or if they will work with the local community 	<ul style="list-style-type: none"> • For the experts, they will have to be brought from other regions but for work that they can do, they will be given but also the chairman should demand for his people jobs once the contractors are on ground.
		<ul style="list-style-type: none"> • They also wanted to know if the project is 	<ul style="list-style-type: none"> • This water will be extracted from River

		<p>being implemented for them or the other villages too because they are already having water issues</p>	<p>Nyagak so it will cover a number of villages; it's a big project water will reach every village</p>
		<ul style="list-style-type: none"> The community also wanted to know when the project or work will commence 	<ul style="list-style-type: none"> Once this study we are carrying out is completed, the report will be submitted to NEMA and when approved the works will begin.
		<ul style="list-style-type: none"> An Inquiry was made on whether the water being extracted from River Nyagak will be treated since it's dirty 	<ul style="list-style-type: none"> We are establishing a treatment plant and it will be treated before being transferred to the reservoir tanks for distribution
		<ul style="list-style-type: none"> The community (landowners) wanted to know how the government will value the land they will offer for use 	<ul style="list-style-type: none"> Another team will come and measure the exact points and one thing is they don't compensate land they just request you to let them bury the pipe in your land so the services can be extended to people, but all this will be explained in detail then the abstraction point will be in the river.
<ul style="list-style-type: none"> 8/11/2022 	<ul style="list-style-type: none"> Patru village 	<ul style="list-style-type: none"> The community wanted to know if it will be possible for the pipeline to cross the road 	<ul style="list-style-type: none"> The community wanted to know if it will be possible for the pipeline to cross the road
		<ul style="list-style-type: none"> Community members asked if the water will be extended up to everyone's home. 	<ul style="list-style-type: none"> The contractor will put the water in the major centers but later it will be distributed to different home steads by National water and Sewerage Corporation through applications by individuals.
		<ul style="list-style-type: none"> Inquiry was made on whether the water will be free once 	<ul style="list-style-type: none"> No, the water will not be for free there will be a small amount that will be paid per

		<p>construction is done?</p>	<p>jerry can because this money will be used for maintenance of taps and pipes.</p>
		<ul style="list-style-type: none"> The community wanted to know if the project will ask for money from the people to implement it 	<ul style="list-style-type: none"> No, it's a government of Uganda project and through M.W.E so they will implement if for free.
		<ul style="list-style-type: none"> Concern was expressed as to whether the gravity scheme project will use machine or local labour and if so, will they be paid? 	<p>Local people will be needed for work that is not technical. The opportunities maybe limited in number so not everyone will be taken on.</p> <p>The project is world bank funded and one of the requirements during implementation is adherence to national and international labour laws and whoever works will be paid</p>
		<ul style="list-style-type: none"> The community wanted to know how long the project will take to commence 	<ul style="list-style-type: none"> The project already started
		<ul style="list-style-type: none"> An inquiry was made on how many sites the village would have 	<ul style="list-style-type: none"> As for now, we cannot know where the points will be but they will later be communicated and shown to you once the network is laid
		<ul style="list-style-type: none"> The community asked if the project has been in any other districts 	<ul style="list-style-type: none"> Yes, this has been implemented in other areas
<ul style="list-style-type: none"> 10/11/2022 	<ul style="list-style-type: none"> Vuu village 	<ul style="list-style-type: none"> The community stressed a concern of M.W.E planning to implement the project and yet they have just planted their crops and given the fact that there is no compensation, how will this be solved? 	<ul style="list-style-type: none"> Compensation in this case will only be considered according to the type of crops found in the garden during construction.
		<ul style="list-style-type: none"> An inquiry was made on how often 	<ul style="list-style-type: none"> The water will be paid per jerry can whenever fetching.

		<p>the money charged will be paid</p> <ul style="list-style-type: none"> The community wanted to know if the project is covering the whole of Madi okollo and when it would commence 	<ul style="list-style-type: none"> The project is covering most villages in Madi okollo and once the exercise we are conducting is done, NEMA will receive a report and construction will start thereafter
		<ul style="list-style-type: none"> The community raised concern of the water bill being paid for and asked who would repair the taps when spoilt 	<ul style="list-style-type: none"> The money that will be paid will be used to repair and maintain the pipes and taps
		<ul style="list-style-type: none"> The community members asked if they would be employed by the contractor 	<ul style="list-style-type: none"> A few community members will be given jobs but the community leaders will have to talk to the contractor to offer their people jobs
		<ul style="list-style-type: none"> The people raised a concern about how NWSC doesn't maintain the taps and pipes of the already existing water sources and yet they pay for the services 	<ul style="list-style-type: none"> Noted and we shall inform M.W.E.
<ul style="list-style-type: none"> 11/11/2022 	<ul style="list-style-type: none"> CAO, Nebbi district headquarters 	<ul style="list-style-type: none"> The office of the CAO welcomed the project and informed us that he would provide support where necessary for the success of the project. Inquired whether the establishment of the water source will not affect the volume of the water downstream, since there are many water users downstream of the river 	<ul style="list-style-type: none"> Noted, and grateful for the support. Only a small amount of water will be tapped off and the rest will be left to flow downstream. Moreso, a water source protection plan will be developed and implemented to maintain the hydrological flow of the river

		<ul style="list-style-type: none"> Requested that the community should be fully engaged, especially the people living around the water source and the water treatment plant. The people at the water source will no longer fetch that water for domestic use because it will be fenced off 	<ul style="list-style-type: none"> Community shall be engaged right from the ESIA study until project hand over, and the ministry will hold an inception meeting to inform the community about project commencement
		<ul style="list-style-type: none"> Inquiry was made about whether the contractors will employ community members during project execution, for example casual works such as excavation. 	<ul style="list-style-type: none"> The contractor shall employ local personnel for casual labor during excavation and construction. Skilled laborers shall also be employed
		<ul style="list-style-type: none"> He requested that the scheme should benefit the local people around the water source and water treatment plant for ownership purposes 	<ul style="list-style-type: none"> The design included a distribution line from the clear water well to the local community around the treatment plant.
<ul style="list-style-type: none"> 11/11/2022 	<ul style="list-style-type: none"> CAO, Zombo district 	<ul style="list-style-type: none"> The office of the CAO had no response for now, but recommended the Ministry and its contractors to start working on the project 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> Requested that water user committees should be set up in the local communities to aid in monitoring of water usage, and also contribute to maintenance of the scheme 	<ul style="list-style-type: none"> Water user committees shall be set up in different communities and will also help to address concerns of the water consumers
		<ul style="list-style-type: none"> Informed us about the weather which is very bad, the district experiences a lot of dry seasons 	<ul style="list-style-type: none"> Noted

		<p>especially in February.</p> <ul style="list-style-type: none"> Inquiry was made about whether the contractors will employ community members during project execution, for example casual works such as excavation. 	<ul style="list-style-type: none"> The contractor shall come with a number of employees, where as some workers such as casual laborers shall be gotten from the local community, on recommendation by the local leaders, and all casual works such as excavation shall be paid for.
	<ul style="list-style-type: none"> District Water Officer, Zombo district 	<ul style="list-style-type: none"> The office of the CAO had no response for now, but recommended the Ministry and its contractors to start working on the project 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> He inquired why the water source is in Zombo district yet the water beneficiaries in the district are very few. He requested that the water coverage should be increased in their district 	<ul style="list-style-type: none"> Zombo district is upstream of the scheme and since the project is completely gravity flow, the project was designed to benefit the people downstream
		<ul style="list-style-type: none"> Informed us about the weather which is very bad, the district experiences a lot of dry seasons especially in February. 	<ul style="list-style-type: none"> Noted. The CAO had also raised the same issue and the design team put it under consideration
		<ul style="list-style-type: none"> He suggested that the ministry should amalgamate the small existing systems into this new system for easy operation and maintenance, and also ensure constant supply of water 	<ul style="list-style-type: none"> The ministry shall engage the different stakeholders responsible for maintaining the existing systems such as NWSC, Mission Water Uganda, and discuss the possibility of merging the systems.

		<ul style="list-style-type: none"> • He advised that since the water source is in their district, a catchment protection should be done to reduce the adverse effects of tapping water upstream on the people downstream 	<ul style="list-style-type: none"> • A catchment protection plan shall be developed and on approval, it will be implemented during project construction and execution.
<ul style="list-style-type: none"> • 10/11/2022 	<ul style="list-style-type: none"> • CAO, Madi okollo district 	<ul style="list-style-type: none"> • The office of the CAO welcomed the project in the district and pledged to support and work with the Ministry during project implementation 	<ul style="list-style-type: none"> • Noted
		<ul style="list-style-type: none"> • An inquiry was made about whether the water will be paid for by the users. 	<ul style="list-style-type: none"> • The payment that shall be made shall be affordable and it is only meant for operation and maintenance of the water scheme, for the benefit of the entire community. The fee shall be decided on by the water user committees
		<ul style="list-style-type: none"> • Informed us about the weather which is very bad, the district experiences a lot of dry seasons especially in February. 	<ul style="list-style-type: none"> • Noted
		<ul style="list-style-type: none"> • Inquiry was made about whether the contractors will employ community members during project execution, for example casual works such as excavation. 	<ul style="list-style-type: none"> • The contractor shall come with a number of employees, where as some workers such as casual laborers shall be gotten from the local community, on recommendation by the local leaders, and all casual works such as excavation shall be paid for.
		<ul style="list-style-type: none"> • The sub county requested that the terms and conditions of 	<ul style="list-style-type: none"> • The ministry shall hold an inception meeting before the project construction

		operation of the scheme should be made clear to both leaders and the community.	to inform the leaders and community about the project details, and also get more views about how best the project can be executed.
		<ul style="list-style-type: none"> Inquiry was made whether there will be any pumping on the scheme such as generator or solar. 	<ul style="list-style-type: none"> There will be no pumping of the water. The scheme will entirely be gravitational flow
	<ul style="list-style-type: none"> RDC and Chairperson LCV, Madi-Okollo district 	<ul style="list-style-type: none"> Informed us about the weather which is very bad, the sub county experiences a lot of dry seasons. 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> Informed us that Rhino camp Sub-County, one of the busiest centers in Madi-Okollo has been left out of the design, and is one of the most stressed areas 	<ul style="list-style-type: none"> Rhino camp Sub-County is not among the proposed beneficiaries of this scheme. However, the Ministry will be informed about the area
		<ul style="list-style-type: none"> The district requested that the terms and conditions of operation of the scheme should be made clear to both leaders and the community. 	<ul style="list-style-type: none"> The ministry shall hold an inception meeting before the project construction to inform the leaders and community about the project details, and also get more views about how best the project can be executed.
		<ul style="list-style-type: none"> The district raised concern about the poor sanitation in some parts of the district due to shortage of clean water. Some communities drink water from River Nile and it has led to an increase in number of patients at health centers most of which have sanitation-related diseases 	<ul style="list-style-type: none"> Ala-Ora Water Supply and Sanitation scheme is intended to solve all these challenges. A sanitation facility (VIP latrine) will also be put up at any area that will be agreed upon by the district leaders and the community
		<ul style="list-style-type: none"> The district informed us that areas such 	<ul style="list-style-type: none"> Ala-Ora Water Supply and

		<p>as Mile 10 and 13 have recorded high cases of Bilharzia due to lack of clean water. They are positive that the project will save the ministry of Health a lot of money.</p>	<p>Sanitation scheme is intended to solve all these challenges.</p>
		<ul style="list-style-type: none"> The district requested for an inception meeting before project implementation 	<ul style="list-style-type: none"> An inception meeting shall be held before project implementation. The Ministry, all its contractors and the local leaders shall be invited to take part.
		<ul style="list-style-type: none"> The district raised a concern that they should have been involved in the project design to prevent loopholes 	<ul style="list-style-type: none"> Noted. Adjustments shall be made where possible during project implementation
	<ul style="list-style-type: none"> District Water Officer, Madi-okollo 	<ul style="list-style-type: none"> Requested that the design team should involve water and sanitation development system North, to incorporate Kati Water Supply in Okollo Sub county 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> Advised that the project should focus more on the areas without water, for example there is an already existing system in Pawiru, yet it is part of the Nyagak scheme. 	<ul style="list-style-type: none"> The project shall focus on water stressed areas, and shall support the already existing systems to improve on reliability.
		<ul style="list-style-type: none"> Suggested that the scheme design should have plan B in case the gravity flow fails especially upstream which will affect the distribution downstream because the scope and scheme coverage is too big. 	<ul style="list-style-type: none"> Noted. All the beneficiaries of the scheme downstream are below the elevation of the reservoir tanks.
		<ul style="list-style-type: none"> Pointed out that the design should 	<ul style="list-style-type: none"> Bringing in Plan B schemes shall cost

		<p>consider alternative sources of water to the people during maintenance. Gravity flow schemes break down the entire scheme in case there is a breakdown upstream.</p>	<p>the entire project highly of which the water is meant to benefit the low-income earners of the local community</p>
		<ul style="list-style-type: none"> Inquiry was made about who will do operation and maintenance since NWSC Nebbi passes through Anyiribu and some other villages in the district. He wanted to know where NWSC will stop and Northern Umbrella will start 	<ul style="list-style-type: none"> After construction, the project will be handed over to Northern Umbrella water supply, who will be responsible for operation and maintenance of the scheme. They will be introduced to the entire scheme for guidance on where to operate.
		<ul style="list-style-type: none"> He welcomed the project in the district and pledged to support and work with the Ministry during project implementation. Described the project as a risky one, especially during maintenance periods 	<ul style="list-style-type: none"> Noted
<ul style="list-style-type: none"> 10/11/2022 	<ul style="list-style-type: none"> District Environment Officer, Madi-Okollo district 	<ul style="list-style-type: none"> The office of the District Environment welcomed the project in the district and pledged to support and work with the Ministry during project implementation 	<ul style="list-style-type: none"> Noted
		<ul style="list-style-type: none"> He pointed out the issue of irrigation and mentioned that it would be important if the project catered for that since community members carry out farming and are always having 	<ul style="list-style-type: none"> The main purpose of the project is to avail clean and safe water for people and hence forth, the issue will be forwarded to ministry of agriculture, animal industry and fisheries.

		problems more so during the dry seasons.	
		<ul style="list-style-type: none"> • How long will the project take to commence? 	<ul style="list-style-type: none"> • The ESIA studies are already being done but construction is anticipated to start next year by June
		<ul style="list-style-type: none"> • Requested sensitization of people along the transmission line and distribution lines to inform the public about the ongoing project 	<ul style="list-style-type: none"> • Noted. Sensitization will immediately during this ESIA study because the Ecoserv social team is already on board
		<ul style="list-style-type: none"> • The community informed us that dry seasons are so hot in the area, that even River Nyagak sometimes dries up during the dry season (especially February) and they were worried that the project shall be helpless during dry seasons 	<ul style="list-style-type: none"> • The flow and quantity of water was monitored by the design team at all times of the year and they expect water to be available at the source at all times of the year, including February.
		<ul style="list-style-type: none"> • He inquired if a catchment protection will be done to protect the volumes of the water, and ensure that the water is not so contaminated from upstream. 	<ul style="list-style-type: none"> • A catchment protection plan will be done by Ecoserv Limited and will be implemented during project construction to maintain the hydrological flow of the river

Public consultation and information disclosure will be a continuous process throughout the ESIA study. Based on the above suggestions it was inferred that people were supportive of the project and those with reservation were not necessarily opposed to it; rather they required continuous sensitization about project activities and the impacts it's likely to present and mitigation measures suggested. As noted from the engagement summaries above potential beneficiaries and the community at large still need sensitization to fully understand and appreciate the project before fully embracing it.

7 ANALYSIS OF ALTERNATIVES

7.1 Introduction

In environmental impact assessment studies, it's important that alternatives be analyzed to maximize environmental safety. Alternatives can take on several forms including technological options, project site options, transportation options, labour sources and type and others. Several factors can influence the choice of alternatives to be considered by a Developer and in most cases, such factors are either technical, financial, socio or environmental.

The best option is one which tries to strike a balance on the above factors with viable mitigations measures for residual impacts. In this project, the scenarios discussed under shall be as follows;

1. Water sources
2. Sanitation options
3. Technological options of evacuating water to the consumers
4. Technological options of treating water
5. Project or no project options

7.2 Sources of water

7.2.1 Ground Water Sources

According to the feasibility study, West Nile has a very low potential for groundwater development. There is difficulty in finding underground water through drilling in the water stressed areas, especially close to river Nile, in West Nile Region. These areas have been described as West Nile dry corridor. The average borehole drilled depth is 100m along the Nile. Every Financial year, the districts in West Nile drill on average three dry wells. The dry wells are paid for by the districts in their contracts. It is estimated that the districts pay 400million shillings for dry wells to the contractors annually.

The districts will pay 8bn shillings in 20 years' time if no alternative solution is sought for other technologies. There are sanitation related diseases in west Nile region like cholera, typhoid, malaria etc. reported annually in the health units. The boreholes in the West Nile dry corridor (stressed areas) have high operation and maintenance costs which are expensive to manage by the communities. Cases of the water sources breaking down within five years due to technical failure accounts for about 43.4% according to ministry of water and environment reports. This has been noted as a concern to planning and development particularly in the Nile belt. Therefore, the option of exploiting underground water sources as an alternative to Nyagak water supply scheme is not a feasible alternative. It's very expensive and not achievable.

7.2.2 Surface Water Sources

As regards surface water, the major water body in the catchment is River Nyagak. According to the feasibility study of this project, the maximum demand for the project is 3009m³/day. Although there are other surface water sources in the project area including mainly River Nyagak's tributaries, such sources would not be able to provide the required water quantity and head at the same time. Only River Nyagak is the main water source that is able to meet the demand of the project area over to 2040 considering the quantity, quality, protection and feasibility. The total water demand for the current and the proposed project is less than **0.01%** of the total volume of the water body and therefore the project will not have significant impact on the downstream users of the river. Therefore, this is the preferred source for the proposed project.

7.3 Sanitation options

7.3.1 Sewerage system

This ESIA is in agreement with the sanitation assessment of the feasibility study report that since the generated waste water from house connections and institutions cannot meet the minimum requirements for both the gravity conventional system and small-bore sewers, the individual connections dispose of their effluent in septic tanks, i.e. on-site storage. On being full, the septic tanks can be emptied using a cesspool emptier. The rest of the households shall be encouraged to use soak pits for waste water disposal.

7.3.2 Public toilets

The project option is that the project will provide for 2 public toilets (water borne toilet type of 9 stances each) to be located at markets or parks. The ESIA assessment of the sanitation facilities on the ground indicates that this provision is still low and should be increased. The ESIA recommends that in addition to providing sanitation facilities at all market centers and parks (which may be more than 2), public toilets should be considered at trading centers with a high population density on a case-by-case basis and as demand arises.

7.4 Water Transmission and Distribution options

The transmission and distribution pipes are either made of steel or plastic. The steel pipes may undergo rusting and this may compromise the quality of water as well. This may also lead to increased maintenance costs as rusting of the pipes may require them to be replaced. The plastic pipes are therefore the best alternative. Treated water will be transmitted and distributed through clear water transmission plastic pipes from the WTP to the Storage Reservoirs as presented on chapter 2 by gravity. Water will then be distributed to users through consumer connections.

7.5 WTP Technology Selection Alternatives

The type of treatment operation performed at a drinking WTP and treatment chemicals used depend largely on the contaminants present in the source water (EPA, 2011a). An analysis of the source water quality indicates elevated levels of total suspended solids (TSS), faecal coliforms, turbidity, and apparent Colour with respect to the Uganda Drinking Water Standard (Annex 3). To transform the source water to a potable form, the key processes of coagulation/flocculation, sedimentation, filtration, and disinfection will have to be employed. Below is an analysis of the key technologies that hat could be adopted in the key processes of coagulation/flocculation, filtration and disinfection.

7.5.1 Coagulation/Flocculation

Coagulants and flocculants that are added to raw water include metal salts (e.g. aluminum sulphates/chloride and ferrous sulphates/chloride) and polyelectrolytes. Below is an analysis of available options. Aluminium sulphates is the preferred option.

Table7.1: Technology analysis of coagulants/flocculants.

	Aluminium/Ferrous sulphates/chloride	Polyelectrolytes
Pro	Offer the lowest price per unit weight and are widely available, thus most commonly used; insoluble at normal drinking water treatment operating conditions, thus very little metal is carried into finished product; generally, settles readily.	Effective over a wider pH range than inorganic coagulants; can be applied at lower doses; produce smaller volumes of more concentrated, rapidly settling floc; floc formed from use of a properly selected polymer will be more resistant to shear, resulting in less carryover and a cleaner effluent;
Cons	Require corrosion-resistant storage and feed equipment; may alter the pH of water since they consume alkalinity, thus need for liming; sludge exhibits poor compaction traits, ranging from 0.5 to 2 percent solids (ASCE/AWWA, 1997), thus difficult to dewater; sludge is biologically inert (inorganic) with little organic content and have little value as a fertilizer/soil conditioner; large volumes of settled floc must be disposed of in an environmentally acceptable manner.	Several times more expensive in price per unit weight than inorganic coagulants; selection of the proper polymer for the application requires considerable jar testing under simulated plant conditions, followed by pilot or plant-scale trials; All polymers must be approved for potable water use by regulatory agencies.

7.5.2 Filtration

After solids settling, the source water passes through filters to remove finer particles and metals. Various types of filter media may be used by WTPs, including permeable fabric and porous beds (EPA, 2011a; EPA, 1995). Table 7.2 below is an analysis of the types of filters used by WTPs. In general, the multimedia filter should be considered as a first option with the rapid sand filter as a second and last option given their suitability as summarized in Table 6-3 for the project, the selected option is rapid sand filtration.

Table 7.2: Technology analysis of filter types

Filter type	Characteristic	Pros/cons
Slow sand filter	Consists of a bed of fine sand above a gravel layer and underdrain system; used for low-flow rates.	Not suitable for high turbidity source waters; trap microorganisms that break down algae, bacteria, and other organic matter. The source water for the project contains up to 16.4 NTU of turbidity. This is above the Uganda Drinking Water Standard of 10 NTU. The use of slow sand filters in the project will imply increase in dosing levels of alum so as to alleviate turbidity, with cost implications.
Rapid sand filter	Consists of a bed of sand above several layers of gravel in varying sizes.	Gravity filtration is the most widely used form of water filtration in many countries. However, in rapid gravity filtration the particulate impurities are removed in or on the media, thus causing the filter to clog after a period. Clogged filters are cleaned by backwashing.
Pressure filter	Similar to rapid sand filters but the operation is housed within a cylindrical tank and the water passes through the filter while under pressure generated by a Pump rather than by gravity.	Pressure filters have been found to offer lower installation and operation costs in small filtration plants. However, they are generally somewhat less reliable than gravity filters. Their use is mainly confined to the treatment of water for industrial purposes.
Diatomaceous earth filter	Consists of a layer of diatomaceous earth above a septum or filter element.	Most suitable for low turbidity and low bacterial count source water; Coagulants and filter aids are required for effective virus removal. The source water for the project contains up to 16.4 NTU and 20 CFU of, respectively, turbidity and bacterial faecal coliforms. These are above the Uganda Drinking Water Standards of, respectively, 10 NTU and 0 CFU. The use of diatomaceous earth filter in the project will imply increase in dosing levels of alum and chlorine, with cost implications.
Multimedia filter	Consists of layers of various sizes of gravel, high-density garnet, sand, and anthracite coal.	Enhances the removal of tastes, odors, and organic substances. Thus, lowering the amount of alum to be employed. However, frequent backwashing may be required to remove clogs.
Membrane filters	Include ultrafilters and micro filters; use pressure as the driving force.	Designed to remove particulates smaller than 10 micrometers; WTPs using membrane separation are typically smaller plants (serving less than 50,000 people) (EPA, 2011a), thus cannot be employed in the project with an ultimate year population of 186,295.

7.5.3 Disinfection

Historically, chlorine was the disinfectant used, but more recently other chemicals such as chlorine dioxide, chloramines, and ozone have been used to purify water. Non-chemical methods of disinfection include heat and radiation (e.g. ultraviolet light (UV)). Table 6.4 below is an analysis of the key options that could be employed in the project. The application of UV disinfection for source water treatment is limited because turbidity and suspended solids that can render it ineffective (EPA, 1999c). Thus, UV has not been analyzed for the project. As can be seen from Table 6.4, ozone, the most efficient disinfectant, is not a persistent

disinfectant, thus unsafe water consumption can occur in case of recontamination along transmission/distribution lines and reservoirs. It is also difficult to fulfil the legal limit for the formation of bromate during the process of Ozonation, thus most WTPs tend not to employ Ozonation.

Chlorine and chloramines are more effective in secondary disinfection in comparison to chlorine dioxide (Less persistent chemical). Thus, chlorine dioxide may not be suitable for the project given the extent of piping systems. Lastly, though the combined residual from chloramines lasts longer than chlorine residuals, chloramines are not as effective as other germicidal agents. In general, chlorine is the key form of disinfectant employed in Uganda. This is similar to the US, a developed country, with up to 80% of WTPs employing free chlorine (EPA, 2011a).

Table 7.3: Technology analysis of disinfection types

Criteria	Disinfectant			
	Chlorine	Chloramines	Chlorine dioxide	Ozone
Persistence	Persistent chemical (used locally and for transport across long distances to the final consumers).	Persistent chemical (used locally and for transport across long distances).	Less persistent chemical (used locally and for transport across long distances).	Non-persistent chemical (used Locally at production plants).
Oxidant demand rate	Chloramine > Chlorine > Chlorine dioxide > Ozone			
Disinfection efficiency	Ozone > Chlorine dioxide > Chlorine > Chloramine NB: efficiency order can be changed by local conditions e.g. disinfectant consumption rate, biofilm protection, etc.			
Disinfection by-products	More than 500 by-products identified that are formed by reaction with organic matter; most products are halogenated (Cl, Br, I) organics; most relevant halogenated by-products are Trihalomethanes, Haloacetic acids, Haloacetonitriles, Haloketones, and Haloaldehydes; Trihalomethanes are regulated in Europe; Both Trihalomethanes and Haloacetic Acids are regulated in the US.	Nearly no halogenated organic by-products formed; negligible reaction with organic matter, except halogen transfer to nitrogen amines; some halogenated organic by products formed with trace of chlorine or chlorine in excess; Ammonia is formed if used in excess, thus nitrite formed from Bacterial oxidation of ammonia.	Nearly no halogenated organic by-products; significant reaction with organic matter leading to no halogen transfer; some halogenated organic by products formed with excess of chlorine used or Chlorine formed in-situ.	Nearly no halogenated organic by-products; significant reaction with organic matter leading to no halogen transfer; some halogenated by-products formed with excess of chlorine used or chlorine formed in-situ; main halogen by-product is bromate; it's difficult to fulfil the legal limit for its formation, thus many WTPs have replaced the Ozonation step.

7.6 Project Option Vs No Project Option

7.6.1 No project option

Analysis of the ‘no project option’ as an alternative is an important component of this ESIA. It provides an environmental baseline against which impacts of the proposed action can be compared. The ‘**no project option**’ alternative here means that the proposed Nyagak water and sanitation project will not be developed, and hence the site and project area continue with the present course of actions or status quo. In this respect, government and the communities would lose all potential benefits associated clean water.

With respect to the socio-economic environment, the “no-action” option would eliminate the opportunity for jobs creation, and secondary socio-economic benefits, which the proposed development would have created. This Alternative is not sustainable in the long run because the growing demand for clean water in West Nile needs a solution. Therefore, this alternative is not recommended.

7.6.2 Project Option

Project option means proceeding with the current plan and implementing the project as it is with some modifications to avert environmental damage and risks associated with community and occupational safety. The proposed Nyagak water and sanitation project is urgently needed by the community and local leaders to accelerate development in the project areas. All stakeholders consulted had no objection to the proposed project.

They were very optimistic about the project citing its contribution to development in the districts, through job creation, revenue collection by government and other secondary socio-economic benefits, which the proposed development will create. In view of this discussion, the Project Option is taken as viable for implementation on condition that the identified impacts are mitigated as suggested.

7.6.3 Key Benefits of Improved Water Supply If Project Is Implemented

- a) Easy access to potable water within homesteads at various levels – stand posts, yard taps and house connections;
- b) Reduction in incidences of diarrheal and other water borne diseases; this leads to reduction in mortality and morbidity, especially of children;
- c) Improvement in hygiene and sanitation from increased use of hand washing, personal hygiene and environmental sanitation;
- d) Reduction in hours spent searching for and fetching water from distant sources which would significantly increase the time allowed for other activities; this is expected to lead to better livelihood for women and the girl child, who are traditionally, responsible for fetching water;

- e) Reduction in domestic violence and abuse of women as people in the homestead compete for the little potable water;
- f) Reduction incidences of promiscuity which are often carried out in the guise of fetching water, some involving children; this leads to incidences of child abuse, domestic violence and early pregnancies;
- g) Cleaner and more conducive environment for urban activities such as sports, markets, public places, etc.;
- h) Higher quality hotels, restaurants and entertainment places since the developers can erect and maintain high quality toilets;
- i) Employment opportunities at all stages of the project – from construction, operation and marketing of the services; this leads to increased skills transfers to the community;
- j) Increased revenue to the local authority and the country in general through the collection of taxes.

7.6.4 Key Benefits of Improved Sanitation Facilities If Project Is Implemented

- a) Reduced incidences of diarrheal and other water borne diseases; this leads directly to lower rates of mortality and morbidity, especially of children;
- b) Greater school attendance by the girl children since they are more comfortable with cleaner and safer toilets; this leads to increased gender awareness and improvement;
- c) Reduced costs for collection and disposal of faecal and other matter from homesteads; this leads to improved environmental sanitation and its attendant benefits;
- d) Cleaner and more conducive environment for urban activities such as sports, markets, public places, etc.;
- e) Higher quality hotels, restaurants and entertainment places since the developers can erect and maintain high quality toilets;
- f) Employment opportunities at all stages of the project – from construction, operation and marketing of the services; this leads to increased skills transfers to the community;
- g) Increased revenue to the local authority and the country in general through the collection of taxes.

7.6.5 Conclusion on the ‘No Project’ Option

Zombo, Nebbi & Madi-Okollo districts are in urgent need of a sustainable water supply and sanitation facilities. The existing piped water supply system is operating below demand. The current sanitation systems are unreliable, in sorry state and sub-standard. If this is allowed to continue, not only will the residents be exposed to public health risks but development opportunities will continue to be stifled and curtailed. This certainly will have local, national and regional implications. Secondary implications include continuing trends of water-related diseases, no direct or indirect employment opportunities associated with the project, and continuing degradation of the environment and water resources due to unplanned disposal of

faecal sludge. In general, the minor benefits of the No-Project option are far outweighed by the benefits to be attained on implementing the Nyagak Water Supply and Sanitation Project.

8 IMPACT AND MITIGATION

8.1 INTRODUCTION

This chapter identifies and evaluates significant environmental consequences of the construction and operation phases of the proposed project. 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.

8.2 IMPACT EVALUATION AND ANALYSIS

8.2.1 Impact evaluation and analysis

This section assesses the level of potential impacts based on various criteria including severity of impacts, duration, geographical scope, and the existence of readily identifiable cost-effective mitigations. The impact assessment also considers the impacts identified by the stakeholders consulted. The methodology for impact evaluation was as follows:

- a. **Extent:** within limited area (<500m from site), local (up to 10 km) or wide (regional or global)
- b. **Duration:** Temporary (1 year), short term (1-5 years), Medium term (5 -10 years), Long term (> 10 years – 50yrs) or Permanent;
- c. **Magnitude of impact:** Low, Medium or High/Very high
 - **Very High (VH) and High (H):** These denote that the impact is un-acceptable and further mitigation measures must be implemented to reduce the significance.
 - **Medium (M):** Impacts in this region are considered tolerable but efforts must be made to reduce the impact to levels that are as low as reasonably practical.
 - **Low (L):** Impacts in this region are considered acceptable.
- d. **Probability of occurrence:** Highly unlikely, Unlikely, Possible, Likely or Almost certain as presented in table 8.1 below.

Table 8.1: Likelihood of occurrence classification

Probability of occurrence		
Level	Probability	
5	Almost certain	<ul style="list-style-type: none">• Very likely to occur (91 - 100%) Could occur either immediately or within a short period of time (likely to occur most weeks or months)
4	Likely	<ul style="list-style-type: none">• This impact will probably occur in most circumstances if controls are not applied (several times a year) (61 - 90%)
3	Possible	<ul style="list-style-type: none">• This impact could occur at some time if controls are not applied May happen every 1 to 15 years). It is expected that the impact will occur; Chance of occurrence (41 - 60%)
2	Unlikely	<ul style="list-style-type: none">• This impact is not likely to occur. Chance of Occurrence 11 – 39%.

Probability of occurrence		
Level	Probability	
1	Highly unlikely	<ul style="list-style-type: none"> Very unlikely to occur (0 - 10%)

e. **Overall assessment of impact:** Negligible, minor, moderate, substantial or severe as presented in Table 8.2 and Table 8.3 below.

Table 8.2: Criteria for rating overall impact severity (environment parameters)

Impact rating	Description of impact
Severe	<ul style="list-style-type: none"> 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 exceedance 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.
Substantial	<ul style="list-style-type: none"> Highly noticeable effects on the environment, difficult to reverse. Widespread degradation of resources restricting potential for further usage. Significant contribution to a known global environmental problem when compared with the industry world-wide. Sub-lethal effects upon a globally or regionally endangered species compromising reproductive fitness and/or resulting in long-term disruption/disturbance to normal behavior. Air quality/noise approaching occupational exposure limits. Water quality parameters approaching maximum stipulated values. Periodic widespread nuisance both on and off site.
Moderate	<ul style="list-style-type: none"> Noticeable effects on the environment, reversible over the long term. Localized 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 behavior 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 localized nuisance both on and off site.
Minor	<ul style="list-style-type: none"> Noticeable effects on the environment, but returning naturally to original state in the medium term. Slight local degradation of resources but not jeopardizing further usage. Disruption/disturbance to normal behavior 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.

Impact rating	Description of impact
Negligible	<ul style="list-style-type: none"> • Infrequent localized nuisance.
	<ul style="list-style-type: none"> • 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.

Table 8.3: Criteria for rating overall impact severity (Social and economic parameters)

Criteria	Significance Definition	
Harm to People	Potential to cause multiple fatalities or widespread chronic health problems for many people	Severe
	Potential; to cause fatalities, mutilations or serious chronic health problems to a people	Substantial
	Potential to cause Lost Time Incidents	Moderate
	Not likely to result in Lost Time Incidents	Minor-Negligible
Assets	Extensive damage to infrastructure, possibly including off-site structures	Severe
	Major damage to on-site infrastructure, halting operations and incurring substantial delay to supply replacement equipment	Substantial
	Minor damage to individual item of equipment for which a spare part or replacement can be quickly mobilized to the development	Moderate
	Damage resolved by on-site reserves, maintenance equipment and on-site personnel	Minor-Negligible
Reputation	Incident attracting international negative press coverage causing lasting harm to corporate reputation, or for which the company could be prosecuted and fined a large amount of money	Severe
	Incident attracting critical reporting requiring the company to take measures to maintain its reputation, or for which the company could be prosecuted and receive a token fine or be required to pay compensation to third parties	Substantial
	Incident attracting local news coverage and complaints, and which involves expense in engaging local communities to apologize, clarify issues and make amends	Moderate
	Incident that does not provoke complaints	Minor-Negligible

8.2.2 Other considerations in impact analysis

In terms of phases involved, the environmental impacts of the proposed water supply can be grouped under two major categories. These include impacts associated with construction of the project and those associated with operation phase. However, under IFC, the Environmental, Health, and Safety (EHS) guidelines are categorised as follows;

- Environmental;
- Occupational Health and Safety;
- Community Health and Safety.

Therefore, the discussion and presentation of impacts in this chapter has been based on the two major processes involved (construction and operation phases) as well as IFC Environmental, Health, and Safety (EHS) guidelines.

8.3 CONSTRUCTION PHASE ENVIRONMENTAL AND SOCIAL IMPACTS

8.3.1 Topography (Aesthetics pollution)

The topography of the area is gently sloping enabling gravity flow of water from Zombo (intake area) to the beneficiaries in Madi-Okollo district (See section 4.1.3). Excavations and heaping of spoil soil or storage of the construction materials will be visible because of the nature of the area and may be anesthetic to some people. The project will involve construction of a water treatment plant, water reservoirs, an office and two sanitary facilities. These being above ground may lead to visual pollution for those who do not want to see them. Because of this, the project may attract complaints from a section of the affected people which may slow down the project implementation pace. A well planned and designed development of this nature with well-kept green areas may be aesthetically pleasing to the eye compared to the current land use. Although this will be permanent, the extent will be local and the magnitude is low and hence the impact is rated as minor.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Aesthetics pollution	Local	low	permanent	Likely	Moderate

Mitigation Measures:

- Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste disposal sites in Nebbi or Madi-Okollo Town Council and any other approved dumpsites by the respective district.
- The affected area shall be restored through landscaping and leaving it to undergo natural colonization by plants.
- The materials shall be stored in a way that the height does not cause visual intrusion. Preferably the height should not be more than 2 meters.

8.3.2 Susceptibility to soil erosion

The soils in the project area are Ferralsols and Vertisols with a sandy loam texture (See section 4.1.5). The sandy nature of soils makes it susceptible to erosion if exposed. The site earthworks during construction of water treatment plant, water distribution pipework network, and associated infrastructure will reduce soil stability and hence make the soils aggregated and more susceptible to erosion especially during the rainy season.

The impact of soil erosion is likely to be Negligible-Minor since width of the trenches for the pit is not big (for transmission lines the trenches are Diameter 6 feet x Depth 1.2m, for the distribution its Diameter 3feet x Depth 1m), excavated soil is used to backfill the trenches immediately after laying the pipes and the impact is localized and for a short time. Whereas for the treatment plants the soil that will be excavated is a lot (more than 50 m³) and if not

well handled may be washed away by rain thereby silting some of the nearby streams including Nyagak River itself.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability occurrence	of Overall Assessment
Increased susceptibility to soil erosion	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation measures_

- The construction sites for water treatment plant, sanitary facilities, and storage tanks will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water.
- No spoil soil shall be temporarily placed in water ways.
- The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation. The top soil shall be kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas.
- MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-seeding the excavated site.
- The excess soil shall be spread along the trench by the Contractor but in liaison with the local people; special attention would be made not to dispose of such construction wastes in swamps on any sensitive ecosystem.
- The excavated soil from the pit for the water treatment plant, sanitary facilities and water storage areas shall be removed from the site when ever need arises and disposed of in accordance with the National Environment (Waste) Management Regulations, 2020.
- Proper storm water drainage facilities (culverts) have to be designed at the various areas along the route to prevent any erosion that may contribute to the increase of suspended solids.
- There will be controlled clearance of vegetation on only sections that are needed for the road works.

8.3.3 Exposure to high noise levels

The sound measurements made during the ESIA exercise indicated that noise levels were within the national standards (See section 4.1.7). The construction activities of all project components therefore are likely to generate noise levels beyond the current levels and those stipulated in the National Environment (Noise Standards and Control) Regulations, 2003 these may include noise from construction activates as presented in section 2 (Construction

stage activities), noise from construction equipment and machinery, movement of material etc.

The Assessment determined that the would be receptors from the the communities are a far from the proposed construction sites and thus will not be receive the noise impacts. However, project workers on site will be directly exposed to impacts of noise nuisance. High noise levels are likely to be generated by workers and movement of equipment. The noise levels should not be above 85dBs as stipulated by the National Environment (Noise) Control Regulations, 2003.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Hearing impairment and potential accident	Within limited area	Medium	Long-term	Possible	Moderate

Mitigation measures

- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards and Regulations). Workers operating equipment generating noise levels greater than 80 dB A over long hours must be given earmuffs;
- Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;
- The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic (every six months) medical hearing checks should be performed on workers exposed to high noise levels and this is in addition to pre-employment medical tests.
- Sites must be hoarded to curb noise impacts to neighboring communities.
- Works should be undertaken during day time i.e. from 8am to 6pm. Restrict construction activities to day time hours to minimize disrupting sleep in the nearby communities.

8.3.4 Impact of project activities on the drainage, wetlands and water resources

There exists a swamp within Ajai Wild Life Reserve and some riverine wetlands where some project infrastructure will be constructed. The wetlands affected by the project are permanent such as that in Ajai Wild Life Reserve and others are seasonal and have been encroached on by other human activities such as farming. The project infrastructure i.e. the water abstraction system and associated components, the transmission and distribution lines will

affect some wetlands. The actual area (distance traversed has been presented in Table 4.3 & 4.4). Waste management and management of off cuts practices can affect the wetland areas if not well managed, but the mismanagement is not expected to occur since the contractor will be closely monitored by UWA field staff. Therefore, the impact on wetlands is rated as moderate.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impacts of project activities to wetlands	Local	Low	Permanent	likely	Moderate

Mitigation measure

- Construction works in Ajai Wildlife Reserve shall be guided by Uganda Wild life Authority guidelines for undertaking projects in protected areas.
- All construction works in Ajai Wild Life Reserve shall be coordinated with UWA field staff at Ajai Wild Life Reserve.
- Suspend water pipes across streams and wetlands on concrete pillars to ensure future disturbance during repairs will not result into further interface with the water resources in these ecosystems.
- No materials/waste shall be dumped in the nearby wetland and all the foreign materials introduced during construction period shall be removed and disposed of in gazette areas
- For all activities that will affect wetlands and river banks, make sure you obtain a wetland user permit before conducting activities in such ecosystems.

8.3.5 Impacts of project activates on Air quality

Construction dust can lead to lung and sight related health risks. Dust will be generated during excavation works, movement of haulage trucks, grading and levelling of ground surfaces, operation of stone crushers, etc. In general, the impact of dust emissions, though medium in magnitude, will be localized, temporary, and reversible and is non-cumulative. Exhaust emissions from vehicles and machinery (e.g. generators) are expected to occur particularly at the construction phase. This will consist mainly of poorly burnt fuels and oils, including nitrogen oxides, carbon oxides, hydrocarbons, particulate matter, etc. Nitrogen oxides react with moisture and other compounds to form nitric acid vapor and related particles. Small particles can penetrate lung tissue, thus worsening of respiratory diseases. Carbon monoxide is highly toxic and the most common type of fatal air poisoning in many countries (Omaye, 2002). Carbon dioxide traps solar radiation being emitted from the earth, thus causing a rise in the earths' temperature, which leads to global warming. The warming of the earth results in the changing of weather patterns leading to climate change. In general, the impact of exhaust emissions, though important to local/immediate surrounding and moderate in magnitude, will be temporary, is reversible and non-cumulative.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Lung and sight impacts due to dust	Local	Medium	Short term	Almost certain	Moderate

Mitigation measures

- Construction sites shall be hoarded off to restrict dust to within site boundaries;
- Sprinkle water on vehicle pathways;
- PPE like dust masks shall be availed to workers whenever needed;
- Loose materials like sand that are susceptible to dust generation during haulage be covered with tarpaulin;
- Limit vehicle speed to 30Km/hr. on marram roads.
- Contractor should carry out maintenance of vehicles and equipment in line with manufactures requirements

8.3.6 Flora (Loss of vegetation and destruction of crops)

The project largely crosses settled and built-up areas interspersed in rangelands with modified equatorial type, wooded savannah mosaic, savannah grassland, supporting an active agro-ecosystem (see sections 4.1.1.1 and 4.2.1). For the most part, the Project Site traverses through an area previously mapped as dry acacia savannah. The landscape in the Project Site is highly transformed from original natural state and in contrast, hosts few remaining species. Very little remaining natural vegetation cover of conservation importance remains, due to extensive human activities. There is no characterization of rare and/or restricted-range species.

However, the area contains some species of high conservation value such *Vitellaria paradoxa* C. F. and *Tamarindus indica* L. which are rated as vulnerable and *Milicia excelsa* (Welw.) C.C. Berg which is rated as near threatened according to IUCN. The project will also cut across Omier Central Forest Reserve (degraded forest and planted with gardens) and Ajai wild Life Reserve (a fairly natural woodland). There was no natural forest within the project area however, along the water transmission and distribution network, there were pockets of planted forests mainly comprising of teak trees (*Tectona grandis*).

The clearing of corridor, movement of equipment and contractor staff and laying of pipes will lead to spot destruction of vegetation especially in areas under fallow and those planted with private wood Lots (plantation forests), and the likelihood of soil erosion due to removal of top soil. These areas are mainly farmlands, savannah grasslands and woodlands. The surveys show that the project area is degraded and comprises mainly subsistence farmlands. At the time of the survey, about 50-70% of the water corridor segment has been turned into

farmlands of beans, G. nuts, maize, cassava and sorghum. The rest of the corridor is either land under fallow or homesteads/trading centers.

There were no endangered species (both flora & fauna) encountered in the proposed water pipeline corridor. However, there were threatened species within the project area but outside the water pipeline corridor (See section Annex 5). The location of the water treatment plant will result into minor destruction of vegetation since the site is a farmland. Although the systematic clearing of the 3-meter strip of land in the road reserve will result into destruction of vegetation, the impact on the conservation status of the affected flora & ecosystems is expected to be minor-low.

The extent of damage is also minor-low. However, movements of the contractor and the entire crew may spread invasive species from one locality to another. Such species include *Eicchornia crassipes*, *Salvinia molesta*, *Senna siamea*, *Lantana camara*, *Mimosa pigra*, *Ricinus communis* and *Senna spectabilis* and others as listed in section 4.2.1.3. In general, the impact of vegetation clearance along the water transmission/distribution line and or at the WTP sites, though permanent (at points that infrastructures will be erected), will be localized, minor in magnitude, is reversible and non-cumulative, thus a minor change will occur. Therefore, the impact of construction activities on the vegetation and habitats is expected to be Negligible to Minor.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of vegetation and terrestrial habitat alteration	Local	Low	Temporary	Likely	Moderate

Mitigation measures

- Construction works in Ajai Wild Life Reserve shall be guided by Uganda Wild life Authority guidelines for undertaking projects in protected areas.
- A RAP shall be developed and implemented by MWE to ensure that affected crops is compensated. Compensation should be in line with the World Bank and Government Chief Valuers approved RAP report.
- Prior to compensating destroyed crops, the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP will be contacted and approached for payment.
- The construction of the proposed water transmission and distribution lines shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6 months in advance such that cultivation under the line and within the

water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance.

- The contractor must be instructed to move in a definite order and the pattern of movement must follow the established corridor as agreed upon by the local government authorities and the Developer. Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated path ways or agreed upon access roads. This must be followed to avoid further destruction of crops by the contractor after compensation has already been affected.
- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated path ways or agreed upon access roads. The designated path must avoid the species as identified in Table 4.12. This will avoid unintended damages to vegetation.
- The Developer and the contractor must guard against fires arising from construction negligence because the impact of fire on vegetation and biological diversity can be immense especially in the savannah woodlands and grasslands. Therefore, the contractor must have a fire management plan in place. That at minimum covers the following mitigation measures:
 - Cooking for the construction crew shall be done in a gazetted area with good clearance from the bushy parts of the area.
 - No smoking shall be permitted while at construction site.
 - If the site has flammable substances like petrol and diesel, the Contractor shall maintain on site a serviced fire extinguisher.
- After construction, there should be landscaping and then grass left to recolonize the disturbed area naturally. The Developer shall set aside funds to contribute towards local environmental programs. MWE shall remit funds towards district and sub-county afforestation projects as part of the catchment management program to compensate for biomass lost during corridor clearing and habitat fragmentation. In case the destruction is due to contractor's negligence, it will be the responsibility of the contractor to make compensation. MWE shall take the overall responsibility however, the contractor takes liability of those plants/trees destroyed either knowingly or unknowingly and which is outside the Corridor.
- The contractor should restore sites where activities will be carried out at all the project sites.
- MWE should also identify and support afforestation initiatives to enhance tree cover areas as a way of reducing its project footprint.
- The MWE should inspect the line alignment and the contractor should identify and mark all trees affected by the project, stating those for cutting or to be retained.

8.3.7 Impacts on Fauna (wildlife, invertebrates, birds, etc.)

Although the baseline data on fauna as presented in sections 4.2.2 to 4.2.6 indicates that the project area harbors some vulnerable species such as reptiles (Gaboon Viper & African Rock Python) and mammals such as Tree pangolin, careful planning and implementation of the

project may not impact any. Majority of all reptiles, Amphibians and mammals recorded in the project area according to the red listing (IUCN, 2018; WCS, 2016) are of Least Concern (LC) both globally and nationally, and most. Bush clearance at the project sites can specifically create a biotope in areas with dense vegetation and hence may become hunting grounds for carnivores. Clearing of trees may also disrupt or alter habitats for some of the birds while at the same time new and invasive species could gain ground. At all stages of planning, implementation and operations and post construction, it is possible to integrate biodiversity consideration to address the potential biodiversity impacts of the project.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of biodiversity	Local	Low	Temporary	Likely	Moderate

Mitigation measures

- Construction works in Ajai Wild life Reserve shall be guided by Uganda Wild life Authority guidelines for undertaking projects in protected areas.
- Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to fauna.
- The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected.
- If wild animals are encountered, the Contractor shall notify UWA so that it is picked and taken to a secure place.
- Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the clarifier and the booster pump, the contractor shall ensure that every evening, the pits are covered with timber while being secured with a warning tape.
- Implement environmental awareness programmes / training among the all project employees, particularly during construction. They should be trained to identify arboreal or burrowing species exposed by vegetation and soil stripping and should have immediate access to a competent specialist on site (e.g. the Environment Officer) who can capture and translocate them to an undisturbed area.
- There are no specific measures for the protection of invertebrates because of the difficulty in identifying these species for those unfamiliar with entomology and for practical reasons with respect to topsoil collection and storage. However, all mitigation measures related to minimising habitat fragmentation, prevention of soil and water pollution, minimising trampling and control of invasive species should be applied.
- Access and service roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation

- Following construction, rehabilitation of all areas disturbed during construction phase and that are not required for regular maintenance operations must be undertaken.
- All exposed area to be re-vegetated using indigenous species

8.3.8 Impact on aquatic biodiversity

Section 4.2.6 presents the status of aquatic biodiversity in the streams of the project area. Such biodiversity includes fish, phytoplanktons, zooplanktons and other aquatic organisms. Construction operations such as installation of water transmission infrastructure across and along streams and or wetlands has the potential to discharge sediments and other pollutants into water resources if appropriate controls are not put in place. Damping of pollutants into water streams could significantly affect the quality of life of aquatic biodiversity. The concern here is construction works may negatively impact water quantity and quality of streams, water bodies, and ground water resulting in seasonal hydrologic changes and potential negative impacts on downstream river biota and communities. Impacts to water quality may result from erosion and accumulation of sediment and organic debris in water bodies (e.g. chemical contamination (e.g. from use of pesticides, fuels, lubricants, and coolants); increased nutrient loads (e.g. from erosion and use of fertilizers); and changes to temperature levels and stream flows which may affect aquatic biota populations. Impacts to water quantity and timing of flows may occur due to the amount and spatial distribution of vegetation removed in response to the precipitation regime and remaining ecosystem processes. Preventing direct, adverse impacts to water resources and maintaining riparian zones is critical to protect water quality and quantity, in addition to aquatic and terrestrial forest habitats. This impact reversible.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Water pollution	Local	High	Short term	Possible	moderate

Mitigation measures

- Prevent or limit disturbance to water resources during the planning phase.
- Implement a riparian management zone (RMZ) by keeping safe shelter belts of undisturbed ecosystems around streams.
- Locate roads, skid trails, and landings away from streams and wetlands.
- Where appropriate, slash and debris should be stockpiled above the high-water mark to prevent materials from entering streams and wetlands.
- Restore or rehabilitate disturbed sites to desired ecological conditions prior to completing or decommissioning project operations and facilities. This should include installing water bars on skid trails and restoration of landings (e.g. ripping and seeding to natural vegetation).
- Suspend water pipes across streams and wetlands on concrete pillars to ensure future disturbance during repairs will not result into further interface with the water resources in these ecosystems.

- No materials/waste shall be dumped in the nearby wetland and all the foreign materials introduced during construction period shall be removed and disposed of in gazetted areas
- For all activities that will affect wetlands and river banks, make sure you obtain a wetland user permit and construction permits from DWRM before conducting activities in such ecosystems.

8.3.9 Impact on Houses/structures and or settlement patterns

Although the proposed Nyagak WSS will be undertaken using the road reserves of the existing public roads, the possibility of displacing some structures cannot be ruled out. Trenching within trading centers such as Anyiribu may displace some kiosks, signposts, and business stalls that were constructed within the road reserve. Therefore, such encumbered areas need to be approached with due care and compensation issues handled well in accordance with the law. However, the chance that a structure will be impacted is very low.



Some structures that may be displaced at Okollo trading centre

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on structures	Local	Medium	Long term	Possible	Moderate

Mitigation measures

- MWE shall work with local council committees, sub-county committees, Councilors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected on the intentions of land acquisition.
- MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12).

- MWE shall negotiate with land and structural owners in compliance with local market prices and government rates so as to establish rational figures for compensation and resettlement.
- All sorts of compensation and settlements must be done at least 6 months before structures are demolished.
- All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation.
- Any grievances in the course of project implementation shall be addressed in accordance with the grievance redress mechanism presented in Annex 13.

8.3.10 Impact on the economy

The construction phase of the project will have positive impacts on the project. The main impact on the economy will be contribution towards eradication of poverty and improved livelihoods of the local people. As described in section 5.2.4.4, 52% the households' income is below the national per capita income of 882 USD (Approximately 300,000 Uganda shillings per month) according to the third national development plan 2020/2021-2024/2025. The income ranges have been summarised in the Table 5.2. The project will create jobs during construction phase for the local community especially for the unskilled workforce. About -20 people will get jobs during operation phase during operation phase. During construction, about 50-100 people will be employed (see section 2.4.4) and employment will be created to the local proprietors who will be providing services like food, accommodation, medical care and supplies like sand and stone aggregates. The income accruing from such activities will obviously have a contribution on enhancing their standards of living. This impact will be enhanced through giving priority to local communities while recruiting workers and procurement of materials for the project.

8.3.11 Impact on Water and Sanitation

Open water sources that are commonly used by the project area residents are prone to contamination from open waste dumping, lack of pit latrines, sharing of the same sources of water with their animals and the use of such sources for washing and bathing areas. According to the National water supply atlas, in Madi-Okollo, access rates vary from 38% in Pawor Sub-County to 95% in Uleppi Sub-County. About 6% of the population lack access to sanitation facilities while and use the bush/open ground and polythene bags as a way of disposing off their faecal matter. During construction, excavations and hipping of soils may affect surface flow regimes of some streams thereby causing flooding and/or water stagnation. Stagnant water may be a breeding ground for disease vectors like mosquitos which cause malaria. The soils may be washed away into water bodies therefore leading to silt loading and causing water turbidity. The Project is expected to engage about 50-100 workers. These will generate wastes and most especially sanitary wastes at all work areas. The sanitary wastes if not well managed can pollute water bodies thereby causing reduced

dissolved oxygen as a result of decomposition of organic wastes, algae growth as a result of nutrients as well as increasing faecal coliforms which are a public health threat.

The project will use earth moving equipment and vehicles. During servicing of these equipment, used oil may accidentally find its way in water bodies thereby increasing BOD and reducing the DO while impacting of aquatic micro-organisms. This impact is limited in the extent and temporary but medium in magnitude. The impacts stated above are localized and of short term and therefore not expected to lead to cause adverse effects to surface water.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impacts on Surface Water	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation Measure:

- The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site
- Appropriate sanitary facilities shall be installed at the campsite and working gangs shall be provided with mobile toilets that will be maintained and emptied on time. The emptied sanitary waste shall be disposed of at regional NWSC Treatment Plant.
- Regular servicing of project vehicles shall be outsourced to gazetted vehicle service centres (Vehicle maintenance and Servicing companies) either in Nebbi or zombie districts. No vehicle shall be allowed to be serviced in sensitive ecosystems. The Service centre must present with proof that its fluids such as old car engine oil shall be is properly managed.

8.3.12 Impacts from Solid waste generation

The Construction of the project will mainly have potential negative impacts due to waste generation. According to the design report, the majority of the households (94%) have toilet facilities. However, 6% of households that do not have access to a latrine, use risky defecation systems (such as open areas) standing a high likelihood of triggering and spreading sanitation related diseases like cholera and hepatitis E. During Construction, sanitary wastes will be generated by workers along and /or at construction sites and the campsite/materials yard. Waste will also be generated during construction and laying of water transmission and distribution pipes. Such waste may include plastic offcuts from the HDPE and uPVC pipes and other accessories associated with water and sanitation projects. Organic waste will also be generated at temporally eating places. Plastics waste such as mineral water bottles, polythene bags (Kaveera), Jerry cans, cups, plates and other plastic accessories may be found along the corridor, at the site if not well managed. The impact of littering waste is likely to be Negligible-Minor since much of the waste is not expected to be hazardous or infectious.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Generation of Solid Waste	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation measures

- All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and given to recycling facilities. Other forms of waste which are inert or ceramic in nature may be collected by NEMA gazetted waste handlers (Who shall be engaged by the Contractor) and taken to a NEMA gazetted waste disposal facilities for disposal.
- All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated Town Council landfills for disposal. This activity shall be supervised by the District Environment Officer and the supervising consultant.
- All plastic waste generated at rented residences for the workers or campsites in the course of work such as mineral water bottles, polyethene bags, jerry cans and cups shall be collected and given/sold either to the local people for re-using or taken for recycling in respective factories.
- The Contractor shall develop and implement a Waste Management Plan that puts into consideration sorting at the source, proper storage and transportation. That will at minimum contain the types, nature and quantities of wastes expected to be generated as well as their corresponding methods of treatment and disposal. The plan shall also indicate the sites of proposal as well as the frequency of collection and disposal.
- Adequate and appropriate sanitary facilities shall be constructed at the campsite while workers along the construction sites shall be provided with mobile toilets that shall be cleaned and emptied promptly.

8.3.13 Transport – Traffic and road safety impacts

The proposed project will cut across several access roads within the project areas. All the roads within project area have been presented in Section 5.2.6. The water transmission and distribution network shall also interfere with the access roads to public institutions like Ogoko Seed Secondary School in Ogiba village, Inde Town Council, Okollo district at E: 319849, N: 297426, H:719m. The excavations for the water transmission/distribution line will cross some access roads which may interfere with their integrity. Fortunately, this project will be crossing the earth surfaced roads mainly except Nebbi-Arua highway. With the understanding that the water pipelines will be constructed along the main road reserves of the existing gravel public roads, the impact of construction works on road safety can be a major challenge. Unless proper mitigation measures are put in place, construction works across and along these roads

could result into critical interferences with traffic or accidents. It's therefore necessary that key precautions be undertaken at such road crossing to avoid accidents and impairing traffic activities.



Plate 7.1: Some of the project area roads whose road reserves will host the proposed project

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Interference with traffic and diminished road safety	Within limited area	Very high	Temporary	Possible	Substantial

Mitigation measures

- To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic preferably on weekends.
- The trench excavated across the roads, after laying the pipes should be backfilled with marram, compacted and levelled to the level of the existing road immediately. This is to ensure that the integrity of the road is not affected by the water line construction activities.
- Conspicuous notices shall be well placed on roads and guides on ground shall direct traffic in case of diversions or open trenches.
- The contractor will have to notify traffic police in advance and work with it during trenching across high ways and other major roads.
- All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.

- The roads that will be affected by the repaired and restored immediately after laying of pipes
- The contractor will implement the traffic management plan that will have been approved by the supervising Engineer.

8.3.14 Impacts on public health

The Project area has Health Centre II and Health Centre III at parish and Sub County respectively and a number of clinics. Further it was also reported that the area experiences several water and sanitation related diseases such as cholera, typhoid and malaria. About 94% of the population has access to sanitation facilities while 6% use the bush/open ground and polythene bags as a way of disposing off their faecal matter. The majority (80%) of the households discharge grey water into the open areas, 7% into the drainage system, while 13% into household gazetted disposal areas. Public toilets are generally lacking in the town and this of course has health risks to the communities. The potential impacts presented by the construction phase are detailed out below.

8.3.15 Social ills of influx of construction labour

The influx of workers, typically young males seeking construction jobs will likely be associated with a series of social challenges such as crime, alcoholism/illicit drug abuse, Sexual Exploitation and Abuse (SEA) of women and girls and prostitution. These are often related to the spread of sexually transmitted diseases including HIV/AIDS. Vices such as drug abuse and prostitution would affect social coherence and security in project communities tarnishing the image and intent of an otherwise good project.

- **Crime, drug abuse and prostitution**

Unless sensitization of all workers is undertaken by contractor, this impact is highly sensitive (considering that the project area hosts refugee settlements). Duration of above-mentioned social ills will be short-term ending with completion of project construction but associated social and health effects can be long-term and irreversible, especially addiction to drugs making impact magnitude high.

- **HIV/AIDS Risk**

The influx of male workers into the project area may increase the risk of HIV/AIDS transmission. The concentration of young males in worker's camps may lead to illicit and unsafe sexual behavior that may push up infection rates in the local areas. However, since most of the labor force will be below 40 years and local residents, it is expected that behavioral change will help stabilize the infection rate. Risky sexual behavior and drug abuse are ranked as likely to occur due to common attitudes of contract labor though this will be moderated by high rates of sensitization on HIV/AIDs. However, should infections occur due to lapses in awareness, sensitivity is high and impact magnitude is **high**. This is therefore an impact of **Major** significance.

- **Sexual Harassment (SH)**

Sexual harassment can occur between workers, particularly male workers against female workers, when there is insufficient sensitization of workers against prohibitions for sexual harassment, as well as the absence of reporting and disciplinary measures.

- **Sexual Exploitation and Abuse (SEA)**

Construction workers are predominantly males. When attitudes that condone gender inequality and abuse of power are prevalent in the work sites and/or the culture, this may increase risk for women and girls in the community of sexual exploitation and abuse committed by construction workers, particularly in settings where there is impunity for this violence. A large influx of male construction workers may also contribute to a human trafficking, whereby women and girls are forced into sex work.

- **Gender Based Violence (GBV) at the community level**

This impact refers to GBV that women and girls may experience as a result of Project implementation. This includes, for example, an increase in intimate partner violence (IPV) when compensation schemes that share funds equally among husband and wife at the household level do not provide adequate sensitization and safety measures to reduce potential for increased tensions due to females receiving funds. This also refers to other GBV-related risks incurred as a result of projects creating changes in the communities in which they operate and causing shifts in power dynamics between community members and within households. Male jealousy, a key driver of GBV, can be triggered by labor influx on a project when workers are believed to be interacting with community women with the fear that it could exacerbate the risk of family breakdown.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Public Health concerns	Local	High	Short –medium term	Possible	High

Mitigation

- The contractor shall involve local (LC) leaders in labour recruitment to ensure people hired have no criminal record.
- Local governments and the contractor shall collaborate with police to contain criminal activities.
- A register of all construction workers shall be filed with local authorities to aid in tracking cases of child neglect.
- With the assistance of a competent sub-contractor, the contractor shall draft an HIV/AIDS policy
- A service provider for professional HIV/AIDS activities shall be procured and engaged
- The contractors shall put in place worker place committees to oversee implementation

of HIV/AIDS control activities.

- Contractor will provide counseling support and work based positive culture to posttest workers
- The contractor will provide condoms to all workers free of charge placed in private and areas of confidence.
- Peer based awareness and counseling shall be instituted within the workforce.
- All workers (permanent or temporary) will be required to sign the project code of conduct prior to commencing their assignments.
- A worker Grievance mechanism shall be established and operated.
- Signing of codes of conduct by workers
- Ensure that there is recruitment of (a) service provider(s) to support in prevention (sensitization) and response (referral pathway) activities.
- Develop and implement a SEA/SH action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA/SH action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). The SEA/SH action plan will include how the project will ensure necessary steps are in place for:
 - Prevention of SEA/SH: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance;
 - Response to SEA/SH: including survivor-centered, multi-sectoral referral and assistance to complainants; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level
 - Engagement with the community: including development of confidential community-based complaints mechanisms GM; mainstreaming of SEA awareness-raising in all community engagement activities; IEC materials; regular community outreach to women and girls about social risks and their SEA-related rights;
 - Management and Coordination: including integration of SEA/SH in job descriptions, employment contracts, performance appraisal systems, etc.; development of contract policies related to SEA/SH, including whistleblower protection; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated SEA focal points and trained community liaison officers as applicable.
- Develop and implement provisions that ensure that gender-based violence at the community level is not triggered by the project, including:
 - effective and on-going community engagement and consultation, particularly with women and girls;
 - review of specific project components that are known to heighten GBV risk at the community level, e.g. compensation schemes; employment schemes for women; resettlement; etc.

- Specific plan for mitigating these known risks, e.g. sensitization around gender-equitable approaches to compensation and employment; etc

8.3.16 Exposure to high noise levels

The activities like movement of heavy equipment are likely to generate noise levels beyond those stipulated in The National Environment (Noise Standards and Control) Regulations, 2003. The current noise levels in the project area are presented in section 4.1.7. Exposure of workers to high noise levels can be a health concern and needs to be mitigated.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Exposure to high noise levels	Within limited area	Medium	Long-term	Possible	Moderate

Mitigation measures

- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards and Regulations). Workers operating equipment generating noise levels greater than 80 dBA over long hours must be given earmuffs;
- Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;
- The procurement process of the equipment for water treatment should put into consideration the noise level requirements under the national standards.
- In the circumstances that the equipment at the treatment plant generates noise above the national standards, then the use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.
- Annual medical hearing checks should be performed on workers exposed to high noise levels.
- Sites must be hoarded to curb noise impacts to neighboring communities.
- The selection of the equipment for water treatment must put into consideration the national requirement/standards for noise level emissions.

8.3.17 Impacts on Education

Section 5.2.8 presents schools that are within the project area. A number of schools are fairly close to the road reserve and during construction activities are likely to impact on the learning process. Noise from trench excavation activities and laying of water pipes may will disrupt the learning process because these schools are all within the vicinity of the project area. The noise from the works site especially when construction is near the schools will disrupt the concentration of students. There is also a probability of occurrence of accidents in locations near schools. Male workers could lure school girls with money and other gifts which could

make them drop out of school. School attendance may be affected as some children might decide to skip school so as to earn money from the project while others may spend time simply watching construction works. This is a highly sensitive impact of moderate magnitude because its duration is short term.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on schools and learning process	Local	Medium	Temporary	Likely	Minor

Mitigation measures

- Schools shall be sensitized on the need to keep off construction sites.
- When working near schools, work should be scheduled to ensure minimal disruption for the learning. The schools should be notified of the work schedule ahead of time
- The contractor shall not employ any person below 18 years and any pupil or student above 18 shall not be employed during school time. Students above 18 years can be employed only during holidays.
- The Contractor should ensure that there is minimal contact between workers and school population.

8.3.18 Impacts on Physical Cultural Resources

Some cultural properties as highlighted in chapter 5 (section 5.2.10) exist in the project area (mainly cemeteries). Although most of the major cultural sites identified are quite far from the proposed project infrastructure, the possibility that some cultural features (along the transmission route or where the treatment plant and other infrastructure will be located) can be encountered can't be ruled out. In general, the impact on Physical Cultural property will be minor since hardly any existing cultural property are likely to be affected.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impact on Physical Cultural Property	Within limited area	Medium	Temporary	Possible	Minor

Mitigation

- Structures like shrines and graves if any will be relocated in accordance with the existing rituals and norms of the society. Loss of incomes shall also be compensated for since the owners may take some time without any income from them especially if it's deemed necessary to relocate them far from their original site due to cultural rituals involved. Details of compensation shall be contained in the RAP.
- Sites that are buried may be discovered during project implementation. Such discoveries of archaeological nature are termed as '**archaeological chance finds**'.

These could be concentrations of pottery, animals and human bones, worked stone etc. Chance Find Procedures as presented in section 8.2 shall be adhered to. In summary, the following shall be undertaken:

- On discovering evidence of possible scientific, Paleontological, historical, prehistoric, or archaeological remains, the contractor shall notify the Department of Museums and Monuments giving the location and nature of the finds.
- The Contractor shall cease work in the vicinity of the site and request the responsible officer from the Department of Museums and Monuments to inspect the site and make recommendation on possible salvage within 72 hours.
- The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings.
- The department of Museums and Monuments is located in Kampala, Kamwokya just before Uganda Wild Life Authority on the road to Ntinda (Kira Road). The Commissioner Uganda Museum can be contacted on +256 772485624. A detailed chance find procedure has been presented in Annex 12.
- To mitigate damage to archaeological resources, it is proposed that the construction foremen will inform construction crew to be aware of the possibility of discovering fossils or archaeological remains, what form these would take (bones, fossils in rock, shards or pottery, arrow heads etc.) and the procedure to be followed shall be as stated above.
- Further still, the contractor shall develop and implement avoidance procedures. In the event of human remains, there shall be no further excavations or disturbance of the site until the responsible police authorities have been informed.

8.3.19 Land

Land in the project areas is mainly communally owned and governed by the customary system of land tenure system (see section 5.2.14). The project areas that will be affected have been modified by agricultural activities and only has patches on natural vegetation. The land requirements for the Nyagak WSS have been presented in section 5.2.14. The project case scenario is that total land take will be 8 acres to be acquired to host the intake structures, raw water main, water treatment plant and area for storage tanks. Land for hosting such structures shall be compensated for in accordance with the Land Act and World Bank Environmental and social safeguard policies.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of land to the water infrastructure	Local	Medium	Long term	Almost certain	Substantial

Mitigation measures

- MWE shall engage all affected land owners and obtain consent before their land is used as water transmission corridor/way leave for the proposed Nyagak water and sanitation project.
- Where the landlords object using their land without any compensation, MWE shall obtain an alternative route for the proposed water pipes.
- All land acquired for establishment of the water treatment plant, transmission pipes, reservoir tanks and any other activity either by the developer or contractor shall be compensated for in accordance with land Act and World Bank Environmental and Social Safeguard Policies. The compensation for married couple should be done after the wife has consented. This is aimed at promoting gender equality given that in the area, women rarely own land (see sections 5.2.15).

8.3.20 Gender and vulnerable groups

8.3.20.1 Gender Impacts

This impact is related to the effect of the proposed project on direct and indirect gender impacts focusing specifically on access and utilization of resources and reducing the gender poverty gap.

1. The project has considerable potential to generate positive impacts on women's and men's livelihood opportunities and empower women, through inclusion in roles from which they have traditionally been excluded. The project has the potential to make a significant difference in women's health, labour burdens, time use, safety and security, and increase possibilities for income generation.
2. The provision of safe water to all, men and women within the trading centers, government institutions and facilities such as health centers, churches, mosques, schools etc., will be perceived by the District Local Government Officials at various levels and by the local communities, as a direct positive impact of the project on gender considerations. In addition, the impact on the local economic and employment dynamics and especially the anticipated opportunities for both men and women to provide local supplies and services, will be an additional benefit in the context of gender equality.
3. Women in a rural setting such as the Project Site, are predominantly engaged in demanding household chores including spending long hours fetching water for domestic use. The supply of community piped water will provide time savings that will in turn widen women's opportunities to gain employment and income outside the home.
4. However, the project also has the potential to reinforce existing gender disparities and biases, in which positive benefits (employment, compensation, etc.) are felt disproportionately more by men and the negative impacts by women. For example,

stakeholder consultations in the Project Area identified the following concerns which they perceived as potentially negative gender-biased impacts of the project:

- a) limited engagement of women on project activities;
- b) increase in sexual harassment of women and young girls by construction workers;
- c) increase in sexually transmitted diseases including HIV/AIDS;
- d) sexual exploitation of young girls which could lead to increased incidents of school drop-out;
- e) social tension within households, gender-based violence and disruption of family units; and
- f) In addition, evidence from previous infrastructure projects demonstrate that women-owned businesses (kiosks, grinding, milling, tailoring, grocery shops, etc.) have less access to property and land for economic activities, and even less access to credit needed for business investment, including electricity connection. The need to address this imbalance is one that will require careful consideration, as it cuts across several government sectors and entities, including financing institutions.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Gender impacts	Local	High	Long term	Almost certain	Substantial

Mitigation Measures

1. A key consideration for the proposed project is the ability to effectively involve key stakeholders in a realistic and positive participatory process to combat gender violence and the abuse and mishandling of women and children on such government infrastructure projects and the Contractor must present a plan to address such.
2. Conducting appropriate sensitization on gender issues at all levels within the Project Area and creation of awareness on the responsibility of all concerned during the various phases of the project to address specific gender concerns. This should entail consultation with both women and men in the Project Area and within the construction teams.
3. MWE and the Contractor should ensure that:
 - a) effective gender responsive and equality activities under the proposed project are duly defined and implemented through participatory engagement;
 - b) the targets and indicators for monitoring the gender impacts and outcomes are clearly defined in the contract documentation;
 - c) the quantifiable and none quantifiable, gender and social related direct and indirect benefits have been defined and duly achieved; and

- d) A social specialist is deployed on the project to oversee among others, gender mainstreaming in the project cycle is observed and implemented.
- e) A Gender Awareness Programme be established and an HIV/AIDS awareness campaigns must be regularly conducted for PAPs, workers and local communities, as well as activities promoting access to health services, treatment and counselling

8.3.20.2 Impacts to vulnerable groups

This impact is related to the effect of the proposed project on vulnerable groups (women, children, persons with disabilities).

1. Stakeholder consultations conducted in the project identified child abuse as a problem that has emerged from previous infrastructure projects. There is therefore concern in the local communities and amongst some of the leadership at various levels that this project may also have the potential to impact school children as vulnerable members of society.

2. The proposed project traverses' areas with schools and settlements and it is likely that some project workers could engage in sexual relations with school and under-aged children. This could result in an increase in child pregnancy/marriage, which was established to be at about 8% in the project area. In addition, sex work involving children and school dropout, defilement of school children and marrying school girls, were also cited as potential impacts that could be generated by the project. The local communities are also concerned that during the construction phase of the project, as has happened in previous infrastructure projects, the Contractors are likely to be tempted to use children as laborers, to save money on labour costs; this amounts to child labour and abuse.

3. As has been mention in previous sections of this document, the project has the potential to make a positive and significant contribution to women's livelihoods through provision of employment opportunities, increased income levels, improved maternal healthcare and gender empowerment.

4. Equally though, the project has the potential to exacerbate existing gender inequalities and lead to a situation in which women become the target of the potential negative impacts of the project. Examples of such impact include: limited engagement in available project work and tasks; sexual harassment and exploitation; social tension in some homes; disruption of marriages; gender-based violence, among others.

5. Male construction workers are also likely to lure school girls with money and other gifts and ultimately lead to incidents of sexual exploitation of young girls, pregnancies and school-drop out. School attendance is also likely to be affected; some children might decide to skip school to earn money from the project, while others may spend time simply watching construction works.

6. For people with disabilities, access to water is an essential service. In addition, people with disabilities are often more likely to have less income and therefore struggle to get employment, afford water costs, and therefore end up requiring greater assistance for basic

services. There is concern that people with disabilities are likely to experience the same challenges throughout the life of this project.

Risk assessment matrix

In general, incidents of child abuse, gender-based violence, sexual harassment and exploitation of women, as well as exclusion of persons with disabilities are issues of serious concern that require considerable attention and remedial action by all concerned parties in infrastructure projects, such as the proposed distribution line project. While the above negative impacts are likely to be localized in geographical extent, their cumulative effects will continue to be felt during the operation and maintenance phases of the project. Consequently, the significance of the impact of the project on vulnerable groups is considerable in intensity and duration.

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Vulnerable group impacts	Local	High	Long term	Almost certain	Substantial

Mitigation Measures

5. A Child Protection Plan should be developed and provided to all the Contractors and school management to discourage the Contractors from using children as laborers. In addition, Contractors will be required to avoid employing workers who are below eighteen years old. They will also be required to keep records that show the ages of their workers.
6. Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 116. The existence of the hotline can be displayed throughout near the construction site and in the community at large.
7. The Contractor should ensure that mechanisms for close monitoring of worker's behavior/conduct are in place e.g. Contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behavior by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behavior.
8. MWE and the Contractor should ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.
9. Talks with the Contractor and his workforce by relevant officials (including the police) on child protection should be encouraged and appropriately scheduled, including continuous popularization of the child help line 116. Parents/guardians should be sensitized and held accountable for children leaving and arriving home before dark.

10. MWE and the Contractor should ensure strict compliance with the provision of relevant safeguard policies with respect to persons with disabilities. MWE and the Contractor should ensure that there are full and effective participations of persons with disabilities and other vulnerable groups, like children and through representative organizations, in all phases of the project, including monitoring and evaluation.

8.3.20.3 Potential abuse to women and girls

The proposed water and sanitation project is likely to attract women who will be employed as laborers. During employment and execution of their duties, it is possible that their sexual rights as women may be abused by educate and unchecked sexual behaviors of contractors and their workers. Impacts relating to women will include issues like denial of employment opportunities, gender-based violence when husband forcefully demand their wives pay. Other potential negative impacts on women include exposure to HIV/AIDS and STIs and increased sexual exploitation of young girls which may likely lead to unwanted pregnancies, drop-out from school and others. These are large negative impacts which are of medium significance and magnitude making the overall impact moderate. These are proposed to be mitigated through the following measures:

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Gender concerns	Local	Medium	Temporary	Likely	Moderate

Mitigation measures

- Workers will be sensitized on their sexual rights. MWE shall Work with the contractor on establishing zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). All employees must be made aware of the zero-tolerance policy and codes of conduct for employees.
- All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences.
- To the extent possible, there will be gender sensitivity in task allocation;
- The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and;
- There will be a Specialist (Social Specialist) to oversee amongst others gender mainstreaming in the project.

8.3.20.4 Potential child abuse

The proposed project traverses’ areas with a number of schools and settlements and it is likely that some project workers could engage in sexual relations with school and under aged

children. This could result in increase in child pregnancy/marriage, sex work involving children and school dropout/Defilement of school children/marrying school girls. In addition, during the construction phase contractors could be tempted to use children as laborers in order to save money on labour costs, which amounts to child labour and abuse. Sensitivity is medium due to relative public awareness about child abuse which makes the overall impact significance substantial.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Potential child abuse	Limited area	Very high	Temporary	Possible	Substantial

Mitigation measures

- A child protection plan will be developed by MWE and provided to all the contractors and school management to discourage the contractors from using children as laborers. In addition, contractors will be required to avoid employing workers who are below eighteen years old. They will also be required to keep records that show the ages of their workers.
- Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 611. The existence of the hotline can be displayed throughout near the construction site and in the community at large.
- The contractor shall ensure that mechanisms for close monitoring of worker's behavior/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behavior by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behavior.
- MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.
- Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child help line 611. Parents/guardians shall be sensitized and held accountable for children leaving and arriving home before dark.
- Any person involved in child abuse shall be dealt with in accordance with the law.

8.4 OPERATION PHASE IMPACTS ENVIRONMENTAL AND SOCIAL IMPACTS

8.4.1 Overview

Once the water treatment plant, transmission and distribution pipes have been constructed, the environmental impacts associated with the operation phase will be minimum. Most of the

impacts of the operation phase are associated with the quality of water treatment process, water transmission and management, social impacts, Sewage collection and management all of which have been discussed already in this chapter under construction phase. Additional impacts during operational phase as detailed down below;

8.4.2 Exposure to high noise levels

The water treatment plant is likely to generate noise levels beyond those stipulated in The National Environment (Noise Standards and Control) Regulations, 2003. The current noise levels in the project area are presented in section 4.1.7. Exposure of workers to high noise levels can be a health concern and needs to be mitigated. High noise levels is likely to be generated by the water pumps and generators among other tools and equipment that will be used at the water treatment plant. The noise levels should not be above 85dBs as stipulated by the National Environment (Noise) Control Regulations, 2003.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Exposure to high noise levels	Within limited area	Medium	Long-term	Possible	Moderate

Mitigation measures

- No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards and Regulations). Workers operating equipment generating noise levels greater than 80 dBA over long hours must be given earmuffs;
- Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;
- The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.
- The water treatment plant should continuously monitor the noise levels at the plant and in case, the levels go above the national standards, then the cause of the increase should be investigated and addressed.
- Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- Periodic medical hearing checks should be performed on workers exposed to high noise levels.

8.4.3 Impact on water quality and quantity due to WTP operations

The WTP will be constructed in Omier Central Forest Reserve. The WTP will employ alum and lime in its treatment processes. Thus, the sludge will have to be disposed. Additionally, backwash (filter cleaning) wastewater will have to be disposed. The clarified backwash water will continuously release residues of aluminum sulphates, suspended solids, chlorine and nutrients. Over the long term, these residues will form a sludge on the river bottom but this is expected to be of minor significance owing to the large dilution effect of the river. In general, the impact of WTP residuals (e.g., Dissolved salts, filtrate residues, Aluminium salts, sulphates, chlorides), if discharged into source water, though localized and temporary, will be limited because of the dilution factor and non-cumulative in effect, thus the impact will be minor. If in considerable quantities, these components can lead to turbidity of and salinity of water. In the aquatic environment, aluminium acts as a toxic agent on gill-breathing animals such as fish and invertebrates, by causing loss of plasma- and haemolymph ions leading to osmoregulatory failure.

According to the design, the amount of water that will be abstracted by 2040 by the project is estimated at 3,009m³/d which translates into 1,083,240m³/year. The hydraulic assessments also showed that the existing direct abstractions from River Enyau is negligible compared to the available volume. Therefore, the project will have negligible impacts on the flow (volume of the river) and hence no need to apply any restrictions. However, the client will have to acquire the water abstraction permit from the Directorate of Resources Management and ensure compliance to the set conditions on volume if any.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Degradation of source water quality and quantity	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation measures

Management of alum & lime sludge

- Do not discharge any sludge into River Nyagak or any nearby water body. Adopt mechanisms that lead to:
 - Pollution prevention & waste reduction (resource recovery) at the WTP as a priority; followed by
 - Residuals treatment and
 - Safe disposal of wastes as a last option.
- Adopt the following pollution prevention & waste reduction mechanisms:
 - optimize intake location to lower turbidity & suspended loads by siting and installing intake infrastructure at a deeper and clearer point of the lake profile;

- Optimize solids settling using the pH in clarifiers and sedimentation tanks to reduce coagulant chemicals (alum coagulation has a minimum solubility at pH 6 (Tchobanoglous, et al., 2003). Thus, adjusting of pH (i.e. above 6) to keep optimal coagulation conditions might help to reduce waste products but still effectively treat the source water);
- Reduce softening chemicals by monitoring source water hardness (WTPs remove calcium hardness to a level that meets the requirements of the customer. By monitoring the calcium content of the influent, WTPs might reduce the amount of chemicals needed to precipitate the required fraction of calcium hardness, thus resulting in a minimized level of residuals requiring additional treatment or disposal); recycle/reuse sludge where applicable.
- Adopt the following residuals treatment mechanism:
 - Utilize drying beds in separating solids and liquid at the WTP facility.
 - Contract a NEMA approved WTP residual handler to collect hazardous solid wastes for safe disposal;
 - Landfill solid wastes but not close to any surface or groundwater (residuals from WTPs are typically, not hazardous (EPA, 2011a), thus can be landfilled).
 - Do not discharge backwash water into River Nyagak or any nearby water body prior to dechlorinating; adopt mechanisms that lead to:
 - Pollution prevention & waste reduction (resource recovery) at the WTP as a first priority; followed by
 - Backwash water treatment; and adopt the following pollution prevention & waste reduction mechanisms:
 - Optimize the filter media by employing filter medium that ensure longer filter run times, thus infrequent backwashing while maintaining or improving on the finished water quality;
 - Return backwash water to the head of the source water treatment plant for reuse.
- Adopt the following backwash water treatment mechanism:
Dechlorinate the free or total combined chlorine residual remaining after disinfection through the addition of sulfur chemicals such as sulfur dioxide, sodium sulfite, sodium bisulfite, sodium metabisulfite, and sodium thiosulfate (NB: do not overdose with sulphite). Too much sulfite can result in sulfate formation, which suppresses oxygen content and lowers the pH of the treatment residuals (EPA, 2000b)
- The Project Proponent shall apply for and acquire a Water Abstraction Permit from Directorate of Water Resources and ensure compliance to the conditions therein

8.4.3.1 Wastewater and septage collection

Measures to minimize potential community health risks in sanitation can be implemented both in the collection and treatment of wastewater and sludge. Collection of sewage and transportation away from public toilets that will be constructed under this program, while not

alone sufficient to protect public health, is nevertheless generally the most important aspect of sanitation. Under the Nyagak WSS, human waste will be managed by use of septic tanks (during both construction and operational phases) which shall be emptied and treated at a site (waste treatment plant) gazetted by NEMA like Arua National Water and Sewage Co-operation. Therefore, measures need to be put in place to ensure all waste water and sewage from septic tanks is fully collected and disposed appropriately.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Failure to collect & dispose waste water and septage	Within limited area	Medium	Temporary-short term	Possible	Moderate

Mitigation measures

- Promotion of collection services, or ensuring that collection services are available, is of primary.
- Timely collection of sewage should be undertaken to prevent sewage over flows.
- There should be a system among the communities, their leaders and the health workers to monitor, detect and alert the responsible authorities to call for emptying of any septic tank that poses a danger to the community.

8.4.4 Fauna (fisheries)

During abstraction water, there is a risk of sucking fish alongside the abstracted water. This is likely to occur at the abstraction point on River Nyagak. However, sucking of fish is less likely as the size of the filter is too small for fish to pass through. Improper management of water treatment chemicals may end up in the river thereby poisoning fish (Chemicals i.e. coagulants like alum and disinfectant like chlorine if not well managed will end up in the water body and may be up taken by fish thereby either killing the fish or bio accumulating in them. However, poisoning of fish is less likely to occur because of the high dilution by the river but the effluent discharged should conform to the National Environment (standards for Discharge of effluent into water or Land) Regulations No.5 1999.

Further, improper management of wastes especially organic based wastes may lead to increased organic waste loading in the lake thereby increasing risks of suffocating fish due to reduced dissolved oxygen in the lake. Given the dilution effect, this impact is minor. The impact on fish has a negative implication on the livelihood of the fishermen in the area and this will obviously have an impact on the entire chain of fish trading. Impact on fish also has an indirect impact on the nutritional values as either fish's price will be high and unfordable to many or the fish catch will be reduced. Further, if fish bio accumulate chemicals in chemical wastes, it may end up in food chain thereby affecting public health.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impacts of project activities to the fisheries	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation strategies for protecting the fisheries

- In order to avoid fish being sucked into abstraction pipe, the pipe should be screened (Screen of utmost less than a 100th inch holes) at the suction end to prevent entrance and sucking in of the fish during water uptake.
- Chemicals and Chemicals containing substances shall be stored in a facility that is leak free to minimize the amount of chemicals entering River Nyagak.
- Chemical containing wastes shall not be disposed of directed into the environment but shall be disposed of to a NEMA approved disposal facility using a NEMA licensed waste transporter.
- In case the discharge of chemicals contaminated effluent into the environment can not be avoided, then the effluent must meet the national standards for discharge.

8.4.5 Economy

The operational phase of the project will mainly present positive impacts. The impacts are presented below.

8.4.5.1 Eradication of poverty and improved livelihoods of the local people

As described in section 5.2.4.4, it was established that 52.12% of the households' income is below the national per capita income of 882 USD (Approximately 300,000 Uganda shillings per month) according to the third national development plan 2020/2021-2024/2025. Human capacity building and the creation of jobs in water management through the involvement of private operators in the construction, management, repair and maintenance of water supply facilities will come along with this project. These will constitute skilled, semi-skilled and unskilled laborers. Skilled personnel will be employed as Managers, Supervisors, and in other technical positions whereas unskilled laborers will be support staff and perform non-technical work.

The income accruing from such activities will obviously change their standards of living. About -20 people will get jobs during operation phase during operation phase. Employment will be created to the local proprietors who will be providing services like food, accommodation, medical care, among other services. The proposed project will also result in increase of volume of water for production which could result in improved livelihoods of the local people. Water is indispensable for survival and improving the quality of life – for health (drinking, eating and bathing) and for economic development (agro-processing and business). The

project would, therefore increase productive activities through reduced sick days and time saved in fetching water. This impact will be enhanced through giving priority to local communities while recruiting workers for the project and putting in place initiatives to promote productive use of water.

8.4.5.2 Increased Revenue to the government

This water supply and sanitation project will generate revenue to the districts and the country in general. This will be in form of VAT on water supply and other taxes associated with extension such as expanded and improved business opportunities in the project areas. This will be enhanced by putting in place an efficient mechanism for revenue collection.

8.4.5.3 Increase in investment in the area

The business community could take advantage of the proposed development to establish businesses that would otherwise be impossible without piped water. This impact will be enhanced through embedding initiatives for promoting productive use of water.

8.4.5.4 Loss of livelihoods

While most households would receive real tangible benefits from the operation of the improved infrastructure, there is one social group, the water vendors, who are likely to have their livelihoods seriously undermined following project implementation. A number of water vendors (6 vendors identified at the time of assessment) who are the men (very rarely are women) currently collect water and sell it on to individual users. These Vendors are involved in other activities like farming and water vending is their secondary/ additional source of income.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Loss of livelihoods	Local	Medium	Temporary	Likely	Moderate

Mitigation Measures

- MWE should sensitize existing water vendors in the area about adapting to the new developments in the area. This would eliminate their negative attitude towards the proposed project and result in total project support.
- The community Development officer (CDO) should mobilize the local people (including water vendors) and sensitize them about the opportunities that the proposed project would bring in the area and how they can take advantage of piped water in the area to create jobs (such as washing bays) and spur development in the area.

- Vendors would be encouraged to become scheme or kiosk operators; vendors would be encouraged to tender for public water points and shall be given priority
- Vendors could continue selling water to those who would wish to get water at their door steps.
- Vendors would be encouraged to be involved in casual work in the course of the construction works.

8.4.6 Water and Sanitation

The project will support construction of 2 water borne toilet type (9 stance) at one of the market areas and or parks at a location to be agreed by the district authorities Madi-Okollo DLG. The project will therefore present both positive and negative impacts in the project area.

Positive impacts

8.4.6.1 Access to clean and safe water

Implementation of the project will increase access to clean and safe water for the majority of the project area dwellers, estimated yield capacity is 3,200m³/d (equivalent to 125 m³/h output on 24-hour basis) to cater for the maximum day demand, estimated to save 132 villages and a population of 72,090 people. Another major positive impact of this project will be the easing of the burden of fetching water which is one of the most arduous tasks for women and young girls in the rural areas. Therefore, the time which has always been wasted on water fetching can be invested into the development of income-generating activities especially for the women. This impact will be enhanced through the following:

- Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
- Ensuring that water is affordable and available all the time

Negative

8.4.6.2 Siltation from excavated soils

During operation of the project, there will be new connections to be made or maintenance of the water line. These may require excavations and hipping of soils. The heaped soils may be washed away into water bodies therefore leading to silt loading and causing water turbidity. The impacts stated above are localized and of short term and therefore not expected to lead to cause adverse effects to surface flow regimes resulting from temporary disruption of existing/natural drains occurring during site preparation or risk of surface water contamination due to erosion and siltation.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Impacts on Surface Water	Local	Low	Temporary	Likely	Negligible-Minor

Mitigation Measure:

- No spoil soil or any other materials shall be dumped or temporary stored in a known drainage system
- All excavated soils shall be used for backfilling immediately after laying of pipes. The heaped soils at deep excavations shall be consolidated in an area with embankments to prevent it from being washed away.

8.4.7 Solid waste

Solid waste residuals generated by water treatment include process residuals, used filtration membranes, spent media and miscellaneous wastes. Process residuals primarily consist of settled suspended solids from source water and chemicals added in the treatment process, such as lime and coagulants. Pre-sedimentation, coagulation (e.g. with aluminum hydroxide [alum]), lime softening, iron and manganese removal, and slow sand and diatomaceous earth filtration all produce sludge.

Composition of the sludge depends on the treatment process and the characteristics of the source water, and may include metals, lime, polymers and other organic compounds, microorganisms, etc. Spent media may include filter media (including sand, coal, or diatomaceous earth from filtration plants), ion exchange resins, granular activated carbon [GAC] and others. Therefore, the different types of wastes generated by the various water treatment processes shall be assessed for toxicity before they are disposed of. The public toilets that will be constructed by this project will also generate sanitary wastes which will require to be emptied and disposed of from septic tanks. If the emptying and disposal is not done promptly and at properly, it may lead to environmental and public health risks.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Soil, water and air pollution	Limited area	Medium	Permanent	Almost certain	Substantial

Mitigation measures proposed

- Minimize the quantity of solids generated by the water treatment process through optimizing coagulation processes.
- A NEMA approved waste handler should be engaged to collect and dispose of solid wastes to a gazetted NEMA waste disposal facility

- Alternatively, landfill solid wastes but not close to any surface or groundwater (residuals from WTPs are typically not hazardous (EPA, 2011a), thus can be landfilled).
- Regenerate activated carbon such as by returning spent carbon to the supplier. Promptly empty the public toilets and toilets at the water office and dispose of sewage to regional NWSC sewage treatment plant.

8.4.8 Chemicals management

Water treatment may involve the use of chemicals for coagulation, disinfection and water conditioning. The chemicals that are used include Alum, Chlorine strong acids and bases, sodium and calcium hypochlorite. Workers may be exposed to these chemicals. If these chemicals are not well managed, they may lead to pollution of water as well occupational health and safety hazards. Therefore, appropriate measures need to be taken to prevent, minimize, and control potential impacts associated with the storage, handling and use of chemicals in water treatment facilities.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Chemical Exposure and Hazardous Atmospheres	Within limited area	High	Temporary	Possible	Moderate

Mitigation measures

- Prudent handling and storage of hazardous chemicals, as described in Annex 11 will help to minimize potential risks to workers.
- All chemicals shall be transported, stored and handled appropriately and shall have respective material safety data safety data sheets well displayed in the store. In addition, the chemicals storage areas and transportation vehicles shall be well secured with appropriate labels. The project shall construct chemicals storage facilities. During operation, covered vehicles with labels like hazardous substances in transit shall use to transport chemicals
- Develop and implement a plan for responding to accidental releases. The plan should at minimum include who to contact (communication and reporting), how to act in an emergency and how to mitigate risk (procedures), and what resources to use. This plan should be communicated to all staff.
- Install containment and scrubber systems to capture and neutralize chlorine should a Use corrosion-resistant piping, valves, metering equipment, and any other equipment coming in contact with gaseous or liquid chlorine, and keep this equipment free from contaminants, including oil and grease
- Implement a training program for operators who work with chlorine and ammonia regarding safe handling practices and emergency response procedures.

- Provide appropriate personal protective equipment (including, for example, self-contained breathing apparatus) and training on its proper use and maintenance.
- Prepare escape plans from areas where there might be a chlorine or ammonia emission.
- Install safety showers and eye wash stations near the chlorine and ammonia equipment and other areas where hazardous chemicals are stored or used.
- Ventilate enclosed processing areas and ventilate equipment, such as pump stations, prior to maintenance.
- Periodically sample air quality in work areas for hazardous chemicals. If needed to meet applicable occupational health national requirements or internationally accepted standards, install engineering controls to limit worker exposure.
- Prohibit eating, smoking, and drinking except in designated areas.
- Rotate personnel among the various treatment plant operations to reduce inhalation of air-stripped chemicals, aerosols, and other potentially hazardous materials.
- Expired chemicals should be transported by a NEMA licenced waste handler and transported to a NEMA approved site for hazardous waste disposal e.g. Luwero Industries to be disposed of.

8.4.9 Risk of fire from offices

There is a potential risk of accidental fire outbreaks in the building structures (offices, waste water treatment plant and booster station) especially as a result of short circuits. This can lead to significant loss of property and lives. The impact is significant as it is likely to occur with dire consequences if prevention measures are not put in place.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability occurrence	of Overall Assessment
Loss of lives and property	Local	Major	permanent	Likely	Major

Mitigation measures

- The project proponent and the contractor will put in place a comprehensive fire plan to guide the occupants and users of the offices in case of fire outbreak.
- The buildings shall be fitted with fire alarms to alert the occupants of any potential fire outbreak
- All electrical wiring will be carried out by certified electricians.
- There will be installation and proper maintenance of firefighting equipment (fire extinguishers and firefighting water horse pipes).
- Management will carry out annual drills to ensure evacuation plans are effective and are understood by all facility occupants.
- The premises should also have permanently stationed security guards and lighting to ensure security against arson-associated fires.

8.4.10 Transport – Traffic and road safety

During operation, the main activities will be maintenances and making new connections. The new connections and or maintenance activities may cut across some access roads. Currently, all the roads within project area are earth surfaced (Table 5.4) with exception of Nebbi-Arua highway. But in future, these roads may be tarmacked. The excavations for the new connections of maintenance activities across some roads will interfere with their integrity. Unless proper mitigation measures are put in place, new connections and or maintenance activities across and along the roads may interfere with traffic or cause accidents. It's therefore necessary that key precautions be undertaken at such road crossing to avoid accidents and impairing traffic activities.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Interference with traffic and diminished road safety	Within limited area	Very high	Temporary	Possible	Substantial

Mitigation measures

- To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic preferably on weekends.
- The trench excavated across the roads, after laying the pipes should be backfilled with marram, compacted and levelled to the level of the existing road immediately. This is to ensure that the integrity of the road is not affected by the water line construction activities.
- Conspicuous notices shall be well placed on roads and guides on ground shall direct traffic in case of diversions or open trenches.

8.4.11 Health

The Project area has health centers at parishes and sub-counties (H C II & III respectively) and several clinics. Further it was also reported that the area experiences several diseases that are water related diseases. During operation stage, the project will have potential positive and negative impacts in the project area. The impacts are:

Positive impacts

8.4.11.1 Improved health care services through supply of water

The project will extend water to health centers and clinics in the project area. This would result in bringing improved water and sanitation services closer to the people. This impact will be enhanced through:

- a) Ensuring that most of the communities in the project footprint foot-print are connected or have access to the piped water.
- b) Ensuring that operations and maintenance are properly done to avoid issues of water contamination
- c) Ensuring that water is affordable and available all the time

8.4.11.2 Reduction in diseases

The proposed Nyagak water and sanitation project will contribute towards reduction in the prevalence rates of waterborne diseases especially cholera, dysentery and diarrhea. This is because the current water sources are prone to contamination and hence source of water borne diseases. The communities were also optimistic that the initiative would reduce the incidence of people using contaminated water and hence the water borne diseases such typhoid, intestinal worms and cholera that have a high occurrence in the area because of limited access to safe potable water. This is expected since the communities will access clean water for drinking and domestic activities. The project would have significant strategic benefits in reducing the burden on the cost of health care services as diseases could be reduced.

This positive impact will be enhanced if the following are done:

- Ensuring that most of the communities in the project footprint foot-print are connected or have access to the piped water.
- Ensuring that operations and maintenance are properly done to avoid issues of water contamination
- Ensuring that water is affordable and available all the time

The improved health conditions will significantly result in a reduction in health costs and time for collecting water which translates into substantial savings for rural households.

8.4.11.3 Improved health in the area

Community engagements concluded that the project would enhance safe water coverage which would in turn improve the health of the area Infant mortality rate of the project area is estimated at 53/1000 individuals. With Safe drinking water, personal/household hygiene and improved sanitation infant/child morbidity and mortality would be reduced. Communities of the project area also recognized the role of safe water in reducing child mortality rates. The marginal price of improved hygiene and sanitation promotion would make them cost effective health interventions. Therefore, extending piped water would reduce such risks. This impact will be enhanced through the following:

- Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
- Ensuring that water is affordable and available all the time

8.4.11.4 Improved maternal health

Women in the project area are responsible for domestic chores including fetching water. The Project would therefore result in reduced physical stress and improved health status of pregnant women, thereby reducing miscarriages, maternal deaths, and adverse impacts on fetuses and new-borns. This impact will be enhanced through the following:

- Ensuring that most of the communities in the project footprint are connected or have access to the piped water.
- Ensuring that water is affordable and available all the time

8.4.11.5 Public Health concerns due to labour influx and sanitation

The project is also expected to have some negative impacts in the project area. This is because it is expected to attract various categories of people who will seek employment on project activities during operation of the project. The number of employees during operational phase is expected not to be more than ten (10). The project will obviously lead to establishment of social networks among the locals and the project workers, which can promote the spread of socially transmitted diseases especially Covid-19, HIV/AIDS and other STIs. According to the community, HIV/AIDS scares them most. Pressure on the existing health services is likely to increase. Although not many skilled workers are expected, the impacts of diseases have a multiplier negative effect. Interaction of workers with communities may enhance chances of the impact on health services and the health of the residents is likely to be minor since the number of imported workers for the operation of the water and sanitation project may be less than 10.

When completed, the project will have two 9 stance public toilets in additions to sanitary facilities at offices. The public toilets if not cleaned on a daily basis, provided with water all the time and if septic tank emptying is not done on time, it may become a public health risk in the area. The public health impacts due to sanitary facilities is major if the mitigation measures are not implemented. The overall impact assessment is moderate.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability occurrence	of Overall Assessment
Public Health concerns due to labour influx and sanitation	Local	High	Short –medium term	Possible	Moderate

Mitigation

- The public toilets should have an adequate water storage facility to ensure that water is available 24 hours even when the supply from the main is off.
- The project should provide for provision of adequate hand washing facilities at the public toilets
- The Operator should ensure that the public toilets are clean at all times

- The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.
- All impacts of public health nature shall be mitigated using a well-coordinated approach that must involve health centres in the project area.
- All workers shall be orientated and sensitized about responsible sexual behaviour in project communities.
- The Operator will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).
- Other future epidemics/pandemics shall be handled as per the guidelines of Ministry of Health and World Health Organisation.

For prevention of Covid-19, the following measures shall be adhered to:

- Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites.
- Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces.
- Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands.
- Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated.
- The Developer/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station.
- The physical meetings must be minimized and virtual meetings encouraged.

8.4.12 Education

The engagement with communities indicated that there a number of schools in the project area. Section 5.3.8 presents schools that are within the project area that will benefit from the project. The schools' water access in the project area stands at 61% which is relatively lower and yet water is an important component of menstrual management among others. This presents a constraint to girls and women of menstrual age to access water for their menstruation. This has led to about 60% of the girl pupils absenting themselves from schools during their menstruation period. Further, poor hygiene and sanitation facilities in schools are important factors for high school dropout rates for girls and this is reflected in lower enrolment rates for girls/women in post primary schools' institutions, tertiary and universities leading to gender inequality in education. The project will extend water to some schools and also support the construction of two 9-stance toilet facility in the project area. Therefore, the proposed project would result in bringing improved water and sanitation services closer to the schools and the people at large, support the menstrual management by a girl child, reduce absentism of pupils and enhance enrolment rates of the girl child in schools and hence gender equality in education. This positive impact will be enhanced through:

- Ensuring that most of the communities in the project foot-print are connected or have access to the piped water.
- Ensuring that operations and maintenance are properly done to avoid issues of water contamination
- Ensuring that water is affordable and available all the time

8.4.13 Gender and vulnerable groups

As presented in section 5.2.15, women and children are the ones carrying out most of household activities including fetching water. Therefore, 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). This impact will be enhanced through:

- ensuring that women and girls are given priority while recruiting personnel for the project
- Ensuring the all the households within the project footprint are either are connected or have access to clean and safe water.

8.5 DECOMMISSIONING PHASE IMPACTS

8.5.1 Overview

The Nyagak Water Supply and Sanitation Project has been planned to operate up to 2040 after which a system upgrade may be required. Therefore, for the next 20 years, full scale decommissioning of the project is not anticipated to take place except a site construction decommissioning approach which can be considered at the moment in this study. During construction phase auxiliary facilities like camps shall be established. These facilities might not be aesthetically pleasing to communities or the land onto which they were established was compacted and therefore cannot be re-used for agriculture. Decommissioning of these facilities will depend on whether the host communities want these facilities. In case they want them, the contractor shall enter into a handover MOU. However, if they are not required, the Contractor shall decommission them. The practical decommissioning will for now involve the following:

- Restoration of disturbed sites through levelling and re-vegetation measures;
- Removal of obsolete equipment and associated equipment parts;
- Demobilization and return of imported labour force after the project;
- Grievance management mechanisms with the host communities before site closure;
- Repairs of damaged roads and restoration of access routes and rout deviations;
- Removal of construction debris and unused materials.

- Within 3 months before decommissioning, the operator shall develop a, detailing the following;
- Requirements and procedure for removing equipment and structures from the site,
- Requirements and procedures to restore the site to a useful condition;
- Site investigation to determine contaminated areas and extent of contamination;
- Description of options for remediation of contaminated areas on site, post decommissioning land use, information on how possible socio-environmental impacts will be minimized during decommissioning and measures to protect the public against risk or danger resulting from site conditions prevailing after decommissioning,
- Plan on how decommissioning will be funded.
- The developer shall submit the decommissioning plan to NEMA for approval. Decommissioning shall also have a restoration plan to adequately remediate any onsite contamination and restore site to the maximum extent consistent with anticipated post decommissioning use.
- The Consultant implementing the project will prepare an operation phase ESMP and training of staff who will be running the facility- as part of decommissioning and handover of the site. This will ensure implementation of operation phase measures

8.5.2 Positive impacts of decommissioning

The following positive impacts are associated with the decommissioning phase of the project

8.5.2.1 Site Rehabilitation

Decommissioning of the project support facilities will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual quality of the area.

8.5.2.2 Employment Opportunities

For demolition to take place properly and in good time, several people will be involved. As a result, several employment opportunities will be created for the demolition staff during the demolition phase of the unwanted facilities. The impact will be direct, temporary and minor.

8.5.2.3 Negative impacts of decommissioning

The following three negative impacts discussed below are associated with the decommissioning phase.

8.5.2.4 Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project decommissioning facilities' areas. This will be as a result of the noise and vibration

that will be experienced as a result of demolishing the structures. The impact will be direct, temporary and minor.

Mitigation

Workers shall be provided with adequate protective wear (Ear muffs)

8.5.2.5 Solid Waste Generation

Demolition of the structures will result in generation of solid waste. The waste will contain the materials used in construction including concrete, metal, wood, glass, paints and adhesives. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. The impact will be direct, permanent and major.

Mitigation

Solid waste shall be managed in accordance with the National laws. A licensed waste handler shall be contracted to transport and dispose wastes at a gazette waste disposal facility

8.5.2.6 Generation of Dust

Some dust will be generated during demolition works. This will affect demolition staff as well as the neighbors. The impact will be direct, temporary and minor.

Mitigation

- All workers shall be provided with adequate and appropriate Dust masks
- Communities shall be informed of the plan to decommission and shall be sensitized on potential impacts

8.6 CROSS CUTTING IMPACTS

These are impacts that affect all the phases of the project namely Construction, Operation and decommissioning phase

8.6.1 Health & safety (Accidents and Injuries)

Work at water and sanitation facilities like excavations and lifting of materials is often physically demanding and may involve hazards such as open water, trenches, and slippery walkways, working at heights, energized circuits, and heavy equipment. Work at water and sanitation facilities may also involve entry into confined spaces, including storage tanks, wet wells, and pump stations. Transportation of workers, materials and equipment may also pose serious health and safety risks both to workers and communities.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Accidents and injuries	Within limited area	High	Temporary	Possible	Moderate

Mitigation measures

- Only trained and certified workers shall be allowed to install, maintain, or repair any equipment and tool associated with the Nyagak WSS infrastructure.
- Install railing around all process tanks and pits. Require use of a life line and personal flotation device (PFD) when workers are inside the railing, and ensure rescue buoys and throw bags are readily available.
- Use PFDs when working near waterways (River Nyagak).
- Implement a confined spaces entry program that is consistent with applicable national requirements and internationally accepted standards. Valves to process tanks should be locked to prevent accidental flooding during maintenance.
- Use fall protection equipment when working at heights.
- Maintain work areas to minimize slipping and tripping hazards.
- Use proper techniques for trenching and shoring.
- Implement fire and explosion prevention measures in accordance with internationally accepted standards.
- When installing or repairing mains adjacent to roadways, implement procedures and traffic controls, such as:
 - Establishment of work zones so as to separate workers from traffic and from equipment as much as possible;
 - Limit speed limits of vehicles to 20 km/hour in working areas by installing speed humps as well as signages
 - Use of high-visibility safety apparel for workers in the vicinity of traffic;
 - No works shall be allowed at night
 - Locate all underground utilities before digging.
- All drivers to be employed by the contractor and the developer shall be qualified, skilled with valid driving permits. With an appropriate class depending on the size of vehicles.
- Traffic guides/flag men shall guide traffic and ensure road safety especially where road users are risk of being injured by construction equipment.
- Temporary road signage warning communities of water and sanitation construction works and heavy vehicles turning into/out of main road and sensitive sites shall be used.
- All construction workers shall be provided with adequate Personal Protective Equipment (PPE).
- The Contractor should also develop and implement a health and safety management plan which should be easily available to all workers.

- All company vehicles used in the transportation of construction workers, material and equipment to and away from the site shall be in sound mechanical conditions. Evidence shall always be provided by recording the status of the vehicle in the Daily Vehicle Inspection Form (Annex 4) before usage.
- The Contractor should prepare emergency plans, carry out drills on the usage during emergency events. The drills should be planned and conducted on a regular basis.

8.6.2 Labour Force Influx

Projects of such nature are normally labour intensive and need a multidisciplinary team of workers ranging from professionals, semi-skilled and casual laborers. According to section 2.4.4, about 50-100 workers will be contracted during project implementation. Some Engineers (Mechanical & possibly Civil) will be contracted during project construction and operation. All staff under the contractor or under the Developer need to be procured under well-established working procedures and must be protected from exploitation. On average, an estimated 50-100 people are anticipated to constitute the workforce during project implementation.

Risk assessment matrix

Impact	Extent	Magnitude	Duration	Probability of occurrence	Overall Assessment
Exploitation of Workers	Local	High	Temporary	Possible	Moderate

Mitigation measures

- Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management/redress mechanism for all the complaints including Gender Based Violence (GBV) and Sexual exploitation and Abuse(SEA)
- Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement
- To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly.
- Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff.
- Contractor to have in place a workers' code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behavior
- While recruiting workers especially to fill up the non-skilled nature of jobs such as casual jobs or where skills can be obtained easily on job, the Developer or Contractor shall give the local people first priority.

- In the employment contracts, workers shall be entitled to work for 8 hours beyond which overtime will be paid.
- All workers shall be given appointment letters indicating their obligations as employees.
- All workers shall be entitled to free medical care if the cause of the injury or sickness is as result of working at the distribution line or any activities of the Contractor or Developer.
- All contract workers must be paid as per the contract. All casual laborers must receive a fair pay for the work done.
 - Exploitation of workers and refusal to pay workers is an offence and the contractor must be monitored to ensure that all workers are paid.
 - All workers must be paid promptly and correctly.
 - Workers need to be sensitized of their rights and need to be represented by a mediator in the affected districts through the office of the labour officer.
 - The contractor shall employ an onsite Environment Health and Safety Officer with a Safety Committee in place.
 - The Contractor shall develop and implement a health and safety management plan that at minimum has safety risks and their corresponding mitigation measures.

9 SOCIAL AND ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

9.1 GENERAL CONSIDERATIONS

The Environment and Social management and monitoring plan proposed in section 9.2 specifies mitigation measures and monitoring actions with time frames, specific responsibilities assigned and follow-up actions defined in order to check progress and the resulting effects on the environment by the construction works of the project. Monitoring shall begin right away and shall continue through both the construction stage and through to the operation phase. One important aspect of monitoring shall be to assess the effectiveness of the mitigation measures suggested. Where they are found lacking, appropriate new actions to mitigate any adverse effects shall be undertaken.

Implementations of these measures have to be carried out at different stages of project construction & operation phases. During the detailed design stage, the consultant shall incorporate proposed mitigation measures in the design and tender documents. The contractual agreement shall also include articles to enforce the environmental issues. Construction stage activities are mainly the responsibility of the contractor and that of the construction supervision consultant. The actual physical implementation works are carried out mostly at this stage. The execution of construction works for the proposed Nyagak water and sanitation project shall also equally treat the implementation of the physical works of environmental mitigation measures.

9.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN MATRIX

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
General Provisions									
1	All impacts	All activities in Project Site	All phases	All project sites	<ol style="list-style-type: none"> 1) Achieve full compliance with the national and World Bank safeguards requirements, upon which this ESMP is based, through regularly monitoring and address on-site situations and through applying the relevant mitigation measures. 2) The Environmental Officer can issue penalties, in consultation with relevant authorities, for incidents of non-compliance, and always in liaison with NEMA. 3) Sensitise all Contractors, including foremen, supervisors and labourers in the requirement for and full implementation of the ESMP. 4) Employ an adequately qualified and experienced Environmental and Social Safeguards Officers to ensure environmental and social safeguards requirements are integrated in the design and construction phases of the project. 	MWE	<p>Compliance with all ESMP requirements.</p> <p>Number of non-compliance fines issued.</p> <p>Number and category of workers trained on ESMP implementation requirements</p> <p>Designs and construction activities that are informed by environmental and social requirements</p>	NEMA, MoGLSD, MoLHUD, DWRM, DLGs, DMM	30,000
Specific provisions									
2	Impact on topography (Aesthetics pollution)	Excavations Heaping of excavated soils Erection of structures	Constructi on	At all the project sites	<ol style="list-style-type: none"> 1) Excavated soil shall be heaped for a short time (1-5 days) and re-used for backfilling. In case the soil is not required for backfilling, it shall be ferried to designated waste disposal sites in the project area 2) The affected area shall be restored through landscaping and leaving it to undergo natural colonisation by plants. 3) The materials shall be stored in a way that the height does not cause visual intrusion. Preferably the height should not be more than 2 metres. 	Contractor	<p>Presence of heaped soils that has stayed for more than five days</p> <p>Number of restored sites and their Restoration closure reports</p> <p>The height of of stored materials (Materials whose storage height is less than 2 metres</p>	NEMA, MWE	10,000
3	Susceptibility to soil erosion	Excavations Storage of construction materials	Constructi on	All excavated areas Materials storage areas	<ol style="list-style-type: none"> 1) The construction sites for project infrastructure will be hoarded off to intercept any eroded material and any soil material will remain within the site until it is taken away for proper disposal or used for backfilling to avoid loose soil being washed away by storm water. The Project Contractor should backfill all trenches immediately after laying the pipes and compact such areas as to near level prior to excavation. 	Contractor	<p>Number of complaints from communities</p> <p>Number of temporary storage areas for spoil in a water way</p>	NEMA, MWE, DLGs	14,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<ol style="list-style-type: none"> 2) No spoil soil shall be temporarily placed in water ways. 3) The top soil shall be kept separately so that it is used last in backfilling of the excavated areas. This is to ensure that the living soil (top soil) is available for plant growth in disturbed areas. 4) MWE will also ensure that proper landscaping and vegetation restoration is carried out to further reduce the possibility of soil erosion. Native vegetation must be used for re-seeding the excavated site. 5) The excess soil shall be spread along the trench by the Contractor but in liaison with the local people; special attention would be made not to dispose of such construction wastes in swamps on any sensitive ecosystem. 6) The excavated soil from the pit at the WTP shall be removed from the site every end of the day and disposed of in accordance with the National Environment (Waste) Management Regulations, 2020. 7) Proper storm water drainage facilities (culverts) have to be designed at the various areas along the route to prevent any erosion that may contribute to the increase of suspended solids. 8) Proper storm water drainage facilities (culverts) have to be designed at the various areas along the route to prevent any erosion that may contribute to the increase of suspended solids. 9) There will be controlled clearance of vegetation on only sections that are needed for the road works. 		<p>Disturbed areas that have been properly restored</p> <p>Number of swamps where construction wastes have been disposed off</p> <p>Waste transfer notes for waste soil disposed off at a NEMA approved facility</p> <p>Culverts installed along access roads to key project components</p> <p>The acreage of cleared land for construction of key project components</p>		
4	Exposure to high noise levels	Excavations Machinery operations Vehicular movements	Construction and operation	On all project sites	<ol style="list-style-type: none"> 1) No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. (National Environment (Noise) Standards and Regulations). Workers operating equipment generating noise levels greater than 80 dB over long hours must be given earmuffs; 2) Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate; 3) The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant. 4) Prior to the issuance of hearing protective devices as the final control mechanism, use 	Contractor/ Operator	<p>Noise monitoring records</p> <p>PPE issuance records</p> <p>Number of workers observed without PPE during works</p> <p>Installed Equipment with acoustic insulation</p> <p>Hoarded off working sites</p> <p>Work schedules clearly showing plans</p>	NEMA, MWE, MoGLSD, DLGs	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.</p> <p>5) Periodic medical hearing checks should be performed on workers exposed to high noise levels.</p> <p>6) Sites must be hoarded to curb noise impacts to neighbouring communities.</p> <p>7) Works should be undertaken during day time i.e. from 8am to 6pm.</p> <p>8) Works near schools should be done in periods like weekends in order not to interfere with learning environment.</p>		<p>for working near public facilities and day time</p> <p>Presence of workers not wearing appropriate PPEs</p> <p>Medical check-up reports</p> <p>Number of complaints registered on noise</p>		
5	Impacts on Wetlands	Works along the banks of the river	Constructi on	At the site for water treatment plant and along the transmission line	<p>1) An abstraction infrastructure shall be installed within R. Nyagak. MWE shall apply for and acquire a river bank & lake shore user permit in accordance with the National Environment (Wetlands, Lake Shores and River banks) Management Regulations, 2000.</p> <p>2) No materials/waste shall be dumped in the nearby wetland/river and all the foreign materials introduced during construction period shall be removed and disposed of in gazetted areas</p> <p>3) No auxiliary facilities shall be allowed within 30m of the wetland/river buffer zone.</p> <p>All construction works in Ajai Wild Life Reserve to be cleared by Uganda Wild Life Authority.</p>	Contractor	<p>River bank and wetland user permits in place</p> <p>Number of swamps where construction wastes have been disposed off</p> <p>Distance from the riverbanks where auxiliary facilities are constructed</p> <p>Permit from UWA to work in Aaji game reserve</p>	NEMA, MWE, DLGs UWA	Embedded in the works BOQs
6	Impact on Flora (Loss of vegetation and crops)	Clearance for the right and other project sites	Constructi on	All project sites	<p>1) A RAP shall be developed and implemented by MWE to ensure that affected property is compensated.</p> <p>2) Prior to compensating the affected persons, adequate community sensitization meetings shall be carried out to ensure that the PAPs are aware of the entire program including visitation schedule per village, parish and or sub-county and how each PAP with be contacted and approached for payment.</p> <p>3) The construction of the proposed water infrastructure shall only commence when all the affected farmers have been fully sensitized of the pending activities. Prior to the construction phase, farmers shall be sensitized on the pending project at least 6</p>	MWE for the approved RAP and the Contractor for property destroyed by their activities	<p>Number of complaints registered on destruction of crops and other vegetation</p> <p>Approved RAP report and its implementation report</p> <p>Percentage of PAPs compensated</p> <p>Works undertaken in only the right of way</p>	NEMA, MoLHUD, DLGs, MWE UWA	10,000 But compensati on costs shall be determined by the RAP

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>months in advance such that cultivation under the line and within the water pipe corridor is stopped or reduced. This will give affected farmers ample time to plan in advance so as to avoid going into several negotiations with The Developer at later stage when the contractors have come in to implement the project.</p> <p>4) Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to vegetation.</p> <p>5) When invasive species are encountered, they will be removed and destroyed, for example, by burning. The equipment and cars shall be cleaned to ensure that the construction activities do not contribute to the spread of the invasive species.</p> <p>6) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the crops can regrow in a natural environment. Excess soil, stones and boulders should be dumped in an area that has been approved by the District Environment Officer</p> <p>7) All construction works in Ajai Wild Life Reserve to be cleared by Uganda Wild Life Authority.</p>		<p>that has no incumbences</p> <p>Number and type of invasive species encountered and removed from the project sites</p> <p>Number of disturbed sites that have been fully restored</p> <p>Permit by UWA to work in Ajai game reserve</p>		
7	Impacts on fauna(wildlife, invertebrates, birds, etc.)	Excavations Clearance of the right of way Movement of equipment	Constructi on	Habitats areas	<p>1) Movement of equipment (vehicles, contractors and the entire construction crew) must follow designated pathways or agreed upon access roads. This will avoid unintended damages to fauna.</p> <p>2) The contractor should restore sites where activities will be carried out at all the project sites. The topsoil that will have been removed before pitting the trenches for the pipeline should be put back to cover the trenches so that the mobile fauna is not affected.</p> <p>3) All construction works in Ajai Wild Life Reserve to be cleared by Uganda Wild Life Authority.</p> <p>4) If wild animals are encountered outside protected areas, the Contractor shall notify UWA so that it is picked and taken to a secure place.</p> <p>5) Trenching, pipework laying as well as well as backfilling will be done concurrently. For pits like at the clarifier and the booster pump, the contractor shall ensure that every evening,</p>	Contractor	<p>Number of ungazzated access tracks by vehicles</p> <p>Number of disturbed sites that are restored</p> <p>Permit by UWA to work in Ajai game reserve</p> <p>Number of wild animals encountered and reported to UWA</p> <p>Number of awareness sessions on procedures for managing any wildlife encountered</p>	NEMA, MWE, DLGs UWA	7,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					the pits are covered with timber while being secured with a warning tape.		Number of incidents of animals falling in uncovered pits		
	Impact on Aaquatic biodiversity	installation of water transmission infrastructure Construction of intake infrastructure	Constructi on	At and across and along river, streams and or wetlands	<ol style="list-style-type: none"> 1) Prevent or limit disturbance to water resources during the planning phase. 2) Implement a riparian management zone (RMZ) by keeping safe shelter belts of undisturbed ecosystems around streams. 3) Locate roads, skid trails, and landings away from streams and wetlands. 4) Where appropriate, slash and debris should be stockpiled above the high-water mark to prevent materials from entering streams and wetlands. 5) Restore or rehabilitate disturbed sites to desired ecological conditions prior to completing or decommissioning project operations and facilities. This should include installing water bars on skid trails and restoration of landings (e.g. ripping and seeding to natural vegetation). 6) Suspend water pipes across streams and wetlands on concrete pillars to ensure future disturbance during repairs will not result into further interface with the water resources in these ecosystems. 7) No materials/waste shall be dumped in the nearby wetland and all the foreign materials introduced during construction period shall be removed and disposed of in gazetted areas 8) Access and service roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation 	Contractor	<p>Riparian Management Zone(RMZ) established in water and wetland areas</p> <p>Number of access roads established in streams and wetlands</p> <p>Number of disturbed areas restored</p> <p>Number of streams and wetlands spanned over by the pipeline</p> <p>Number of spoil disposal areas established in wetlands or near streams</p> <p>Number of new access roads opened by the contractor</p>	NEMA, , DLGs, MWE	10,000
8		During water abstraction	Operation	At and around the intake point	<ol style="list-style-type: none"> 1) In order to avoid fish being sucked into abstraction pipe, the pipe should be screened (Screen of at most less than a 100th inch holes) at the suction end to prevent entrance and sucking in of the fish during water uptake. 2) Chemicals and Chemicals containing substances shall be stored in a facility that is leak free to minimize the amount of chemicals entering River Nyagak. (Refer to Annex 11 for more details on chemicals handling). 3) Chemical containing wastes shall not be disposed of directed into the environment but shall be disposed of to a NEMA approved disposal facility using a NEMA licensed waste transporter. 4) Empowering fishermen through provision of incentives for protecting water source e.g. supporting other livelihood programmes 	Operator	<p>Screens installed at the suction end of the abstraction pipe</p> <p>Number and type of fish removed from the suction system</p> <p>Levels of Chemicals detected in the river during water quality monitoring</p> <p>Delivery notes of obsolete chemicals disposed off at a NEMA approved facility</p> <p>Number of fishermen that have benefited</p>	NEMA, MAAIF, DWRM, DLGs, MWE	7000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
							from the livelihood program		
8	Impact on Houses/structures	Site clearance for project infrastructure	Construction	All project areas	<ol style="list-style-type: none"> 1) MWE shall work with local council committees, sub-county committees, Councillors, district land boards, CAOs, RDCs, Politicians and other local leaders to sensitize all people to be affected on the intentions of land acquisition. 2) MWE shall conduct a Resettlement Action Plan (RAP) in accordance with the Land Act and World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12). 3) MWE shall negotiate with land and structural owners in compliance with local market prices and government rates so as to establish rational figures for compensation and resettlement that are in line with the World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12). 4) All sorts of compensation and settlements must be done at least 6 months before structures are demolished. 5) All physically or economically displaced people should be offered an option between either a full resettlement package, including the provision of replacement residential land and a house, or cash compensation in line with the World Bank environmental and social Safeguard Policies especially Involuntary Resettlement (OP 4.12). 6) Any grievances in the course of project implementation shall be addressed in accordance with the grievance redress mechanism presented in Annex 13. 	MWE	<p>RAP report approved by the CGV and the Bank</p> <p>Percentage of PAPs compensated</p> <p>6 months' notification to the PAPs</p> <p>Number of complaints registered</p> <p>Clearly spelled out options for compensation procedures disclosed</p> <p>Grievance log showing status of addressing complaints</p> <p>Number of engagement meetings with stakeholders</p>	NEMA, MoGLSD, MoLHUD, DLGs,	10,000 + compensation costs as detailed out in the RAP report
9	Impact on Water resources and Sanitation	Excavations, sanitation management and equipment servicing	Construction	All project areas	<ol style="list-style-type: none"> 1) The Contractor shall construct a drainage system with silt traps to reduce impacts of storm water from the construction site. 2) All excavated soils shall be used for backfilling immediately after laying of pipes. The heaped soils at deep excavations shall be consolidated in an area with embankments to prevent it from being washed away. 3) Appropriate sanitary facilities shall be installed at the campsite and working gangs shall be provided with mobile toilets that will be maintained and emptied on time. The emptied sanitary waste shall be disposed of at regional NWSC Treatment Plant. 4) Regular servicing of project vehicles shall be outsourced to gazetted vehicle service 	Contractor	<p>Number of complaints from community registered on pollution of water</p> <p>Silt traps in drainage system</p> <p>Spoil soil consolidated with embankments</p> <p>Appropriate and adequate sanitary facilities</p>	NEMA, MWE, DWRM, DLGs, NWSC	12,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					centres (Vehicle maintenance and Servicing companies) either in Noatak or neighbouring districts. No vehicle shall be allowed to be serviced in sensitive ecosystems. The Service centre must present with proof that its fluids such as old car engine oil shall be properly managed		Vehicle maintenance log		
10		Siltation from excavated soils	Operation	Excavated area	<ul style="list-style-type: none"> a) No spoil soil or any other materials shall be dumped or temporary stored in a known drainage system b) All excavated soils shall be used for backfilling immediately after laying of pipes. 	Operator	<p>Number of complaints registered due to siltation of drainage channels, water sources and gardens</p> <p>No excavated trenches are left not backfilled</p> <p>Number of Draining systems with spoil soil</p> <p>Work procedures with an initiative of backfilling the pits immediately after laying pipes</p>	NEMA, MWE, DLGs	10,000
11		water quality and quantity due to WTP operations	Operation	At the WTP	<ul style="list-style-type: none"> 1) Do not discharge any sludge into River Nyagak or any nearby water body 2) Adopt the following pollution prevention & waste reduction mechanisms: 3) Utilize drying beds in separating solids and liquid at the WTP facility. 4) Contract a NEMA approved WTP residual handler to collect hazardous solid wastes for safe disposal; 5) Landfill solid wastes but not close to any surface or groundwater (residuals from WTPs are typically, not hazardous (EPA, 2011a), thus can be landfilled). 6) Do not discharge backwash water into River Nyagak or any nearby water body prior to dechlorinating; adopt mechanisms that lead to: 7) Pollution prevention & waste reduction (resource recovery) at the WTP as a first priority 8) Optimize the filter media by employing filter medium that ensure longer filter run times, thus infrequent backwashing while maintaining or improving on the finished water quality; 9) The Project Proponent shall apply for and acquire a Water Abstraction Permit from Directorate of Water Resources and ensure compliance to the conditions therein 	Operator	<p>Number of complaints registered due to contamination of water</p> <p>Water quality monitoring results with traces of sludge components</p> <p>Water Discharge and abstraction permits in place</p> <p>Deliverly notes of sludge to waste disposal facilities</p> <p>Installed drying beds and in use</p> <p>Water Discharge permit</p> <p>Percentage of wastes re-used or recycled</p>	NEMA, MWE, NWSC, DLGs	10000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
							Contract with a NEMA license waste handler Records of types, quantities of wastes generated and how they are handled		
12		Wastewater and septage collection	Operation	At the sanitation facilities	<ol style="list-style-type: none"> 1) Promotion of collection services, or ensuring that collection services are available, is of primary. 2) Timely collection of sewage should be undertaken to prevent sewage over flows. 3) There should be a system among the communities, their leaders and the health workers to monitor, detect and alert the responsible authorities to call for emptying of any septic tank that poses a danger to the community 	Operator	<p>Number of complaints registered due to overflowing septic tank</p> <p>Number of private sector players involved in septic collection services</p> <p>Number of promotional initiatives implemented</p> <p>Number of sewage overflows from septic tanks reported</p> <p>Emptying and collection schedule and records</p> <p>Contacts of emptying service providers readily available</p> <p>Delivery notes for all emptying and collection done</p>	NEMA, MWE, DWRM, DLGs, NWSC	20,000
13	Impact from waste generation	Construction activities	Construction	All project sites	<ol style="list-style-type: none"> 1) All sorts of waste generated during construction such as HPDE and uPVC offcuts and other accessories associated with water and sanitation projects shall be collected by the contractor and given to recycling facilities. Other forms of waste which are inert or ceramic in nature may be collected by NEMA gazetted waste handlers (Who shall be engaged by the Contractor) and taken to a NEMA gazetted waste disposal facilities for disposal. 2) All organic waste generated at eating places during construction such as food stuffs shall be collected and transported by the contractor to designated landfills for disposal. This activity shall be supervised by the 	Contractor	<p>No Wastes indiscriminately disposed off in the project site observed</p> <p>Sanitary facilities on all project sites</p> <p>Number of complaints on improper waste disposal registered</p> <p>Waste Management plan and records</p>	NEMA, MWE, DLGs	13,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>District Environment Officer and the supervising consultant.</p> <p>3) All plastic waste generated at rented residences for the workers or campsites in the course of work such as mineral water bottles, polyethene bags, jerry cans and cups shall be collected and given/sold either to the local people for re-using or taken for recycling in respective factories.</p> <p>4) The Contractor shall develop and implement a Waste Management Plan that puts into consideration sorting at the source, proper storage and transportation. That will at minimum contain the types, nature and quantities of wastes expected to be generated as well as their corresponding methods of treatment and disposal. The plan shall also indicate the sites of proposal as well as the frequency of collection and disposal.</p> <p>5) Adequate and appropriate sanitary facilities shall be constructed at the campsite while workers along the construction sites shall be provided with mobile toilets that shall be cleaned and emptied promptly.</p>		<p>Number of waste bins on sites</p> <p>Records of quantities of waste collected and recycled or disposed off</p> <p>Waste Delivery Notes after disposal</p>		
14		Water treatment and sanitary facilities maintenance	Operation	WTP and Sanitary facilities	<p>1) Minimize the quantity of solids generated by the water treatment process through optimizing coagulation processes.</p> <p>2) A NEMA approved waste handler should be engaged to collect and dispose of solid wastes to a gazetted NEMA waste disposal facility</p> <p>3) Alternatively, landfill solid wastes but not close to any surface or groundwater (residuals from WTPs are typically not hazardous (EPA, 2011a), thus can be landfilled).</p> <p>4) Regenerate activated carbon such as by returning spent carbon to the supplier.</p> <p>5) Promptly empty the public toilets and toilets at the water office and dispose of sewage to regional NWSC sewage treatment plant.</p>	Operator	<p>MOU with NEMA licensed waste handler</p> <p>Quantities of wastes generated</p> <p>Emptying schedules and disposal records</p>	NEMA, MWE, NWSC, DWRM, DLGs	20,000
15	Impact on transport -Traffic and Road Safety	Excavations across roads	Construction and operation	Road crossings	<p>1) To minimize interference with traffic, digging trenches and piping across roads shall be conducted in hours with less traffic preferably on weekends.</p> <p>2) The trench excavated across the roads, after laying the pipes should be backfilled with marram, compacted and levelled to the level of the existing road immediately. This is to ensure that the integrity of the road is not affected by the water line construction activities.</p>	Contractor and Operator	<p>Number of traffic incidents registered</p> <p>Number of complaints regarding traffic interactions registered by the road users</p> <p>Road traffic signages</p>	NEMA, MWE, UNRA, DLGs, , Uganda Police	5,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>3) Conspicuous notices shall be well placed on roads and guides on ground shall direct traffic in case of diversions or open trenches.</p> <p>4) The contractor will have to notify traffic police in advance and work with it during trenching across high ways and other major roads.</p> <p>5) All drivers to be employed by the Developer or Contractor shall be qualified, skilled with valid driving permits.</p> <p>6) The roads that will be affected by the repaired and restored immediately after laying of pipes</p>		<p>Notifications to Traffic Police</p> <p>Daily reports</p> <p>Number of affected road crossings that are repaired</p> <p>Drivers with defensive driving licenses</p>		
	Impact on public Health	Interaction of workers with communities (Influx of workers)	Design and Construction	All project sites	<p>1) Workers and the community shall be sensitized on protective behaviour and practices during work by distributing appropriate education materials to workers and the surrounding community.</p> <p>2) The Contractor shall develop and implement an HIV prevention and management Plan.</p> <p>3) High risk groups such as the youths especially students shall be continuously sensitized on the dangers of casual sex, consequences of early marriages, teenage pregnancy and monitored to ensure that such groups are not at risk of falling victims.</p> <p>4) The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered.</p> <p>5) Excessive alcohol abuse shall be discouraged as a policy among project construction workers.</p> <p>6) The contractor and subcontractors ought to have adequate sanitation facilities for the workers at both places of residences and at all work places.</p> <p>7) The contractor or subcontractors shall procure a secure and descent accommodation for all staff either through renting the existing structures in the project area or by constructing new houses in consultation with MWE and local authorities.</p> <p>8) All construction workers shall be orientated and sensitized about responsible sexual behaviour, prevention of Gender Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) in project communities.</p> <p>9) The contractors will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s).</p> <p>10) For prevention of Covid-19, the following measures shall be adhered to:</p>	Contractor	<p>Number of incidents related to public health, drunkardness, etc regiered on the project</p> <p>HIV prevention and management plan</p> <p>HIV prevention and management reports</p> <p>Diseases outbreak surveillance and management plan</p> <p>Substance/alcohol; abuse policy</p> <p>Decent accommodation facilities</p> <p>Code of conduct developed and signed by all employees</p> <p>SOPs for Covid -19 prevention</p>	MWE, NEMA, MoGLSD, DLGs,	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<ul style="list-style-type: none"> a) Establish a daily screening protocol for staff and visitors, to ensure that potentially infected staff do not access worksites. b) Regularly clean and sanitize surfaces like desks, doors, printers, vehicles, toilets, and other shared equipment and spaces. c) Establish a hand washing station at the entrance to the worksite and the security MUST ensure that all people accessing the worksite wash their hands. d) Employees and visitors must at all times maintain the recommended social distancing and must not make unnecessary make direct contact with the staff and clients. The Ministry of Health proposal for working in shifts MUST be complied with. In this regard, recommend that a rotational timetable for staff be prepared and communicated. e) The Developer/contractor should provide protection materials i.e. (i) face shields which must be put on all the time when the employees are on duty and (ii) Hand sanitizers to be on every work desk/station. f) The physical meetings must be minimized and virtual meetings encouraged. 				
		Social ills as a result of influx of construction workers(Crime, , HIV risks, Sexual Harrasment, Sexual Exploitation and Abuse and GBV	Constructi on	Along all project sites	<ul style="list-style-type: none"> 1) The contractor shall involve local (LC) leaders in labour recruitment to ensure people hired have no criminal record. 2) Local governments and the contractor shall collaborate with police to contain criminal activities. 3) A register of all construction workers shall be filed with local authorities to aid in tracking cases of child neglect. 4) With the assistance of a competent sub-contractor, the contractor shall draft an HIV/AIDS policy 5) A service provider for professional HIV/AIDS activities shall be procured and engaged 6) The contractors shall put in place worker place committees to oversee implementation of HIV/AIDS control activities. 7) Contractor will provide counseling support and work based positive culture to posttest workers 8) The contractor will provide condoms to all workers free of charge placed in private and areas of confidence. 9) Peer based awareness and counseling shall be instituted within the workforce. 10) All workers (permanent or temporary) will be required ro sign the project code of conduct prior to commencing their assignments. 11) A worker Grievance mechanism shall be established and operated. 	Contractor	<p>Number and category of stakeholders are sensitised on GBV, SEA, SH and responsible sexual behaviour</p> <p>Recommendation letters for workers from LCs</p> <p>Minutes of coordination meetings between the contractor, LCs and Police</p> <p>Workers' register shared with LC</p> <p>HIV prevention policy in place</p> <p>Service provider for counselling engaged</p> <p>Code of conduct signed by all workers</p>	MWE, NEMA, MoGLSD, DLGs, Uganda Police	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>12) Ensure that there is recruitment of (a) service provider(s) to support in prevention (sensitization) and response (referral pathway) activities.</p> <p>13) Develop and implement a SEA/SH action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA/SH action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). The SEA/SH action plan will include how the project will ensure necessary steps are in place.</p>		<p>Workers GRM established and functional</p> <p>SEA/SH Action plan and implementation reports</p>		
		Drug abuse and prostitution	Design and Construction	All project site	<p>1) The contractor shall involve local (LC) leaders in labour recruitment to ensure that people hired have no criminal record.</p> <p>2) The local content provision shall be emphasised to minimize labour requirements needed from outside the community.</p> <p>3) Local governments and the contractor shall collaborate with police to contain criminal activities.</p> <p>4) The Developer together with the Contractor and the Zombie, Nebbi & Madi-Okollo district local governments shall undertake comprehensive awareness to avoid/minimize risks related to drug use and prostitution.</p>	Contractor	<p>Recommendations from LCs for workers</p> <p>MOUs with police/Local Government</p> <p>Percentage of of labour sourced from the community</p> <p>Awareness and sensitisation reports</p>	MWE, NEMA, MoGLSD, DLGs, Uganda Police	5000
		Exposure to high noise	Construction	Construction sites	<p>1) No employee should be exposed to a noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection.</p> <p>2) Workers be provided with the necessary personal protective equipment (PPE) such as ear muffs as found appropriate;</p> <p>3) The use of hearing protection by all the workers should be mandatory. The mandatory use of hearing protection equipment (earmuffs) should be enforced by the management of the Water Treatment Plant.</p> <p>4) Periodic medical hearing checks should be performed on workers exposed to high noise levels.</p> <p>5) Sites must be hoarded to curb noise impacts to neighbouring communities</p>	Contractor	<p>Complaints registered on noise pollution</p> <p>Levels of noise from Noise monitoring records</p> <p>Medical check-up reports</p> <p>Records of PPE issuance</p>	MWE, NEMA, DLGs	10,000
		Exposure to Air pollution and Dust	Construction		<p>a) Construction sites shall be hoarded off to restrict dust to within site boundaries;</p> <p>b) Sprinkle water on vehicle pathways;</p> <p>c) PPE like dust masks shall be availed to workers whenever needed;</p> <p>d) Loose materials like sand that are susceptible to dust generation during haulage be covered with tarpaulin;</p> <p>e) Limit vehicle speed to 30Km/hr on marram roads.</p>	Contractor	<p>Complaints registered on air/dust pollution</p> <p>Levels of air/dust emissions from the monitoring reports</p> <p>Trucks covered with tarpaulin during</p>	NEMA, MoGLSD, MWE , DLGs	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
							transportation Water sprinkling records PPE issuance records Instructions to drivers on speed limit including speed limit signage installed along the haulage routes		
		Interaction of workers and communities during connections and maintenance activities	Operation	Water offices At all project infrastructure	<ol style="list-style-type: none"> 1) The public toilets should have an adequate water storage facility to ensure that water is available 24 hours even when the supply from the main is off. 2) The project should provide for provision of adequate hand washing facilities at the public toilets 3) The Operator should ensure that the public toilets are clean at all times 4) The Contractor shall provide surveillance and active screening and treatment of workers and the community where a communicable disease is discovered. 5) All workers shall be orientated and sensitized about responsible sexual behaviour in project communities. 6) The Operator will develop and follow a code of conduct. The information regarding Worker Code of Conduct will be provided in local language(s). 	Operator	<p>Number of engagement/sensitisation meetings undertaken</p> <p>Complaints registered due to lack of flowing water</p> <p>Hand washing facilities in place</p> <p>A public toilet attendant recruited for cleaning</p> <p>Medical check up for cleaners</p> <p>Code of conduct developed and signed by all employees</p>	NWSC, DLGs, MWE	11,000
	Impact on Education (schools and learning process)	Excavations and pipe laying Construction of the booster station	Construction	Within or near schools	<ol style="list-style-type: none"> 1) Schools shall be sensitized on the need to keep off construction sites. 2) Working schedule shall be consulted with the school administrator to avoid critical quiet hours. The working schedule shall be designed considering the school schedule and any potential adjustments needed to minimize any disturbances to student education and learning performance. 3) Workers to be instructed to observe silence while working across sections of the project and transmission line which are considered nearby schools. 4) The contractor shall not employ any person below 18 years and any pupil or student above 18 shall not be employed during 	Contractor	<p>Number of engagement meetings held with the schools</p> <p>Agreed working schedules with respective schools</p> <p>Complaints from schools registered</p> <p>Code of conduct developed and signed</p>	NEMA, MWE, MoGLSD, , DLGs	Costs of hoarding of construction site already incorporated in civil works BoQs

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>school time. Students above 18 years can be employed only during holidays.</p> <p>5) Workers shall be required to strictly adhere to the code of conduct designed for the project</p> <p>6) The workers shall not be allowed to interface with the students of the affected schools. The Code of conduct that shall be signed by all workers and will have a requirement of workers not interacting with school children.</p>		<p>Child protection policy developed and implemented</p> <p>Records of employees with their national IDs</p> <p>Work procedures for working in and/or near institutions are developed and implemented</p>		
	Impacts on Physical Cultural Resources	During excavations	Construction	At all project sites	<p>1) Structures like shrines and graves if encountered (if any) will be relocated in accordance with the existing rituals and norms of the society. Loss of incomes shall also be compensated for since the owners may take some time without any income from them especially if it's deemed necessary to relocate them far from their original site due to cultural rituals involved. Details of compensation shall be contained in the RAP.</p> <p>2) On discovering evidence of possible scientific, Paleontological, historical, prehistoric, or archaeological remains, the contractor shall notify the Department of Museums and Monuments giving the location and nature of the finds.</p> <p>3) The Contractor shall cease work in the vicinity of the site and request the responsible officer from the Department of Museums and Monuments to inspect the site and make recommendation on possible salvage within 72 hours.</p> <p>4) The Contractor shall exercise care so as not to damage artefacts or fossils uncovered during excavation operations and shall provide such cooperation and assistance as may be necessary to preserve the findings.</p> <p>5) The department of Museums and Monuments is located in Kampala, Kamwokya just before Uganda Wild Life Authority on the road to Ntinda (Kira road). The Commissioner Uganda Museum can be contacted on +256 772485624. A detailed chance find procedure has been presented in this report.</p> <p>6) To mitigate damage to archaeological resources, it is proposed that the construction foremen will inform construction crew to be aware of the possibility of discovering fossils or archaeological remains, what form these would take (bones, fossils in rock, shards or pottery, arrow heads etc.) and the procedure to be followed shall be as stated above.</p>	Contractor	<p>Number of complaints on PCR registered</p> <p>Notifications to DMM</p> <p>Proof of payments for the relocation</p> <p>Number of incidents when works stop due to PCR</p> <p>Training records on CFP</p> <p>PCR avoidance procedures</p>	NEMA, MWE, MoGLSD, DLGs, DMM	6,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					7) The contractor shall develop and implement avoidance procedures. In the event of human remains, there shall be no further excavations or disturbance of the site until the responsible police authorities have been informed.				
	Impacts on land	Sites clearances	Constructi on	All project sites	<ol style="list-style-type: none"> 1) MWE shall engage all affected land owners and obtain consent before their land is used as water transmission corridor/way leave for the proposed Nyagak water and sanitation project. 2) Where the landlords object using their land without any compensation, MWE shall obtain an alternative route for the proposed water pipes. 3) All land acquired for establishment of the water treatment plant, transmission pipes, reservoir tanks and any other activity either by the developer or contractor shall be compensated for in accordance with land Act and World Bank Environmental and Social Safeguard Policies. The compensation for married couple should be done after the wife has consented. This is aimed at promoting gender equality given that in the area, women rarely own land. 	MWE	<p>Number of land owners engaged</p> <p>Number of PAPs that sign the consent forms</p> <p>Number of PAPs compensated for the land taken up by project components</p> <p>Complaints related to land take registered</p>	NEMA, MoLGSD, MoLHUD, DLGs	Sensitisation costs already imbedded in sensitisation budget and the cost of compensation to be determined by RAP
	Impact on gender vulnerable groups (Women, children, etc.)	Employment Compensation Sexual relationships	Constructi on	All project sites	<ol style="list-style-type: none"> 1) Workers will be sensitized on their sexual rights. MWE shall Work with the contractor on establishing zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). 2) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences. 3) To the extent possible, there will be gender sensitivity in task allocation; 4) The contractor shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others 5) A child protection plan will be developed by MWE and provided to all the contractors and school management to discourage the contractors from using children as labourers. In addition, contractors will be required to avoid employing workers who are below eighteen years old. They will also be required to keep records that show the ages of their workers. 6) Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 611. The existence of the hotline can 	Contractor	<p>Number of compliants related to gender and other vulnerable groups</p> <p>Number workers sensitised on their sexual rights</p> <p>Number of sensitisation on social protection requirements undertaken</p> <p>Atleast 30% of the workforce are women</p> <p>Number of workers sensitised on gender, children and other vulnerable groups requirements</p> <p>Number of complaints registered</p> <p>Child protection Policy and implementation reports</p>	NEMA, MWE, MoGLSD, DLGs	<p>Social Development Expert already catered for in 2 above.</p> <p>20,000</p>

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					<p>be displayed throughout near the construction site and in the community at large.</p> <p>7) The contractor shall ensure that mechanisms for close monitoring of worker's behaviour/conduct are in place e.g. contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behaviour by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behaviour.</p> <p>8) MWE and the contractor shall ensure that all local leaders and women/child representatives are fully oriented to the labour force related risks for children engaging in construction related activities.</p> <p>9) Talks with the contractor and his workforce by relevant guests (including the police) on child protection shall be encouraged and appropriately scheduled, including continuous popularization of the child help line 611. Parents/guardians shall be sensitized and held accountable for children leaving and arriving home before dark.</p> <p>10) Any person involved in child abuse shall be dealt with in accordance with the law.</p> <p>11) There will be a Specialist (Social Specialist) to oversee gender mainstreaming in the project.</p> <p>12) Workers will be informed about national laws and funder's policies that make sexual harassment and gender-based violence a punishable offence which is prosecuted;</p> <p>13) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination);</p> <p>14) The contractor, where a case arises, will cooperate with law enforcement agencies in investigating complaints about gender-based violence.</p>		<p>National abuse hotline availed to all the workers</p> <p>Number of cases on child abuse, SH and GBV reported to police</p> <p>Orientation plans and reports on child abuse, GBV, SH etc</p>		

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
			Operation	All project sites	<ol style="list-style-type: none"> 1) The Operator will develop and implement zero tolerance policies and codes of conduct related to violence against women and girls (VAWG). 2) All workers shall receive adequate briefing and education on the laws against defilement and other sexual offences. 3) To the extent possible, there will be gender sensitivity in task allocation; 4) The Operator shall conduct gender sensitization to the work force on matters such as gender sensitive communication and on the gender sensitive conduct of workers towards women including putting in place toilets segregated by gender amongst others and; 5) Worker Code of Conduct will be part of the employment contract, and including sanctions for non-compliance (for example, termination); 	Operator	<p>Engagement/sensitisation plans and reports</p> <p>Induction reports on relevant environment and social laws and requirement</p> <p>Policies related to gender developed and implemented</p> <p>Code of conduct developed and implemented</p>	NEMA, MWE MoGLSD, DWRM, DLGs	10000
	Loss of livelihoods	Water distribution	Operation	In the distribution network	<ol style="list-style-type: none"> 1) Sensitise existing water vendors in the area about adapting to the new developments in the area 2) Mobilise the local people and sensitise them about the opportunities presented by proposed project 3) Encouraged Vendors to tender for public water points. 4) Develop and implement a livelihood restoration program for the affected communities 	Operator	<p>No. of sensitization meetings targeting existing water vendors</p> <p>No. of Vendors operating public water points</p> <p>Number of people benefiting from Livelihood restoration program</p>	NEMA, MoGLSD, , DLGs, MWE	Covered under awareness budget
	Fire outbreak	Electrical shocks	Operation	Offices	<ol style="list-style-type: none"> 1) The project proponent will put in place a comprehensive fire plan to guide the occupants and users of the offices in case of fire outbreak. 2) The buildings shall be fitted with fire alarms to alert the occupants of any potential fire outbreak 3) All electrical wiring will be carried out by certified electricians. 4) There will be installation and proper maintenance of firefighting equipment (fire extinguishers and firefighting water horse pipes). 5) Management will carry out annual drills to ensure evacuation plans are effective and are understood by all facility occupants. 6) The premises should also have permanently stationed security guards and lighting to ensure security against arson-associated fires. 	Operator	<p>Fire prevention and management plan</p> <p>Fire suppression equipment installed at the key facility components</p> <p>Wiring certificate for electricals in place</p> <p>Number of fire drills undertaken</p> <p>Presence of security guards</p>	MWE, NEMA, MoGLSD, DLGs,	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
	Chemical exposure	Storage, transportation and use	Operation	At WTP	<ol style="list-style-type: none"> 1) Prudent handling and storage of hazardous chemicals, as described in Annex 11 will help to minimize potential risks to workers. 2) All chemicals shall be transported, stored and handled appropriately and shall have respective material safety data safety data sheets well displayed in the store. In addition, the chemicals storage areas and transportation vehicles shall be well secured with appropriate labels. The project shall construct chemicals storage facilities. During operation, covered vehicles with labels like hazardous substances in transit shall use to transport chemicals 3) Develop and implement a plan for responding to accidental releases. The plan should at minimum include who to contact (communication and reporting), how to act in an emergency and how to mitigate risk (procedures), and what resources to use. This plan should be communicated to all staff. 4) Install containment and scrubber systems to capture and neutralize chlorine should a Use corrosion-resistant piping, valves, metering equipment, and any other equipment coming in contact with gaseous or liquid chlorine, and keep this equipment free from contaminants, including oil and grease 5) Implement a training program for operators who work with chlorine and ammonia regarding safe handling practices and emergency response procedures. 6) Provide appropriate personal protective equipment (including, for example, self-contained breathing apparatus) and training on its proper use and maintenance. 7) Prepare escape plans from areas where there might be a chlorine or ammonia emission. 8) Install safety showers and eye wash stations near the chlorine and ammonia equipment and other areas where hazardous chemicals are stored or used. 9) Ventilate enclosed processing areas and ventilate equipment, such as pump stations, prior to maintenance. 10) Periodically sample air quality in work areas for hazardous chemicals. If needed to meet applicable occupational health national requirements or internationally accepted standards, install engineering controls to limit worker exposure. 11) Prohibit eating, smoking, and drinking except in designated areas. 	Operator	<p>Number of incidents of chemical exposure</p> <p>Chemicals Management Plan</p> <p>Emergency Response Plan</p> <p>Training records on chemicals management</p> <p>Emergency showers in place</p> <p>Containment and scrubber systems installed</p> <p>Working schedule</p> <p>PPE issuance records</p> <p>Number of employees found without appropriate PPEs.</p> <p>Emergency Safety showers installed</p> <p>Air quality monitoring records from areas where chemicals are used</p> <p>Designated areas for eating</p> <p>Rotational schedules for workers handling chemicals</p>	NEMA, MoGLSD, MWE, DLGs	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					12) Rotate personnel among the various treatment plant operations to reduce inhalation of air-stripped chemicals, aerosols, and other potentially hazardous materials.				
	Decommissioning phase impacts (Noise and vibration, Solid waste generation and Dust)	Demolition of structures and levelling	Decommissioning	At sites where decommissioning is taking place	<ol style="list-style-type: none"> 1) Workers shall be provided with adequate protective wear (Ear muffs and dust masks) 2) Solid waste shall be managed in accordance with the National laws. A licensed waste handler shall be contracted to transport and dispose wastes at a gazette waste disposal facility 3) Communities shall be informed of the plan to decommission and shall be sensitized on potential impacts 	Contractor	<p>Number of complaints on restoration process registered</p> <p>Approved decommissioning plan</p> <p>No wastes are left on site</p> <p>Number and category of community members engaged</p>	MWE, NEMA, MoGLSD, DLGs	20,000
	Occupational health and safety of workers	Lifting, working at heights, transportation etc.	Construction and Operation	All project sites	<ol style="list-style-type: none"> 1) The contractor should have in place a Health and Safety Policy and Action Plan, addressing workers' occupational health and safety issues, workers' welfare and working conditions in line with the Occupational Health and Safety Act of 2006, and World Bank Group EHS general Guidelines, and the EHS guidelines for water projects 2) The Contractor should have HSE induction sessions for all workers, and undertake daily tool box meetings prior to works, including work at heights 3) Ensure adequate provision of PPEs (gloves, safety shoes, safety belts, overalls and goggles), as well as continuous awareness on the need for use of PPEs and enforcement of usage 4) Ensure good housekeeping practices on site (have all equipment, materials, containers well stacked or stored) to avoid trips and falls on site 5) The movement of hazardous liquid chemicals will be done on drip trays to avoid spillage to the ground 6) All workers on sites should be well trained on the risks and their tasks 7) Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment. 8) First aid facilities should be provided on site and accessible to all personnel. It should among others contain rubber gloves, bandages, pain killers and cotton wool to cater for minor accident victim. 9) Fence off equipment storage areas and camp sites to discourage idlers to the sites 	Contractor and Operator	<p>Number of Safety Inductions undertaken</p> <p>Number of safety incidents registered</p> <p>Number of complaints on health and safety registered</p> <p>Workers observed on sites with appropriate and adequate PPEs</p> <p>PPE issuance records</p> <p>Traffic Management Plan</p> <p>Training records for workers</p> <p>Records of safety drills</p> <p>Fenced material storage areas and camp sites</p> <p>First aid box and facilities available at worksites</p>	NEMA, MoGLSD, MWE, DLGs	10,000

No.	Environmental/ Social Impact	Activity	Project Phase	Impact Location	Mitigation Measures	Responsible Party for implementation	Monitoring indicators	Responsible Party for Monitoring	Annual Cost (USD)
					10) The contractor and Operator to have in place a traffic management plan, and guidelines for drivers to avoid accidents.				
	Labour issues and employee conduct	Employment Interrelations among workers and communities	Constructi on and Operation	All project sites	<ol style="list-style-type: none"> 1) Contractor to have in place a Labour Force Management Plan, in line with the Labour Act and OHS Act. Labour Force Management Plan to address issues of workers' welfare, child labour, workers code of conduct, sexual harassment among workers, compensation in cases of accidents, payments and contracts, a grievance management mechanism 2) All workers to have contracts 3) Persons seeking employment will have to be screened, including references from the local Council Chairpersons of their villages of origin before engagement 4) To mitigate negative impacts arising from recruitment of labour from distant places, the contractor should hire local labour mainly. 5) Both men and women will be given equal employment opportunities and that there will be fair treatment and non-discrimination among staff. 6) Contractor to have in place a workers' code of conduct to address abuse of women and girls that may lead to broken marriages, early pregnancies, sexual exploitation, spread of HIV/AIDS and all kinds of risky and inappropriate behaviour. 	Contractor and Operator	Number of complaints from workers registered Number of Workers with contracts Percentage of workers recruited from the project area Workers code of conduct signed Workers Grievance Management Committes established and functional Policy on gender equality developed and implemented Recommendations from LCs for workers	NEMA, MWE, MoGLSD, DLGs	10,000
16.	Project delays due to complaints	Formation of Grievance Redress Commitees(GRCs) Training of GRCs Faciltation fo GRC	Pre-constructio n Constructi on	All project sites and at the district level	<ol style="list-style-type: none"> 1) GRCs shall be formed at the village and district levels in the project area 2) All GRCs shall be inducted/trained on the requirements for the project, their role in grievance management, handling and process procedures for handling Grievances 3) GRCs shall be facilitated with Grievance Register books, refreshments during their meetings and any other facilitation deemed necessary for successful management of complaints 	MWE	Functional GRs in place Reports on GRC formation and induction/training Grievance Register Books issued to all GRCs Minutes of GRCs meetings Percentage of complaints resolved by the respective GRCs	NEMA, MWE, MoGLSD, DLGs	30,000
	TOTAL								420,000

9.3 PENALTIES FOR NON-COMPLIANCE

Where actions have resulted in significant environmental and/or social impacts, with no remedy action been shown, a penalty mechanism and/or stop work order can be used against the Contractor for causing environmental and social harm. It should be specified as early as bidding for the construction work that high E&S performance is mandatory and non-compliance will be dealt with through the issuing of non-compliance fines, with no claims allowed for lost time by the Contractor. This will ensure that Contractors take E&S compliance seriously and conduct all work within the specified guidelines of the ESMP. Failure to do so, resulting in fines and/or stop work orders, will show that full E&S compliance simply makes for better profits; it certainly supports better environmental and social governance, enhances positive benefits and reduces the risks and realisation of negative project impacts.

9.4 E&S ACTION PLANS AND METHOD STATEMENTS

Action Plans from the Contractor will be required for overall E&S management and provides a framework under which all E&S tasks will be implemented by the Contractor. Action Plans will indicate what further plans/programmes the Contractor has compiled to manage, for instance, HIV/AIDS, gender equality, gender-based violence and the abuse of children, amongst others. Method Statements from the Contractor are more specific will be required for specific sensitive actions on request of the authorities, EO and/or E&S Supervising Consultant/s. A Method Statement describes how sensitive area work takes place, is a dynamic document in which modifications are negotiated between the Contractor and E&S Supervising Consultant/s during the construction phase, as construction works progress.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the E&S Supervising Consultant to understand the Contractors intentions and methods. This will enable them to assist in linking mitigation measures, which would reduce environmental and social impacts during the execution of these construction activities. For each instance wherein, it is requested that the Contractor submit a Method Statement to the satisfaction of the E&S Supervising Consultant, the format should clearly indicate the following:

- Description of the activity to be undertaken;
- Detailed description of the process of work, methods, equipment and materials storage and movement to work sites;
- Description/sketch map of the locality of work;
- Sequence of actions with commencement dates and completion date estimates;
- Management of any emergencies, like contamination and spills, if they should occur; and
- Other relevant details that shown how E&S risks will be managed.

The Contractor must submit E&S component specific Action/Management Plan/s and Method Statement/s prior to commencement of any particular construction activity, and work may not commence until these have been approved by the EO and E&S Supervising Consultant/s. Modifications to the Methods Statement must be communicated to the E&S Supervising Consultant. However, approval of the Methods Statement/s or E&S component specific contractor management plane does not absolve the Contractor from other or additional obligations or responsibilities as contained in the terms of contract, the ESMP and their E&S Action Plan.

For this project, Methods Statement/E&S specific contractor management plan that shall be required are:

- **Influx Management Plan**

While project-induced influx can benefit the project and host communities (e.g., by increasing business opportunities, improving the availability goods and services, and offering employment to locals), the influx can pose significant risks and impacts. If not carefully managed, labour influx can negatively affect public infrastructure, utilities, public services, housing, health, food security and social dynamics in the project area, especially in rural, remote or small communities, which typically have less absorptive capacity than a large urban environment. The Plan will detail measures aimed at: a) avoiding or reducing negative influx impacts and enhancing positive impacts in the project area of influence; and b) providing capacity building for Contractor, local government and communities to help them cope with project-induced in-migration.

- **Labour 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.

- **Explosives and Blasting Management Plan**

The project construction activities will require considerable amounts of gravel. In order to quarry this material, explosives will be employed as a primary means of breaking the rock from designated sources. The purpose of the Explosives and Blasting Management Plan is to describe how the Contractor will integrate safe use of explosives into quarrying operations while minimizing environmental and social impacts. The objectives of the Explosives and Blasting Management Plan are as follows:

- Ensure that handling of explosives is done in a manner that will minimize the possibility of accidents or incidents;

- Provide guidance on explosives management for the Project;
- Prescribe procedures for safe blasting;
- Ensure that infrastructure for explosives storage is compliant with all applicable regulations;
- Prescribe safe and environmentally sound measures for disposal or destruction of explosives;
- Prescribe procedures for dealing with spills of explosive materials; and
- Elaborate the chain of responsibility for explosives management.

Permits required for the use and storage of explosives will be obtained prior to quarrying. The permits and licenses required are listed below;

- Permit for Use of Explosives (Renewable yearly) – Required under the *Explosives Act*,
- Explosives Magazine License (Renewable yearly) – Required under the *Explosives Act*,
- Explosive Transportation Permits – Required under the *Explosives Act*,
- Blasting Certificate – Required under the Occupational Health and Safety Regulations.

- **Traffic Management Plan**

The major purpose of the Traffic Management 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 of the project. It will outline traffic control and traffic management procedures to prevent potential hazards associated with road use during construction. Any 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 should include a road safety awareness program.

- **Security Management Plan**

The Plan will provide guidance and requirements on safety and security for the Project. It will identify potential security risks present during the construction phase, methods and actions to mitigate these risks, and the requirements to ensure the highest levels of safety and security in the implementation of the Project. It will, therefore, set out commitment of the Project to security under the project. MWE will not sanction any use of force by direct or contracted workers in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat. MWE will (a) make reasonable inquiries to verify that the direct or contracted workers retained by the Contractors to provide security are not implicated in past abuses; (b) train them adequately in the use of force and appropriate conduct towards workers and host communities; (c) require them to act within the applicable law and Bank ESF; (d) MWE will review all allegations of unlawful or abusive acts of security personnel, take action to prevent recurrence and where necessary report unlawful and abusive acts to relevant Authorities such as the Police, Local Councils, District Local Governments; (e) MWE shall require that all deployed Security personnel sign a Code of

Conduct to make behavioral commitments; (f) MWE shall require establishment of a clear and accessible Grievance Redress Mechanism handle complaints from both the Workers and the host community; (g) Establish coordination and reporting arrangements between the Project Security and the Public Security Agencies; and (h) Put in place appropriate site access and control measures such as fencing of facilities, installing manned gates, surveillance cameras etc.

- **Noise Control Plan**

The noise sensitive receptors mainly include schools and residential areas located within less than 100 m from the direct project footprint. Workers exposed to construction noise are sensitive receptors as well. The Noise Control Plan will consolidate the noise control mitigations and methods to be compiled by the contractor while undertaking activities leading to noise impacts. The objective is to mitigate noise nuisance and disturbances to other public/ socio-economic activities and land uses sensitive to noise. It will be a requirement in the plan that construction activities will be prohibited between 10pm and 6am in residential areas. Also, when operating close to sensitive areas (within 250m) such as residential, schools or medical facilities, the contractor's working hours shall be limited to 7am to 6pm.

- **Air Quality and Dust Control Plan**

This plan will detail the actions to be taken to mitigate dust generation and air emissions associated with construction works. It will identify the sources of air pollution, the predicted levels in the ESIA, the sensitive receptors, management actions and details of the air quality monitoring program. The objectives of the Plan are as follows:

- To minimize the nuisance impact on surrounding communities of dust generation during construction activities;
- To minimize potential risks from dust generation;
- Identify all possible air pollution sources related to construction activities as well as actions to minimize emissions into air.
- Ensure there is regular monitoring and reporting of air quality aspects.

- **Erosion and Pollution Control Plan**

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 several soil erosion and drainage impacts, such as, siltation and water stagnation that could be experienced in the direct project area. It is recommended that the Contractor includes a comprehensive Erosion, Sedimentation & Pollution Control Plan Checklist.

- **Waste Management Plan**

The Waste Management Plan should include the following:

- Waste sources and streams
- Management Hierarchy (3Rs)
- Practices (collection + storage + disposal) for non-hazardous waste
- Practices (collection + storage + disposal) for hazardous waste
- Logistics (bins, etc.)
- Permitting requirements
- Monitoring + Reporting (KPIs)

The Contractor will implement waste management measures and practices throughout the construction period to mitigate risks. The Contractor shall undertake measures to respond to all generated categories of wastes i.e. solid wastes (food residues, metal scraps, bottles, plastics, polythene sheets, wood pallets, papers, faecal matter and other parking materials), construction wastes such as rejects/offcuts of bricks, steel reinforcement, nails, iron sheets, timber among others and liquid wastes (waste oil, wastewater, urine etc.). 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.

- **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 that he will 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.

- **Emergency Response Plan**

The Emergency Response Plan (ERP) will cover the required actions for all situations that could generate emergency situations during the project's construction phase. The ERP will provide guidance to manage emergency events during different stages of construction. It will include general guidelines and procedures for the management of emergency events including emergency management command structure and mechanisms for incident reporting and investigation.

- **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. The contractor is expected to also come up with a Gender Management Plan (GMP). The GMP will cover gender related aspects, such as GBV risks at community and worker's level, Sexual Harassment to protect women workers as well as community members, mitigation measures, responses and who is in charge of different actions, show aspects of gender division of labour in terms of equality and equity, gender segregation (for example female workers having separate toilets and changing rooms from male workers), gender working conditions, provision of job opportunities where the contractor identifies areas where ladies are given high opportunities such as cleaning, human resource positions, working in laboratories, flag ladies among others. The GMP should show gender sensitivity and show a clear code of conduct. The GMP should also provide a checklist to help identify whether the project is gender complainant.

- **Site Restoration/ Decommissioning Plan**

At the end of construction activities, the Contractor shall ensure restoration of the disturbed natural sites through environmental rehabilitation, backfilling and restoring topsoils, (re-) introduction of genetic species (e.g. natural re-grassing) similar to those destroyed in order to re-establish the natural local ecology. The decommission phase will focus on any of the following as applicable:

- Workers' camp
- The parking/ equipment yards
- Material stockpile areas
- Access roads
- Quarries and borrow pits

Specifically, the process of rehabilitating and restoring the site shall follow the following sequential approach:

- All facility structures shall be demolished; the rubble/debris shall be used for fill purposes or taken to an approved disposal site;
- All equipment, vehicles, trucks and machinery shall be removed from sites;
- Makeshift access roads shall be closed, scarified and revegetated
- Backfilling all openings with soil and leftover overburden
- Planting fast-growing trees and grasses to stabilize excavated areas with native species;
- Fencing off the re-vegetated areas should be provided until the reinstated vegetation has reached maturity

Joint site inspections will be conducted to ensure site restoration before handover of the project in order to assess the progress of restoration activities. They will constitute the Contractor, MWE, Supervision Consultant and the District Environment Officer.

Progressive restoration should be encouraged throughout project implementation, especially for the exhausted materials areas/sites, including parts of quarries, etc. Thus

need for restoration plans to be prepared in advance and where necessary approved by NEMA and other responsible statutory bodies.

- **Stakeholder Engagement Plan and Information Disclosure**

- Environment and Social Safeguards requirements recognize the importance of open and transparent engagement with project stakeholders. Success of any project is hinged on level and quality of stakeholder engagement which is an inclusive process expected to occur throughout the project life cycle. Engagement is more useful when introduced in the early phases of project development and is mainstreamed into all levels of decision-making.
- Under Stakeholder Engagement and Information Disclosure, the following scope is envisaged:
 - Stakeholder identification and analysis: This requires the identification of key project affected parties and those with interests in the project. At this level emphasis is on vulnerable people or groups of people whose situation are likely to be accelerated by project implementation. Identification should be able to bring out different sets of affected people and their interests.
 - Stakeholder Engagement Plan: A Stakeholder Engagement Plan (SEP) shall be drafted in consultation with the Bank. The SEP will be disclosed at all appropriate levels to afford all affected and interested have inputs into project design and implementation.
 - Information Disclosure: The borrower is obliged to undertake timely and effective disclosure of information regarding the project including its purpose, nature, scale, potential risks and impacts on the local communities and further present possible mitigation measures.
 - Meaningful Consultations: Consultation is meaningful if a dialogue exists, communities and individuals should be given an opportunity to interact with respect and dignity. Interactions should be based on prior disclosure of project relevant information to all parties.
 - Engagement during project implementation and external reporting: Continuous interaction with project affected persons throughout the project lifecycle is key for successful implementation of the project. Project affected Persons shall be availed all relevant information using appropriate means to enable them reach an informed decision.
 - Grievance mechanism: A grievance mechanism is expected to guide the resolution and management of concerns, complaints and issues that may arise during the entire project life cycle. The GRM will be proportionate to identified potential risks and impacts.
 - Organisational capacity and Commitment: MWE shall define clear roles, responsibilities and authority and further designate properly skilled personnel to be responsible for implementation of specific stakeholder assignments.
 - Prior to construction activities, and in pursuit of timely, meaningful and appropriate stakeholder engagement, the contactor shall develop a clear strategy for stakeholder

engagement to assist in managing and facilitating engagement through the construction activities. The SEP at this stage will be guided by that developed by the borrower at the project planning stage. This stakeholder engagement plan will adopt an inclusive perspective. The SEP will inform on-going stakeholder engagement through the various stages of construction, decommissioning and the defects liability period.

9.5 INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

The Project will be implemented by MWE through its regional entities (WMZs, WSDFs) in close collaboration with Zombo, Nebbi & Madi-Okollo District local governments and their partners (e.g. private sector operators). To facilitate integration within the sector, MOU/MOUs outlining joint responsibilities will be signed between the MWE, respective district local governments and entities responsible for specific activities (e.g. Districts).

The Project's primary stakeholders are the: a) MWE through which the project will be implemented in coordination with its relevant departments (e.g. DWRM, DWD, DEA); ii) Zombo, Nebbi & Madi-Okollo District Local Governments iii) and local communities and consumers who will participate in project planning, and benefit from the outputs and outcomes of the project. The MWE currently has adequate Environmental and Social Safeguards staffing for the ongoing projects. However, with more planned, the environment and social safeguards teams will need further reinforcement with at least 1no. Social Safeguards Specialist, 1no. Environmental Safeguards Specialist, 1no. Health and Safety Expert. These experts will be supported by a similar structure of expertise from the Supervision Consultant and the Contractor. Zombo, Nebbi & Madi-Okollo District Local Government have Environment Officers and Community Development Officers who will be involved in project monitoring and supervision.

9.5.1 Roles and Responsibilities in the ESMP Implementation

Ministry of Water and Environment will coordinate with NEMA on ensuring that environmental and social issues are addressed effectively throughout the lifecycle of the Project. Implementation of the different environmental issues is done through the relevant government institutions (Lead Agencies) within whose mandate the respective issues lie. The role of NEMA is to coordinate the input by all the different lead agencies and ensure compliance with the National Environmental Policy and Law. The monitoring team/ institutions shall be required to report on a quarterly basis. The reporting metrics shall include among others accident and incidents, compliance with ESMPs, challenges and how to address the challenges.

Implementation of the ESMP will involve multiple institutions at all levels as detailed out below in Table below.

Table 9.1 Institutions involved in safeguards management of the project

Ministries and Departments	Mandates/Responsibilities
The Ministry of Water and Environment (MWE)	The Ministry of Water and Environment (MoWE) has the overall mission: to promote and ensure the rational and sustainable utilization, development and effective management of water and environment resources for socio-economic development of the country. The ministry has three directorates: Directorate of Water Resources Management (DWRM), Directorate of Water

	Development (DWD) and the Directorate of Environmental Affairs (DEA). MWE shall take lead on implementation of the project and shall ensure all recommendations contained in the mitigation plan are implemented.
Ministry of Local Government -MoLG	The Ministry is mandated to carry out a number of responsibilities in the Local Government Act as follows: to inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments; to coordinate and advise Local Governments for purposes of harmonization and advocacy; to act a Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Parastatals, Private Sector, Regional and International Organizations; and to research, analyze, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments. Zombo, Nebbi & Madi-Okollo DLGs fall under this Ministry and will be supervised and supported by MoLG.

STATUTORY AGENCIES

National Environment Management Authority (NEMA)	<p>NEMA retains its mandatory role of coordination, supervision and monitoring environmental issues. As for the implementation of the ESIA process, NEMA's role will involve coordinating the review of the ESIA's of the planned interventions with relevant line agencies. Other lead agencies that would participate in the review are the Ministry of Local Government and local governments.</p> <p>Specifically, the Environmental Monitoring and Compliance Department of NEMA is responsible for the review and approval of ESIA's, post-implementation audits and monitoring of approved projects. Although project sponsors have a responsibility for monitoring their own activities, NEMA carries out its own monitoring largely through District Environmental Officers and environmental inspectors at NEMA's head office/ Lead Agencies.</p>
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DIRECTORATES

Directorate of Environmental Affairs (DEA)	The DEA is responsible for environmental policy, regulation, coordination, inspection, supervision and monitoring of the environment and natural resources as well as the restoration of degraded ecosystems and mitigating and adapting to climate change.
Directorate of Water Development (DWD)	The DWD is responsible for providing overall technical oversight for the planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Private Operators and other service providers.
Directorate of Water Resources Management (DWRM)	The DWRM 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.

DISTRICT	
District Environment Officer (DEO)	The functions of the District Environment Officer is amongst others, advice the district Environment committee on all matters relating to the environment amongst others.
District Environmental Committees	The functions of the District Environment Committees include: to act as a forum for community members to discuss and recommend environmental policies and bye laws to the District Council and advice the District Technical Planning Committee, the District Council and NEMA on environmental management issues in the district.
NGOs	The NGOs working in the sector are coordinated at the national level through UWASNET, Uganda Water and Sanitation NGO Network an umbrella organization, which has been largely funded by sector development partners through MWE.
Water Management at District Level	They receive funding from the center in the form of a conditional grant and can also mobilize additional local resources for water and sanitation programs. Local Governments, in consultation with MWE appoint and manage private operators for urban piped water schemes that are outside the jurisdiction of NWSC.
COMMUNITY	
Beneficiary Communities	The Communities will participate in planning and implementation of the rural water supply and sanitation project. A water user committee (WUC), which is sometimes referred to as a Water and Sanitation Committee (WSC) shall be established at each water point. Being the primary beneficiaries of the project, the community will be made to participate fully in all aspects of the program including project identification, preparation, implementation, operation and maintenance.

The goal of the IWMDP is to the maximum extent possible utilize existing institutional structures and capacity within the MOWE and NWSC to implement the Project. In order to successfully implement the ESMP, it is important to ensure that target groups and stakeholders who play a role in implementing it are provided with the appropriate and continuous Environmental and Social Safeguards capacity development.

The key institutions/group of people whose capacity needs to be enhanced to effectively implement and monitor the ESMP of this project are:

- Beneficiary Communities: There is a need to carry our training and awareness trainings for the key community members on the safeguard's aspects of the project through community policing and reporting.
- Staff of the respective District Local Governments: The staff at the district level needs to be trained on key aspects of the project. They also need to be facilitated to enable them effectively monitor the ESMP implementation process.

There is a need for the project to foster inter institutional monitoring of the implementation of the project's ESMP. An interinstitutional monitoring committee should be formed, trained and

their activities facilitated. A capacity building plan should be developed after instituting institutional monitoring committee.

9.5.2 Roles of the Contractors during Project Implementation

All contractors hired to undertake project civil works shall be required to develop a Contractor's ESMP which will include among others the following aspects: the initial sub-project ESIA approved by both NEMA and World Bank, Health and Safety Management Plan, Traffic Management Plan, Waste Management Plan, Equipment Yard Management Plan, Labour Influx Management Plan which shall also include Code of Conduct for Workers, Construction Materials Acquisition Due Diligence Procedure, etc. The Contractors shall hire the following key staff to undertake project implementation: Project Manager, Environmental Specialist, Sociologist and a Health and Safety Officer. The contractor shall be required to submit a monthly safeguards report. The reporting metrics shall include among others accident and incidents, compliance with ESMPs, challenges and how to address the challenges.

9.5.3 Capacity Building in Environmental & Social Aspects of the Project

The goal of the IWMDP is to the maximum extent possible utilize existing institutional structures and capacity within the MOWE and NWSC to implement the Project. In order to successfully implement the ESMP, it is important to ensure that target groups and stakeholders who play a role in implementing it are provided with the appropriate and continuous Environmental and Social Safeguards capacity development.

From the assessment, MWE and NEMA has safeguards personnel that have some level of capacity in terms of equipment and training in environmental management and monitoring. However, the assessment ascertained that the beneficiary communities and District Local Governments do not have sufficient capacity in terms of equipment, personnel and funds to monitor the implementation of the project. The contractors may also need awareness and training in the environmental and social aspects of the project. The ESMF also recommended capacity building in environmental management at the district and sub-district levels and refresher training at National level as well. It is therefore recommended

The key institutions/group of people whose capacity needs to be enhanced to effectively implement and monitor the ESMP of this project are:

- Beneficiary Communities: There is a need to carry out training and awareness trainings for the key community members on the safeguard's aspects of the project through community policing and reporting.
- Staff of the respective District Local Governments: The staff at the district level needs to be trained on key aspects of the project including but not limited to environmental monitoring, RAP implementation, health and safety, reporting and modeling as well as

catchment management. They also need to be facilitated to enable them effectively monitor the ESMP implementation process.

- MWE and NEMA staff also need refresher training in environmental monitoring, RAP implementation, reporting and modeling as well as catchment management approaches.

There is also need for the project to foster inter institutional monitoring of the implementation of the project's ESMP. An interinstitutional monitoring committee should be formed, trained and their activities facilitated. A capacity building plan should be developed after instituting the inter institutional monitoring committee.

In general, the human resource equation for the delivery of environmental and social safeguards compliance over-sight by environment and social safeguards experts of the Ministry has been reinforced with the recruitment of the Project Social Development Specialist and Environmental Specialist. Hence the Ministry has adequate capacity to monitor the implementation of the safeguards requirements of the project.

In execution of supervisory and monitoring role, Ministry relies largely on physical site inspections, interviews and review of records without going into some in situ measurements of some physical and ecological parameters. The approach can be exploited by fraudulent contractors since they will have known that, there will be measures for on-site physical verifications. It is therefore important that the Ministry obtains some in-house equipment for rapid verification of noise, air quality, vibrations and water, and the results may be used to inform resolution of related complaints. In the same vein, there should be readily available logistics in terms of vehicles for the environment and social personnel of the Ministry to rapidly respond to environmental and social safeguards emergencies in the projects as they happen.

9.6 GRIEVANCE REDRESS MECHANISM

This section presents procedures for affected persons to lodge a complaint or express a grievance against the project staff or contractors during project implementation. It also describes the roles and responsibilities for addressing grievances. The objectives of the grievance process are:

- a) Ensure that appropriate and mutually acceptable corrective actions are identified and implemented to address complaints;
- b) Verify that complainants are satisfied with outcomes of corrective actions;
- c) Avoid the need to resort to judicial proceedings.
- d) The project will operate two major grievance redress mechanisms, namely:
 - i. Worker's grievance redress mechanism, and
 - ii. Community Grievance Redress Mechanism.

Each of the affected persons should be able to trigger the GRM to resolve their complaints, while still being able to resort to the judicial system. Nonetheless PAPs are free to seek judicial redress, as a result of dissatisfaction with the GRM in place, the implications of that alternative shall be explained to them as well as providing the necessary information that the courts will require during the litigation process. The project will also cooperate with NGO's providing pro-bono services for example Legal Aid of Uganda. The grievance redress procedure will address any grievance or complaint by the PAPs promptly and fairly in a manner acceptable to all parties concerned. Grievances are useful indicators of a project performance therefore have to be treated with the due care they deserve.

A high number of grievances may be an indicator of poor work practices. Likewise, a low number of grievances may not necessarily mean everything is working out smoothly but could point to a nonfunctional system that is inaccessible to PAPs or is inefficient and ineffective in handling project related complaints.

The following guiding principles shall be followed during grievance and complaint redress;

- i. Receiving, assessing and resolving complaints in a timely, transparent and conclusive manner;
- ii. Identifying and implementing appropriate and mutually acceptable actions to redress complaints;
- iii. Keeping accurate records of all the complaints received, actions on each and time taken to resolve each complaint.
- iv. Observing confidentiality where necessary at all times
- v. Ensuring non- retaliation in all cases reported to the GRC
- vi. Gender responsiveness and social inclusion through sensitivity to vulnerability and provision of additional support to the less empowered to report and follow up their complaints handling. These groups include the elderly, children, women, people with disabilities, etc.
- vii. Ensuring that all the complainants are satisfied with outcomes of the corrective actions; and
- viii. Supporting PAPs to resort to the judicial process if necessary.
- ix. Improving project outcomes through addressing complaints received.

9.6.1 Village and District Grievances Redress Committees

It is proposed that dispute resolution will depend on Grievance Redress Committees (GRC) which will be initiated at the village level to record grievances and also help in mediation. These committees will comprise the LC I Chairperson of the affected village, a trusted village elder, a religious representative, chairperson Area Land Committee, a representative of PAPs, representative of specific vulnerable group r of relevance to the village i.e. women and the disabled who will be elected by the PAPs save for the LC I who is elected and known and may not necessarily be a PAP. The same committee shall also participate in the verification of PAPs. Disputes will as much as possible be resolved at the village level and where need be referred to the District GRC.

No GRC is established at the Sub County level although there will be one at the district level. At the District Level, the Grievance Redress Committee will be established [as an appeal mechanism] to deal with any grievances unsettled at the village level. The Grievance Redress Committee at the district level will at a minimum comprise the LCV Chairperson, CAO, RDC, District Land officer, District Water Officer/ Project focal person, LC3 representative, Sub county Chief/ representative, representatives of vulnerable groups, District Environment Officer, District Land Officer/Surveyor and District Community Development Officer. The Sociologist from MWE will be called in when the committee deems it necessary.

The GRCs will be responsible for receiving and logging complaints and resolving disputes. The GRCs will work with the MWE to resolve each grievance or dispute to ensure that redress actions are implemented. If affected persons are not satisfied with the grievance redress structures, they will be entitled to seek redress through the Area Land Committees before referral to the District Land Tribunals in the case of land related complaints or Ugandan Courts of Law.

When GRCs are in place, they will be oriented through appropriate induction training. This training will be tailored to enable the GRCs perform their expected roles. These roles include providing advice on and grievance resolution including compiling records of all project grievances raised and ensuring their timely resolution through the various referral points. The GRCs will also popularize alternative channels through which PAPs can raise their complaints including use of phone calls, hot lines if any and letters among others.

9.6.2 Site Grievance Redress Committee for Community Grievances

The GRC at site level shall include the following: □ Resident Engineer- Chair Person, Site Engineer, Contractor's Sociologist, Contractor's Health and Safety Officer, Consultant's Site Sociologist- Secretary and □ Consultant's Site Environmentalist. For timely management of community level complaints, the Contractors shall have a grievance desk at, the site. Under the supervision of the consultant Site Sociologist, the contractor shall make immediate, responses to matters related to the project construction, contractor's workers, agents, sub-contractors or suppliers. Unresolved matters by the contractors shall be escalated or referred to the MWE's Grievance Redress Committee.

9.6.3 Project Workers Grievances Redress Committees

Complaints are likely to arise during construction activities. Project Workers' Grievance Committees (WGCs) shall be set up to receive and resolve such complaints. This may include; physical violence, noncompliance in the use of PPE, Illegal drug taking, possession of drugs or the consumption of alcohol during operations, undesirable working conditions in physical terms, changes without prior notice, poor employee relations, improper wage adjustments, dissatisfactory office policies in case of: promotion, demotion, leaves, overtime, violation of laws, labour-management hostility, incidences of workplace favouritism and nepotism, among others. etc. Any complaints that may not be handled by the WGCs shall be referred to the government authorities such as Uganda Police. The WGCs will comprise the Project Manager, Foreman and the social and environment safeguards personnel and representatives of the following categories of workers; Casual workers, Drivers, Operators and Turn men, Flag Personnel, Site Cooks & Cleaners and Technical. The disciplinary process will be conducted in five stages and can be initiated by an employee as well. This stages include; initial action where a reminder to the individual is provided, issue a warning, stop the work, removal of individual from site; disciplinary report, escalation, discipline review and contract cancellation.

9.6.4 Roles of Workers Grievance Redress Committees

These committees shall proactively and fairly handle complaints registered by workers or employer. The Committee doesn't take on the obligations of the project management but rather provides an opportunity for any aggrieved workers of employer to register complaints and have them resolved in a fair way. Workers' Grievance Redress Committee shall: Provide a forum for registering a complaint and free exchange of information between management and employees on issues that affect them.

- 1) Receive and report workers' complaints/grievances to management and negotiate for timely redress/ participate in arbitration of cases between workers and management through disciplinary hearings and / or between fellow workers through conflict resolution meetings
- 2) Represent the interests of workers pertaining to their terms and conditions of employment, staff welfare, staff development and other matters of concern to the workers, and to negotiate with the contractor's management on their behalf accordingly.
- 3) Educate Workers on their rights, discipline, code of conduct, spirit of staff unity across the project as well as on respect for cultural diversity pertaining to workers of different races, tribes, religion and other cultural differences
- 4) Solicit for employees' suggestions/opinions to management through appropriate and
- 5) organized channels such as their representatives, suggestion box, or joint meetings from time to time.

- 6) Establish and maintain good relations, foster effective two-way communication and mutual understanding between workers on one hand, and with management on another.
- 7) Identify and represent concerns of special interest groups on the project such as women, expectant and lactating mothers, workers with disability etc.
- 8) Organize and conduct monthly Workers' WGN meetings to review and discuss staff welfare, discipline and related matters; compile and share in timely manner meeting minutes with the contractor, supervising consultant and MWE pointing to key action areas requiring attention.
- 9) Keep adequate log of all matters that come before the Workers' GRC for better reference and effective management

9.6.5 MWE'S Internal Grievance Redress Committee

MWE will have an internal GRC which will be responsible for handling the cases that are escalated to MWE in order to ensure quick processing of the complaints. It will include:

1. The Project Coordinator;
2. The Environment Officer
3. The Sociologist
4. The Project Engineer

If a complaint remains unresolved at this level, it will be forwarded to the MWE Management.

9.6.6 Process of handling grievances

Step 1: Receipt of complaint

The grievance management committees at all levels will have one person to act as the grievance officer. A verbal or written complaint from a complainant will be received by the grievance officer and recorded in a grievance log that is kept in the community at each Grievance management level. Complaints can be submitted at any time, either directly or through a grievance handling committee member. Some can also be submitted by word of mouth or through telephone, SMS or emails.

At the village committee level, which is the first level of community grievance management, the secretary shall register the complaint, screen it and handle it if possible or;

1. Refer to the grievance management committee for further investigations, or
2. Refer to police if the grievance is of criminal nature for example assaults, rapes, defilements, theft etc. If the aggrieved party is satisfied, the matter shall be closed and signed off with them in the complaints Register.

This committee shall sit at least every two weeks to investigate and conduct hearings, outcomes of which will be given to the complainant within 24hrs. If the complainant agrees and is satisfied with the decision taken, the matter shall be closed and signed off in the complaints Register. If the party is not satisfied, the matter shall be referred to the site committee in Step 2.

Step 2: Escalation of Grievances to Construction Site Grievance management committee

The site GRC shall receive and register the grievances by the Contractor's Sociologist. The Consultant, Site Sociologist will then review the register and recommend to the Chairperson the schedule for GRC meeting. The affected person (s) shall be involved in GRC hearings so that conclusive solutions are arrived at. Once completed, the affected person shall sign in the grievance register if satisfied and if not satisfied with outcome, he/ she or the Site committee will escalate to District GRC within 7 days. *NB: At the Site level, the Resident Engineer shall update MWE on grievances management and emerging issues which might require immediate or explicit action or support from MWE to expedite project implementation.*

Step 3: Escalation of Grievances to District Grievance management committee

In the event that a complainant is not satisfied with the decision made by the village committee or the committee fails to resolve it, it shall be referred to the District Grievance Redress Committee. At district level, the District Community Development Officer shall be responsible for receiving and recording the grievance in the complaints register. On receipt, he or she will screen the grievance and handle it if possible. If not, he will notify the committee chairperson who shall convene a meeting/ hearing within one week, the outcome of which shall be communicated to the aggrieved person within 24hrs. If the complainant is satisfied with the outcome, the matter shall be signed off in the Complaints Register. If the aggrieved is not satisfied, the matter shall be referred to the Ministry of Water and Environment. *NB: At the District level, the CAO shall update MWE on grievances management and emerging issues which might require immediate or explicit action or support from MWE to expedite project implementation*

Step 4: Escalation of Grievances to MWE Grievances Management Committee

At the Ministry of Water and Environment/ NWSC, referrals shall be registered in a complaint Register by the Project's Sociologists. Within 2 weeks, the MWE committee shall investigate and if necessary, conduct site visits and conclude the issue.

If the complainant is satisfied with the decision, the matter shall be signed off in the complaints Register with consent of the complainant. The Ministry shall, in form of reports, also report to the World Bank on the complaints handled and the outcomes of the same.

In the event that the matter has not been solved at this level, MWE may advise the complainant to seek further justice from alternative offices like courts of law or any other Government agencies.

9.6.7 The World Bank's Grievance Redress Service (GRS)

The WB GRS provides an avenue for individuals and communities to submit complaints directly to the World Bank if on their opinion a World Bank financed project has or is likely to cause harm to communities and the environment which in turn may have adverse effects to them or the community. The GRS seeks to ensure that grievances are promptly reviewed and responded to, and problems and solutions identified by working together. The GRS acknowledges the project-level grievance mechanisms as the primary tools for raising and addressing project-related grievances. The GRS helps to resolve issues that cannot be resolved at the project level or where there is no project-level grievance mechanism.

9.6.8 Establishment and Composition of the GRCs at village level

Community meetings will be held in the selected central areas within the villages hosting the project. Residents will be sensitized on the importance and need for a GRM, its mandate and the type of people required on the GRCs. The community members present (including PAPs) will then nominate and elect their representatives who will receive induction training on their roles and responsibilities.

Membership of the GRCs will be voluntary and it will be functional throughout the project life. The size of the GRC will depend on the number of villages within the cluster. It will comprise:

1. The GRC Chairperson, who will be a trusted village elder, (for example a religious representative) and not any of the LC chairpersons. This is to avoid conflicts about jurisdiction, political inclination and also to ensure public trust of the committee in case some community members do not trust their chairpersons;
2. Vice Chairperson who may be an opinion leader or a respected member of the community;
3. Secretary (responsible for recording grievances in the log book and taking minutes during GRC sittings);
4. Representative of vulnerable groups/special interest groups;
5. The LC I chairpersons of each of the affected villages in the cluster or their representatives will be ordinary members.

Presence of female members on the GRCs is crucial in order to ensure better consideration of gender issues for conflict resolution. The PAP representatives will be democratically chosen by the PAPs with the help of their leaders. The same committee shall also participate in the verification of PAPs during disclosure. Therefore, this committee will be set up before disclosure of compensation packages

9.6.9 Grievance processing

Grievances will be screened and categorized into three (3no.) as detailed in the table below:

Screening and categorization criteria

Category	Description	Implication
Category 0:	Complaints that are not related to a MWE project, project workers or any MWE activity	Out of scope and require immediate feedback/referral and closure
Category 1:	Queries, comments, and suggestions	Require immediate feedback and closure
Category 2:	Complaints and concerns, which are not criminal in nature or do not require the involvement of police	It is within mandate of MWE in respect to project activities and require processing
Category 3:	Complaints and concerns that involve allegations that require investigation or intervention by the police or other law enforcement authorities. These are mainly cases related to SEAH/GBV, CH	Require immediate escalation to Police and other regulatory agencies

Once the complaint is screened for eligibility, then a decision will be taken to either drop it or proceed with assessments and investigation, and the complainant will be duly informed. Complaints that are categorized as (0) or (1) are quite straight forward will be resolved on first contact and closed out. The complainant will be given feedback and sign a closure out form. After screening and ascertaining need for further investigation by MWE, the grievance will be attended to by the GRC or assigned to relevant department at MWE as quickly as possible.

Investigation and Feedback (Tier One): If a grievance is categorized as (2) and requires further investigation it will be handled by the GRC or by mandate assigned to relevant officers or department. The process flow is lustrated in table below

Grievances Process Flow

Step	Action	Responsibility
1.	Reception and registration by GRC or MWE office/centre/contractor/consultant	GRC sec or appointed MWE representative or contractor /consultant CLO/sociologists
2.	Acknowledgement of receipt to complainant	GRC sec or appointed MWE representative or contractor /consultant CLO/sociologists

3.	Sorting/categorization	GRC sec or appointed MWE representative or contractor /consultant sociologists
4.	Grievance review and investigation (if category 2) and solution discussion	GRC, relevant MWE department or contractor/consultant representative
5.	Feedback to complainant	GRC sec or appointed MWE representative or contractor /consultant sociologists
6.	Notification of responsible parties and implementation of resolution	GRC sec or appointed MWE representative or contractor /consultant sociologists
7.	Closure	GRC sec or appointed MWE representative or contractor /consultant sociologists

- In case the complainant is satisfied with the proposed solution, there solution will be effected and grievance closed out. Complainant will sign a grievance closure form witnessed by the MWE or appointed representative.
- The second tier is where the complainant is not satisfied with the resolution at the first tier. A mediator will be identified to mediate between the complainant and MWE or contractor/consultant. Possible mediators include religious leaders, family/clan leaders, elders and CSO leaders or managers.
- At the second tier, a near process described in table above will apply.
- In case the complainant is satisfied with the mediator proposed solution, the resolution will be effected and grievance closed out. Complainant will sign a grievance closure form witnessed by the mediator or appointed representative.
- In case complainant is not satisfied with the mediation resolution, this GRM provides for recourse to the formal and traditional judicial system.
- For SEA/SH/GBV cases, the GRM shall adapt a survivor centred approach facilitating safe and confidential access to services by complainants/survivors.

NB: In all cases, criminal matters (SEAH/GBV, CH etc) shall be explicitly handled in accordance with the Criminal Code Act and other laws governing criminal issues in Uganda. I.e. these cases shall be directly referred to police for investigations and submission to the Office of Director of Public Prosecution for sanctioning.

9.6.10 Publicity of the GRM and GRCs

It is not possible to have every community member/PAP attend all the meetings. Some people may not be aware of the newly constituted GRCs. Therefore, MWE will popularize the GRCs by:

1. Holding an adequate number of community meetings within the affected villages;
2. Preparing posters with names, designations and contacts of selected GRC members and their roles, posted in communal areas such as market places, trading centers, churches and mosques;

3. Making announcements using community radios and any other popular local radio stations as well as in churches and mosques.

9.6.11 Terms of Reference for the GRCs

1. The village GRC through its operations will handle complaints related to project activities in liaison with the Sociologist of MWE. The GRC will, also deal with the complaints from contractor workers by liaising with contractor's workers' disciplinary committees. The GRC will schedule regular monthly meetings to handle the routine grievances.
2. Ad-hoc meetings will be held when incidents that require urgent attention arise.
3. The GRC together with the community members will decide on the official venue of the monthly meetings and these will be communicated to the communities during sensitizations and radio announcements.
4. The GRC will ensure timely resolution of complaints, with timeline for resolutions expected between two weeks and one month.
5. The District GRC will monitor the working of the village GRC and work as a forum for appeal against decision of the village GRC

9.6.12 Training of the GRCs

The GRC will be trained on the following:

1. Execution of the terms of reference
2. Categorization of complaints/grievances
3. Referral pathway for each category of complaints/grievances
4. Basic mediation, conflict resolution techniques and skills
5. Communication and basic public relations skills
6. The property valuation process
7. Scope of the project and the associated risks
8. Code of conduct for the contractor
9. The committee's mandate: The committee will be charged with the responsibility of ensuring timely resolution of complaints from site workers and PAPs to ensure project success.

9.6.13 Facilitation of the GRCs

MWE will provide the following in order to facilitate the GRC's work:

1. Grievance Logbooks and related logistics;
2. Orientation/training of GRCs on grievance resolution;
3. Materials such as pens and notebooks; and
4. Branded items such as MWE T-Shirts, pens, folders etc. for motivation.

9.6.14 Monitoring and Evaluation of the GRCs

In addition to the Grievance Resolution Form, a Grievance Log will be kept by the project implementers, indicating the date the complaint was lodged, a brief description of the grievance, actions to be taken, status of the resolution etc. The Project Liaison Officer will

monitor and document the progress of all complaints through monthly grievance resolution reports.

The performance of the GRCs will be evaluated based on the following:

1. Number of meetings held compared to the planned meetings including numbers of members actively participating in the committees including women
2. The cases resolved against cases received
3. Functionality of the referral system i.e. number of cases referred, feedback received on referred cases and time taken for action at various levels including final resolution.
4. Time taken to resolve complaints (depending on its magnitude and urgency)
5. Content of the complaint reports made including data on:
 - Numbers of complaints/suggestions
 - Compliance with performance standards
 - Issues raised in complaints
 - Trends in complaints over time
 - The causes of complaints
 - Whether remedial action was warranted and redress given
 - Recommendations/strategies to prevent or limit future recurrences

Feedback from PAPs and community members on the effectiveness and efficiency of the project GRM will be very important in its evaluation

9.7 ENVIRONMENTAL MONITORING AND REPORTING PROGRAMME

9.7.1 Overview

The general approach to effective monitoring is to compare the pre- and post- project situations, measuring relevant environmental impacts against baseline conditions. Baseline data establish a reference basis for managing environmental impacts throughout the life of the project. A monitoring process will therefore be introduced to check progress and the resultant effects on the environment as the implementation of Nyagak water and sanitation project proceeds.

MWE will undertake the necessary monitoring measures for short- and long-term monitoring programme respectively. However, during monitoring close links shall be maintained with other relevant lead agencies. The key lead agencies that shall be kept in the loop will include Zombo, Nebbi and Madi-Okollo Local Governments, NEMA and DWRM. It is the role of the Developer to ensure that the Contractor implements the proposed mitigation measures presented in this ESIA report. The planned mitigation measures indicated in chapter 7 (Project Impacts) and chapter 8 (ESMP) shall be the starting point. These shall be planned and checked against their effectiveness in reducing the negative impacts/or enhancing the benefits identified in this report.

The process shall also include regular reviews of the impacts that cannot be contemplated at the time of doing this Environment Impact Assessment. Action shall be taken in response to the unforeseen changes and subsequently scale up the mitigation and monitoring measures. Monitoring shall undertake appropriate new actions to mitigate any negative effects.

The issues to monitor may include the following:

- Monitoring the clearing of the water transmission and distribution corridors including all forms of compensations and or resettlements made in respect of the displaced families or persons.
- Monitoring and supervision of the excavations for the water pipes and subsequent laying and burying of pipes.
- Monitoring the occupational health and safety of workers and the community among others.
- Monitoring the fate of solid waste/debris disposal and other wastes after it has reached and has left the site.
- Monitoring behavioural changes among the community and Contractors staff
- Monitoring Water Quality
- Monitoring Noise and dust pollution
- Monitoring Biodiversity changes
- The contractor shall report all severe accidents/incidents to the MWE and subsequently reported to the bank within a period of 24hours
- The Contractor shall prepare and submit monthly monitoring reports on EHS, Biodiversity and project progress.

The Developer will monitor the actual environmental impacts of the proposed water and sanitation project to ensure that mitigation measures are implemented and standards adhered to. To be able to fulfill this requirement, it will be necessary to work with indicators of environmental change outlined in the ESMP. The indicators will be monitored as indicated in the ESMP and for some impacts, it may be weekly, monthly, quarterly, annually and at project decommissioning. Capacity to conduct monitoring will be built through training. The major objectives of the monitoring plan shall be;

- To assess compliance with the National Environment Management Authority (NEMA) ESIA approval certificate conditions;
- Measure and improve the effectiveness of the Environment Management Plan (EMP);
- Assess the chemical, physical, and biological impacts of the project to the general environment.

A monitoring program will check on progress of the project and the resulting impact on the environment. It will also include regular reviews of the impacts that could not be adequately assessed before the project started, or which may arise unexpectedly. In such cases, appropriate new actions to mitigate any adverse effects will be undertaken. Furthermore, an environmental audit report will be prepared annually and submitted to NEMA for review and approval.

9.7.2 Monitoring Team

While the Developer will do his own internal monitoring; a monitoring team headed by the District Environment Officers of Zombo, Nebbi & Madi-Okollo districts and composed of the local environmental authorities, representatives from the District and NEMA and any other lead agencies may also carry out monitoring. The Contractor shall undertake monitoring of key environmental parameters like water quality, noise and air pollution etc. and make monthly reports to the Developer.

9.7.3 Stakeholders to be involved in the implementation

The management and supervision of the ESMP is strictly the responsibility of the Ministry of Water and Environment as the Developer. During construction, the Contractor will be responsible for the day-to-day implementation of the ESMP. During the operation phase, the Operator who will take over management of the project, will be responsible for the implementation of the ESMP. The Developer, the Contractor and the Operator should employ an Environmentalist with relevant academic qualification and work experience. At the local level, Zombo, Nebbi & Madi-Okollo districts will be responsible for the day-to-day monitoring of the ESMP in their areas of jurisdiction.

At the National level, two institutions i.e. the National Environment Management Authority (NEMA) and the Department of Occupational Safety and Health (DOSH) of the Ministry of

Gender, Labour and Social Development will be involved. The role of NEMA is to monitor the project as per the Environment Act No.5 of 2019 and to approve external environmental compliance audits as per the Environmental Audit Regulations (2020). The role of DOSH is to issue permits (Certificate of occupation of a workplace) and periodically inspect the project site. DOSH will issue workplace Certificates every year if the project meets working conditions as set out in the Occupational Safety and Health Act 2006. The District and town councils will approve construction permits in their area of jurisdiction.

As a means of impartiality, local NGO's or CBOs will be involved in the implementation of ESMP. Their role is to be neutral observers. They should have experience in environmental and social management and skills in conflict resolution.

9.7.4 Water Source Protection

The area for the water source protection has been defined as the land that drains into the point of abstraction where the intake works for Nyagak WSS will be located. The total area of the defined drainage basin is about 50km² and referred to as Water Source sub-catchment. In addition, the area covered by the future water supply system is considered for the purpose of protecting the water resource all along its path from intake to consumers. Protection interventions proposed focus on addressing priority protection issues identified as shown in the table below.

These interventions include among others limiting harmful activities and encourage beneficial activities by creating a buffer zone as per the National Environment (Wetlands, Lake shores and River Banks) Regulation. These interventions should be implemented as part of the ESMP.

Table 9.2: Proposed source protection interventions.

Water Source protection	Underlying Cause	Intervention/control
Sustaining water quality at Abstraction point	Loss/degradation of wetland belt (due to agricultural encroachment) thus undermining capacity to filter sedimentation and or stabilize the river bank.	<ul style="list-style-type: none"> Enforce wetland policy to protect or regulate wetland use. Enforce Environmental Regulations (River banks, Lake Shore and Wetlands). Promote wise use practices of wetland resources. Demarcate and protect Wetland/river bank protection zone. You will supervise the Contractor during installation of concrete pillars along the boundary of the protection zone and planting of trees in the zone.
	Use of agro pesticides that find their way into water at abstraction point	<ul style="list-style-type: none"> Improve capacity for safe handling and disposal of agro-pesticides Promote soils erosion control measures so as to reduce surface runoff

Water Source protection	Underlying Cause	Intervention/control
		<ul style="list-style-type: none"> Supervise the Contractor during construction of diversion trenches to trap and divert storm water or Soil wash from uptake point
	Soil erosion/surface erosion from gardens and along the access road resulting in sedimentation/silting and pollution.	<ul style="list-style-type: none"> Promote soils erosion control measures so as to reduce surface run off Supervise the Contractor during construction of road drainage to divert storm water away from abstraction point.
	Poor human and livestock waste disposal leading to contamination of water at the abstraction point	<ul style="list-style-type: none"> Restrict human and livestock access to abstraction and water treatment point through implementation of fencing. Ensure safe disposal of human waste by implementation of Public, Communal and Institutional toilets.
	Sand mining in the upstream drainage system	<ul style="list-style-type: none"> Regulate sand mining
Sustaining water quantity	Poor agricultural land uses in the catchment that affect the hydrological system (underground water) e.g., through increased surface runoff, exposing high water table	<ul style="list-style-type: none"> Promote Sustainable land management /agricultural practices in the catchment. Regulate sand mining in upstream drainage
Maintenance of Water Supply Infrastructure	Insecurity of water supply infrastructure due to vandalism and thefts	<ul style="list-style-type: none"> Implement fencing of water supply infrastructure and provide for security of major infrastructure. Develop and apply conflict mitigation/management strategies.
Ensuring adequate and equitable access to piped water	Population growth or concentration along supply routes resulting into increasing water demand	<ul style="list-style-type: none"> Implement water supply system that serves all the current and future population within the Project area. Promote alternative water supply /water harvesting /water storage technologies.
	Conflicts related to access to piped water among current and potential water users	<ul style="list-style-type: none"> Engage all Stakeholders during implementation of the water supply system. Develop and apply conflict mitigation/management strategies.
Sustaining livelihoods	Declining soil fertility and overall land productivity	<ul style="list-style-type: none"> Promote Sustainable Land Management practices (soil fertility management, control of soil loss, etc.) Promote technologies for enhancing land productivity (e.g., improved varieties of crops, disease and pest control, etc.)

Water Source protection	Underlying Cause	Intervention/control
	Conflicting or competing land uses (e.g., cultivate wetland edge) and water uses (e.g., fishing near/around the abstraction point)	<ul style="list-style-type: none"> • Zoning protection areas of the wetland, River and infrastructure • Empowering stakeholders to plan for and manage their water sources (provision of incentives for protecting water source e.g., fishing gear and boats that enables fishing activity in deep waters) • Increase awareness on the relationship between land/water use and water quality and water availability in the project areas.

9.7.5 Reporting

Reporting shall be a core aspect of this project. Either a standalone Monthly Environment Report shall be prepared, or safeguards shall be sufficiently covered in the Contractor’s Monthly Progress Report in fulfilment of the Contractor’s contractual reporting obligations. The report will highlight different activities undertaken to manage environmental and social aspects of the project in line with contract specifications, laws, standards, policies, and plans of Uganda and World Bank ESF. Planning for management of environmental aspects is typically done on a continuous basis. In that regard, every monthly progress report should include a schedule for environmental and social activities for the next month. This Contractor’s Monthly Report is expected to summarize the following:

- Progress in implementing the CESMP and the standalone management plans;
- Status of key approvals and documentation for the project;
- Compliance with legal obligations and specifications;
- Findings of the monitoring programmes, with emphasis on any breaches of the control standards, action levels or standards of general site management;
- Summary of any complaints by the community and actions taken/to be taken; and
- Key environmental activities for the next month.

In addition, quarterly reports will be prepared for the project. As a legal requirement, an annual Environmental Compliance Audit will be carried out and findings shall be shared with NEMA and the Bank. However, in case of serious incidents on the project, the Accounting Officer will be reported to within 12 hours while other stakeholders, including the World Bank shall be informed within 24 hours.

10 CONCLUSION AND RECOMMENDATIONS

10.1 Recommendations

Generally, the purpose of this project is to increase sustainable access to safe water and basic sanitation in the selected sub-counties of Zombo, Nebbi and Madi-Okollo district especially those close to the Nile which are water stressed. From the assessment, the positive impacts outweigh the negative impacts. Further, the negative impacts of the project are identifiable and mitigatable. The report presents specific mitigation measures for each impact identified. The mitigation measures are aimed at either eliminating the impact or reducing its magnitude and or severity or both. Therefore, ESIA team recommends that the project should proceed but with the following recommendations;

- a) Conduct and implement pre-construction phase mitigation measures which include;
 - Sensitization of the affected community
 - Induction of contractor's and Consultant's personnel
 - Planning and co-ordination with local authority of Zombo, Nebbi and Madi-Okollo district administration.
- b) Prepare a Resettlement Action Plan on which actual compensation and resettlement shall be based. This will include:
 - Socio-economic Survey of the people who have either been displaced, lost property including land, crops as well as loss of income due to change in business premises {Directly Project Affected Persons};
 - Cadastral Survey of the individual peoples' portions of land to be acquired by the project;
 - Property Valuation.
- c) Construct the proposed water transmission/distribution line along the road reserves of the existing public roads as proposed by the Developer in order to avoid several delays, impacts and negotiations associated with land acquisitions with private landlords. The land for other project infrastructure should be acquired in compliance with the national legal requirements and World Bank Safeguard Policy OP 4.12.
- (d) The mitigation measures outlined in the ESMP above should be fully implemented to minimise potential negative impacts of the project.
- (e) Detailed design for the water transmission and distribution lines shall be undertaken in close consultation with UNRA so as to take care of the new road designs which UNRA may be planning to implement in the project area.
- (f) All construction works in Ajai Wild Life Reserve and Omier Central Forest Reserve should be under taken with clearance and close supervision from UWA and NFA respectively.

- (g) The environmental management and monitoring plan shall be attached as a condition for the project construction contract so as to make the contractor aware of his environmental obligation before securing the contract and enhance the implementation of the ESMP.
- (h) In case of any archaeological finds during excavation, these shall be reported and handed over to the Department of Museums and Monuments in the Ministry of Tourism, Wildlife and Antiquities for further follow up in accordance with the Chance Find procedure developed for this project (Annex 12).

10.2 Conclusion

The main conclusion of this Environment and Social Impact Assessment is that there are no significant environmental obstacles to hinder the development of this project if the proposed mitigation measures are implemented. The proposed Nyagak WSS is therefore a viable undertaking considering the proposed project sites and source of water.

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12 ANNEXES

Annex 1: Details of Stakeholder Consultation

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Annex 3: Water Test Results

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Annex 9(c): Map showing general land cover of the project area

Annex 9(d): Map showing the geology of the project area

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Annex 10: Nema Approved ToRs

Annex 11: Handling of Chemicals And Other Potentially Harmful Materials

Annex 12: Chance Find Procedure

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Annex 14: Project Drawings

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ANNEX 1: DETAILS OF STAKEHOLDER CONSULTATION AND SELECTED LIST OF PEOPLE CONSULTED

Annex 1 (a) Consultations at districts and sub-counties

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.	
Category of stake holders	Chief Administrative Officer, Madi-Okollo district	
purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.	
Date, time, place of meeting	10 th /11/2022 11:00am Madi-Okollo District Head Quarters.	
present	List of stakeholders is appended to the report.	
SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/concern	response
Welcome remarks	The office of the CAO welcomed the project in the district and pledged to support and work with the Ministry during project implementation	Noted.
Water Payment	An inquiry was made about whether the water will be paid for by the users.	Yes some payment will be required from users. The fees will be determined by the ministry together with the operator. We expect the charges to be affordable.
Weather condition	The CAO mentioned that the districts experiences dry spells especially in February.	Noted.
Employment	Inquiry was made about whether the contractors will employ community members during project execution, for example as casual labourers for excavation.	The contractor shall come with a number of employees, especially the technical people where as some workers such as casual laborers shall be got from the local community, on recommendation of local leaders.
Terms and conditions	He requested that the terms and conditions of operation of the scheme should be made clear to both leaders and the community.	The ministry shall hold more meetings to explicitly explain the project to the leaders.
Water pumping	Inquiry was made whether there will be any pumping on the scheme such as generator or solar.	The scheme is a gravity flow scheme. No pumping is expected.

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.	
Category of stake holders	RDC and Chairperson LCV, Madi-Okollo district	
purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.	
Date, time, place of meeting	10 th /11/2022 12:00pm	

	Madi-Okollo District Head Quarters.	
present	List of stakeholders is appended to the report.	
SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/concern	response
Weather condition	Informed the ESIA team about the weather which is very bad, the district experiences a lot of dry seasons.	Noted.
Project coverage	The ESIA team was informed that Rhino camp Sub- County, one of the busiest centers in Madi-Okollo has been left out of the design, and is one of the most water stressed areas	However, the Ministry will be informed about the area
Terms and conditions	The district requested that the terms and conditions of operation of the scheme should be made clear to both leaders and the community.	The ministry shall hold more meetings to explicitly explain the project to the leaders
Poor sanitation	The district raised concern about the poor sanitation in some parts of the district due to shortage of clean water. Some communities drink water from River Nile and it has led to an increase in number of patients at health centres most of which have sanitation-related diseases	Ala-Ora Water Supply and Sanitation scheme is intended to solve some of these challenges. A sanitation facility (VIP latrine) will also be put up at a selected site by the district leaders and the community
Water stressed areas	The district informed us that areas such as Mile 10 and 13 have recorded high cases of Bilharzia due to lack of clean water. They are positive that the project will save the ministry of Health a lot of money.	noted
Inception meeting	The district requested for an inception meeting before project implementation	An inception meeting shall be held before project implementation. The Ministry, all its contractors and the local leaders shall be invited to take part.
Project design	The district raised a concern that they should have been involved in the project design to prevent loopholes	Noted. Adjustments shall be made where possible during project implementation.

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.
Category of stake holders	District water Officer, Madi-Okollo district
purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.
Date, time, place of meeting	10 th /11/2022 1:00pm Madi-Okollo District Head Quarters.
present	List of stakeholders is appended to the report.
SUMMARY OF MEETING PROCEEDINGS	

Theme	Issue/concern	response
Project design	Requested that the design team should involve water and sanitation development system North, to incorporate Kati Water Supply in Okollo Sub county	Noted
Project scope	Advised that the project should focus more on the areas without water, for example there is an already existing system in Pawiru, yet it is part of the Nyagak scheme.	This will be communicated to the design team through The MWE.
Project reliability	Suggested that the scheme should have plan B in case the gravity flow fails especially upstream which would affect the distribution downstream because the scope and scheme coverage is too big.	Noted. All the beneficiaries of the scheme downstream are below the elevation of the reservoir tanks hence are expected to receive water. the feasibility study ascertained this.
Alternative sources	Pointed out that the design should consider alternative sources of water to the people during maintenance. Gravity flow schemes break down the entire scheme in case there is a breakdown upstream.	The maintenance will be well planned and scheduled and communicate earlier before to the users
Operation and maintenance	Inquiry was made about who will do operation and maintenance since NWSC Nebbi passes through Anyiribu and some other villages in the district. He wanted to know where NWSC will stop and Northern Umbrella will start.	Details about who will operate will be communicated by the ministry They will be introduced to the entire scheme for guidance on where to operate.
Project response	He welcomed the project in the district and pledged to support and work with the Ministry during project implementation. Described the project as a risky one, especially during maintenance periods	Noted

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	District Environment Officer, Madi-okollo district	
Purpose of meeting	To disclose the project and collect social and environment input into the proposed River Nyagak gravity flow scheme.	
Date, time, place of meeting	10 th /11/2022 2:00pm Madi-Okollo district headquarters	
present	List of stakeholders is appended to the report	
SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/ concern raised	Response /guidance offered

Welcome Remarks	The DEO welcomed the project in the district and pledged to support and work with the Ministry during project implementation	Noted.
Water use	He pointed out the issue of irrigation and mentioned that it would be important if the project catered for that since community members carry out farming and are always having problems more so during the dry seasons.	The main purpose of the project is to avail clean and safe water for people. The issue will be forwarded to ministry of agriculture, animal industry and fisheries.
Project timeline	How long will the project take to commence?	The EISA studies are already being done but construction is anticipated to start after the necessary permits are secured, probably mid next year.
Sensitization	Requested for sensitization of people along the transmission and distribution lines to inform the public about the ongoing project	Noted. Comprehensive sensitization will be undertaken during this ESIA study because the Ecoserv social team is already on board
Climate change	The DEO informed the ESIA team that dry seasons are so hot in the area that even River Nyagak reduces significantly (especially February). He expressed fear of the project being rendered useless during the dry season.	The flow and quantity of water was monitored by the design team at all times of the year and they expect sufficient water to be available at the source at all times of the year, including February.
Catchment protection	He inquired if a catchment protection plan would be prepared to protect the areas up stream of the abstraction point to avoid contamination.	A catchment protection plan will be prepared by Ecoserv Limited.

Pictorial Evidence:



Figure 2: Meeting with Chairman LCV and RDC, Madi-Okollo district



Figure 3: Meeting with District Water Officer, Madi-Okollo district

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.
Category of stake holders	Chief Administrative Officer, Zombo district

purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.	
Date, time, place of meeting	11 th /11/2022 11:00am Zombo District Head Quarters.	
present	List of stakeholders is appended to the report.	
SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/concern	response
Welcome remarks	The office of the CAO had no response for now, but recommended the Ministry and its contractors to start working on the project	Noted.
Water-user committees	The CAO said that water user committees should be set up in the local communities to aid in monitoring of water usage, and also contribute to maintenance of the scheme	Water user committees shall be set up indifferent communities and will also help to address concerns of the water consumers
Weather condition	Informed us about the weather which is very bad, the district experiences a lot of dry seasons especially in February.	Noted.
Employment	Inquiry was made about whether the contractor will employ community members during project execution, for example casual works such as excavation.	Yes. Some community members will be engaged for casual work but the technical people such as engineers will be sourced from outside the community

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.	
Category of stake holders	District Water Officer, Zombo district	
purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.	
Date, time, place of meeting	11 th /11/2022 11:05am Zombo District Head Quarters.	
present	List of stakeholders is appended to the report.	
SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/concern	response
Welcome remarks	The water officer welcomed the team and added that the Ministry and its contractors should start working on the project	Noted.
Water coverage	He expressed concern about the fact that the abstraction point being in Zombo yet most beneficiaries are in Madi Okollo. He requested that the water coverage should be increased in their district	Zombo district is upstream of the scheme and since the project is completely gravity flow, the project was designed to benefit the people downstream.

Weather condition	Informed the team about the harsh weather conditions experienced in February.	Noted. All these were factored in during the project design.
Existing systems	He suggested that the ministry should amalgamate all small existing systems into this new system for easy operation and maintenance, and also ensure constant supply of water	The ministry shall be informed about this proposal and different stakeholders to consider this option.
Catchment Protection	He advised that since the water source is in their district, a catchment protection should be done to reduce the likely adverse effects of tapping water upstream without compromising users downstream.	A catchment protection plan shall be developed and on approval, it will be implemented during project construction and execution.

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM.
Category of stakeholders	Chief Administrative Officer, Nebbi district
purpose of meeting	Disclose the project to collect environmental and social input on the proposed river Nyagak gravity flow scheme.
Date, time, place of meeting	11 th /11/2022 3:17pm Nebbi District Head Quarters.
present	List of stakeholders is appended to the report.

SUMMARY OF MEETING PROCEEDINGS

Theme	Issue/concern	response
Welcome remarks	The office of the CAO welcomed the project and informed us that he would provide support where necessary for the success of the project.	Noted, and will be grateful for the support.
Water source	Inquired whether the establishment of the water source will not affect the volume of the water downstream, since there are many water users downstream of the river	During the feasibility, all these assessments were made and determine that the river will have sufficient water for the scheme and downstream users. A water source protection plan will be developed and implemented
Community engagement	Requested that the community should be fully engaged, especially the people living around the water source and the water treatment plant. The people at the water source will no longer fetch that water for domestic use because it will be fenced off	Community shall be engaged by the ESIA study and these will be continuous throughout the project cycle
Employment	Inquiry was made about whether the contractors will employ community members during project execution, for example casual works such as excavation.	The contractor shall employ local personnel for casual labour during excavation and construction. Skilled labourers shall also be employed but these may not come from the community

Water coverage	He requested that the scheme should benefit the local people around the water source and water treatment plant for ownership purposes	Noted
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Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	PAIDAH SUBCOUNTY (Sub County chief, LCIII chairperson, parish chiefs)	
Purpose of the meeting	To disclose the project and collect environment and social input on the proposed River Nyagak gravity flow scheme	
Date, time, place of meeting	11 th /11/2022 10:00am PAIDHA SUBCOUNTY HEADQUATERS	
Present	A list of stake holders is appended to the report	

SUMMARY OF MEETING PROCEEDINGS		
THEME	CONCERN/ISSUE/RAISED	RESPONSE/GUIDANCE
Beneficiaries	A request was made by the sub county chief that institutions like schools and health centres should benefit in the sense that taps should be put in such places since they accommodate many people of the community for better coverage	Noted, the issue will be forwarded to the ministry for consideration.
Labour	They expected the local community to be considered for employment more so the casual labour like excavation.	Community locals will be given first priority when it comes to casual labour.
Sensitization	They stressed that the workers should be sensitized about the diseases such as Covid and Ebola to prevent fast spread and also warned heavily on the consequences of gender-based violence.	Workers will be briefed on how well they can protect themselves and the community against such diseases. Sensitisation will also include gender related issues.
Project timeline	They wanted to know how long the project was going to take before commencing	The project will begin after a certificate is issued but for now our assignment ends with environmental and social impact assessment.
Water costs	A concern was raised about the water costs more so during the dry seasons and therefore request ministry of water to ensure that rates are affordable	The costs will be set at a later stage but the message will be passed on to the ministry.
Gravity flow scheme	A concern was raised about the reality of gravitational flow and advised that there should be a backup plan in case the it fails	Noted.
Compensation	The sub county chief mentioned that there are many complaints from community members about compensation more so when such	Those whose land will be tampered with during construction, property will be valued and compensated accordingly.

	projects are being implemented because there is no compensation.	
security	They informed us that there is no need to worry about security	Noted.



Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
category of stakeholders	Nebbi subcounty officials (subcounty chief and CDO)	
Purpose of the meeting	To disclose the project and collect social and environment input on the proposed River Nyagak gravity flow scheme	
Date, time, place of meeting	11 th /11/2022 3:15pm Nebbi sub county headquarters.	
present	A list of stake holders is appended to the report	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERNED RAISED	RESPONSE
Water situation	They stressed that the area is water stressed and therefore are happy to hear about this project.	Noted.
Project timeline	The CDO wanted to know how long the project would take and at what point would the ministry share information about it	The project will begin after a certificate is issued but right now our assignment ends on environment and social impact assessment.
Compensation	The CDO emphasized that compensation should be considered for damaged property especially where the tanks and treatment plant will be.	Another team will come to explain about land acquisition. Important to note is that the project will not pay for land save for where the tanks and reservoirs will be.
Social Cooperate Responsibility	They requested that a fence be built around the market	Noted. The issue will be forwarded to the ministry for consideration
Uniform value rates	It was mentioned that uniform values should not be used. They proposed	This team doesn't have control over the rates but this will be communicated to the ministry.

	that lower rates should be considered for rural areas.	
Labour	They requested that the locals be considered as first priority when it comes to casual labour	A few of the community members will be selected for particular works like excavation.
Water payment	They wanted to know if the water was going to be provided would be free	The water will not be free, a fee will be collected for purpose of operation and maintenance of taps and pipes.



Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Ogoko sub-county	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	9 th /11/2022 2:30pm Sub-county offices	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	

Summary of meeting proceedings

Theme	Issue/Concern raised	Response/guidance offered
Public toilet proposal	The leaders raised a concern about the public toilet that will be put in place and proposed that since there are two major markets namely okubani and ndrowisi where the tanks will be placed, they propose it should be put at okubani because ndrowisi is having land issues and the plan is just underway to procure land for it so it wouldn't make sense having a latrine at ndrowisi market.	Noted
Waste disposal	They also said there is no toilet at Ndrowisi and the place has locally	Noted

	constructed urinals so it's possible that waste is dropped in the market.	
Morals	The leaders made a concern about the different cases that arise when projects are being implemented for example rape cases, defilement, re-forestation and many others so awareness should be created and sensitization if community members and workers done	Sensitisation will cover many areas including but not limited to safety, social and environment issues
Diseases	The leaders mentioned the cholera cases that are registered every financial year because there are no toilets in areas and also once constructed, they end up collapsing due to the loose soil texture	Noted
Water sources	They also said that boreholes were constructed and they are not functioning well because of poor maintenance and they easily sink	Noted
Consultation	The leaders advised that consultations with UWA should be done before implementation because, during project implementation, wildlife will be scared away	Noted. A meeting has been scheduled with the regional office of Ajai wildlife field office and more consultations will be made at the head office
Trade	The leaders also mentioned the fact that they will have access to water once the project is implemented thus improving trade in our area, attracting investors and many others. They gave an example of the radio staff who fear operating from here because of access to water therefore we welcome the project	The intention of the project is to improve access to clean water.
Contaminated water	The leaders also made concern about the seasons where water dries up and people are forced to go and fetch water from the Nile	Noted



Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stakeholders	ANYIRIBU SUBCOUNTY (LCIII & CDO)	
Purpose of meeting	To disclose the project and collect social and environment input on the proposed River Nyagak gravity flow scheme.	
Date, time, place of meeting	11:26am ANYIRIBU SUBCOUNTY	
present	A list of stake holders is appended to the report.	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/ CONCERN RAISED	RESPONSE
Water situation	They informed the ESIA team that Anyiribu sub county is a very water stressed area and were happy to hear about this project on which they would be benefiting	Noted
Sensitization	The CDO emphasized the point if sensitization of workers on gender-based violence, AIDS, Covid, and Ebola	The workers will be briefed on how they can protect themselves and the community from such diseases and will be sensitised about change inclusive behaviour that need to

		be exercised during project implementation.
Project information	They requested that ministry of water and environment should provide implementation programme so that they know the details of the project	The project details will be expounded more during the meetings that will be held ahead.
employment	The sub county leadership indicated that they expect to benefit from the project through employment of local people during the construction period.	Priority will definitely be given to the members of the community for work that requires no skills or skills that they poses.
Quality of material	Requested ministry of water and environment to ensure that the contractor uses good quality equipment of pipes in the project equipment.	A credible contractor will be procured and a supervising engineer will among others look at quality, social and environmental issues.



Annex 1(b): Consultations at Villages

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Adraa and Pamachi village	
Purpose of meeting	Disclose project and collect environmental and social input of the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	12 th /11/2022 11:00 am Centre	
Present	A List of stakeholders is appended to the report	
Agenda	6. Prayer 7. Remarks from the L.C.1 chairperson 8. Communication from the Ecoserv team 9. Concerns/ views/Issues 10. Closure	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Cost	The community wanted to know how much the water would cost after implementation	The fees will be set by the ministry in conjunction with the service provider. You will know the cost before the scheme starts functioning bt the rates will be fair and affordable.
Employment	Inquiry was made as to whether they would be employed by the contractor during the construction	A few community members will be goffered jobs because the project has limits and not everyone can be accommodated.
Unfairness	The community complained about offering land yet they still had to pay for water.	This is an expensive project and the government is borrowing money to extend service. The small fees to be charged will be for the operations and maintenance costs.
Additional water points	The community wanted to know whether besides the trading institutions would be connected	For now water will be in the areas defined under the scope but with time the network will expand to other areas
Unfairness	They also expressed the need to know why centres should be served when the people in the villages are the ones in need of the water	It will first cover the small area and then later move to the villages because the project might become too expensive for the government if all is done at once
Area supply	They also wanted to know if the tank will supply all villages listed	The tank has the capacity to serve the entire area.
Compensation	Community members wanted to know how the relocation of graves would be handled if affected.	In case they are encountered along the transmission or distribution line, Yes, the graves will be paid and also the cost of relocating them will be catered for.
Water stressed	The community thanked us for informing them about the project because they need it and if possible work should commence as early as possible	Noted
Concern	A request was made for the ministry to consider providing water free of charge.	Noted we shall inform the ministry





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11:00am

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT...12th.....11...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
1-	BALWONDI SIMON	PAMACH	0770407462	[Signature]
2-	EDENIA JOSEPH	PAMACH	0788592244	[Signature]
3-	ALINFA DENISTH	ADRAA	0779613099	[Signature]
4-	NYONI CHRISTOPHER	ATIRA		[Signature]
5-	DRAPIAMANI BOSCO	DRAJIBU/OCONYARA	0779770285 0758285418	[Signature]
6-	OTOMA GITI	ADRAA	077746485	[Signature]
7-	WUGO JOHN	ADRAA.	0789255718	[Signature]
8	BADARU MONICA	ADRAA	-	[Signature]
9	BAAKUA RUBEN	PAMACH	0777000360	[Signature]
10	ALYOMA SWALHA	PAMACH	0775865078	[Signature]
11	MUZAMIL SAUBI	PAMACH	0777280148	[Signature]
12	ANTATHA KAUSIO	ATIBU/OSABU	0775864756	[Signature]
13	TASIRA ROBINNA	ADRAA	0783035654	[Signature]
14	ANGUCIA LILIAN	ADRAA	-	[Signature]
15	ONDIRI LYDIA	ADRAA	-	[Signature]

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Agelemu (Alindi, Alike) village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	11 th /11/2022 10:00 am Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Sensitization	community members expressed fear about the perception that tap water causes diseases like typhoid	This is a myth. The water will be properly treated before distribution starts.
Cost	The community stressed that they experience water shortage but the charges imposed against water could be high and unfordable because the affected population is generally poor.	There will be a charge levied on the water and the scheme is for small towns so the fee will be modest.
Employment	The community wanted to know whether laborers would be brought from outside the community. They added that the y have youths who are able and willing to work.	We shall recommended that local people be given priority during recruitment.
Sex abuse	Concern was raised about the likelihood of contractor's workers engaging in sexual relations with under aged girls.	More sensitisation covering such and other topics such as health gender, HIV will be conducted before the project is implemented.
Project Timeline	The community wanted to know how long the project will take and when it will begin	The designs have been completed we are carrying out assessments, and we shall come back to conduct a RAP. It will begin as soon as all the required clearances are obtained.
Compensation	They also wanted to know what would be done supposing the pipeline affects their property	During the designs, they tried to avoid structures, but if they get affected they will be valued and compensate for
Water distribution	An inquiry was made on whether water will be distributed at their places of worship like churches and if not could be included in the project	The scheme will first serve where there are concentrations of people but at a later stage, it will spread to have a wider coverage.



10:00am



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT th 11/.../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	Olamu Richard Aweze	Agelemu	0777494070 0753331655	
2	SUBULING	ALUKI	0786265342	
3)	ONECIANC	al Jacetz	0784525263	
4,	LAWRENCE-OKUMU	AGELEMU	0740 567149 0721 890 611	
5,	MUGISA Rabed	Agelemu	0755120903 0775324507	
6	WATHUM LININGSTONE Simoni	Agelemu Village	0859137122 0784061453	
7	OCAKI DAUW	-	-	
8	Tumukugye John	Alindeli	0759149600	
9.	PITHUA JILBERT	Agelemu	-	
10	Okumu micle	Agelemu	-	
11.	ODANGA JACOB	Agelemu	-	
12	RWOTHOMIO HENRY	Agelemu	-	
2	13. BITHUM Jamuk	Agelemu	0703693209	
14	Oalkane ALEX Awendoket		0750076547	

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Anyavu/Gazi village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	10 th /11/2022 11:00 am Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Water source	An inquiry was made about why the water is being extracted from Nyagak yet the Nile is nearer	The Project is a gravity flow scheme, which means the source has to be higher than the areas target for supply for it to flow properly
Uncooperative community members	The community raised an issue about what could be done Supposing one of the community members refuses the pipeline to pass through their land	This is why we are here to tell you about the project and how it will be implemented. This project will be for the people so we don't anticipate anyone will refuse. We shall continuously engage such people if any until they appreciate and accept the project for the benefit of majority.
Demand for tap	The community members who anticipate that the pipes will pass into their land freely asked if they would get taps in their homes	The water will be provided in major centres where many people can access it. Once NWSC takes over the project then one can demand a tap at their home.
Project design	They also asked how far the line was from the roadside	The line will be close to the road, the RAP team that will have a surveyor will open up the boundaries for the line and show the community where exactly the line will pass.
Land	The community raised a concern about the pipes having to pass through UWA land and indicated that there are projects that stalled due to this fact and asked if the project will not be affected by that	UWA and M.W.E are government bodies and this will be resolved between them to ensure that the project is implemented sustainably.
Employment	The community inquired if employment would be given to locals when construction commences or if the ministry would bring its own people. They added that if it's the locals, will they be paid or not	The ESIA report will recommended that local people are given priority during recruitment and those engaged will be paid for the effort.
Lack of interest	Community members raised concern about them already paying 200 Uganda shillings at some water sources and they are not interested in this pipe passing in their homes	Members were implored to embrace the project for the benefit of the entire community.

Unfair payment	The community stressed the issue of varied payment for similar work to different individuals.	This noted and will be emphasised in the ESIA report. Such issues will be looked at keenly during the implementation phase.
Taps for institutions	The community expressed the need to extend water to institutions within their area.	We shall let the M.W.E know but we believe these have been considered and included in the scope.
Dishonesty	The community stressed views about different companies showing up to sensitize and later do not implement the projects so they asked if this will be the same issue	Projects go through different processes before implementation so earlier studies could have conducted the said meetings.
Monitoring	An inquiry was made as to who would monitor the pipes after implementation for leakages.	The service provider will be in charge of maintenances.



11:00am



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT10th /11 //2022

S/N	NAME	DESIGNATION- VILLAGE	CONTACT	SIGNATURE
1	ANGULILO GIDRY	AYAVU GAZI	0785466163	
2	RONALD ESILI	AYAVU GAZI	0774420913	
3	DIKU MUNDUA RASU	GAZI	0157158255	
4	ERIZA SIMON	''	0775197636	
5	NGABIWAZIA	MAURINIE		
6	ATIKOBUA BAO	''		
07	AARON JACOB	AYAVU GAZI	0762571379	
08	EYOTARU MULLY	AYAVU GAZI	0761286834	
09	ADRIKO SIRAJI	AYAVU GAZI	0774368708	
10	MUNGULENI HILARY	AYAVU	0788507387	
11	ALOYORANI GRACE	AYAVU	0789946869	
12	DHALERU DINAH	AYAVU	0783788168	
13	ORIONZI MORRISHA	AYAVU GAZI	0774630872	
14	CAMUDIKU COMFER	AYAVU GAZI	0787751715	

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Areju, Lanyi village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	11 th /11/2022 2:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Cost	An inquiry was made as to whether the water will be free of charge	The water will not be free of charge but the charges will be affordable.
Compensation	The community wanted to know if they will be paid in case the pipelines get to pass through their structures and gardens	Compensation will be for any damaged property on the land. The RAP study will explain what is to be compensated and who is eligible for compensation.
Water stressed	They also mentioned that they do not have clean safe water so they end up utilizing water from River Nyagak	Noted
Labour	The community wanted to know if the labour will be required from the community or if the contractor would bring their own workers	No. some workers will be got from the community but the technical ones will be sourced from elsewhere.
Project design	They wanted to know where exactly the pipes would pass.	The RAP team which will have a surveyor will show us the project alignment.
Treatment	The community wanted to know if the water will be treated before distribution	Yes, it will be treated from a treatment plant before distribution
Diseases	The community notified the team that they suffer from waterborne diseases like bilharzia	Noted
Compensation	They wanted to know how cases of damage to property and plants would be handled as the project is undertaken.	Compensation and resettlement modalities will be explained in detail during the RAP study. Important to note is that the project has no provision for compensation for land.





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2:00pm

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...11/...11/2022 AREJU/LANYI

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	MANDHAWUNDA	Plf	"	[Signature]
2	JUSIND WACHAL	JAFUR	"	[Signature]
3	JAWOHO EVARISIO	JAFUR	"	[Signature]
4	OMYUTHI	Chairman	"	[Signature]
5	OLAMA WILLIAM	JAFUR AREJU	0762 270533	[Signature]
6	KISSA WILLIAM	AREJU LCI-CP	0781488411 0781218191	[Signature]
7	WANDOK	C AREJU/LANYI	0770417928	[Signature]
8	OMIRAMBE KENED	"	"	[Signature]
9	OTIRWOTH SITAHIN	"	"	[Signature]

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Atyak (Odihure) village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	11 th /11/2022 4:30 pm Center	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Pipeline distribution	The community wanted to know if the pipes will be placed in their respective homes freely or at a cost because their homes are far away from the centers	Well, for now, the project is looking at distributing water in trading centres where a number of people can access clean safe water. Extension to homes can only be done at a later stage when the operator takes over the scheme.
Employment	The community informed that ESIA team that there are a lot of idle youth who engage in crime but if engaged such time and energy would be spent productively.	This issue has been raised in most villages and to be honest, not everyone will get employed because only a few opportunities will be available but it will be on a first come first serve basis.
Un cooperative members	An inquiry was made on what will be done if a landowner denies passage of the pipe and how this will be resolved	We are here to inform you about the project. Such landowners will be talked to and convinced but it should be put in mind that this project is intended to benefit a wider community
Project commencement	The community expressed the need to know when the project will commence because the elders have to meet with the contractors once on ground	The project started some time back which is why you kept seeing different groups collecting different information and carrying out different studies for instance a team came and conducted the feasibility study to know if the area is suitable for the project and we are here to conduct an ESIA (Environmental and Social Impact Assessment) so it's in phases. The community will be informed of all processes.
Personal taps	The community wanted to know if the people in centers can get their personal taps	Yes they can but after the project has been handed over to a service provider.
Fees collection	An Inquiry was made on who would be in charge of the collection of the money	This information will be given to you before the project is handed over to the service provider to operate it.
Responsible organ	The community wanted to know if this project is under the government or the district	This is a government project





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CONSULTATIVE ENGAGEMENT FORM FOR THE **ESIA**
SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
TEREGO) AND YUMBE.

DATE OF ENGAGEMENT 11/11/2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	ODOKOT V	ATYAK/ODHURE		
2	IDA GA GILBERT	ODHURE		
3	KUMATECH WILLY BRIGHT	ATYAK/ODHURE	0786341358	
4	OTIM/INNOLEM	ATYAK/ODHURE		
05	OKII	ODHURE		
06	John	ATYAK		
07	Shamin	"		
08	OTOM RUSHTI RICHARD	ATYAK		
09	RAIMOND BYOMOTHO	ATYAK	0779565407	
10	Marcelo -B-	"		
11	Owanyiu Lewin	Nyagak		
12	Afrachen Curtine	Nyagak		
13	MUBER SAUDA	ATYAK		
14	makani Anuga	"		
15	Fuasila	"		
16	KASAMB	"		
17	Obey Tantigio	"	0775530241	
19	Onenchem Patrick	"		
20	Akumu Sunday	"		



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CONSULTATIVE ENGAGEMENT FORM FOR THE
 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY
 AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA
 (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...11/...../2022

S/N	NAME	DESIGNATION	VILLAGE	CONTACT	SIGNATURE
1.	AKUMU ROZEHINI		ATYAK		
2	OLANGI RAPHAEL		ODHORE		
3.	CHARLES FAMBONA		"		
4.	KUMAKECH PATRICK		"		
5.	Ayominwa		"		
6.	Piraciw Yunass		"		
7	majunga FRED		"		
8	AJURUVA		"		
9.	Omar		ODHORE		
10	onyuthi		ATYAK		
11	Oyitwoth Bernard		"		
12	KAM A		-		
13	Ocia CAM CHARLES		"		
14	OTIM GIU		"		
15	WEGU-BER. BIRAB		ODHORE/ATYAK		
16	DRYEMA FRANCIS		"		
17	Obnem KIZITO		"		
18	ACOU		"		
19	OGIR NMOENT		"		
20	ONGOM ALFRED		"		

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Ayiju village	
Purpose of meeting	Disclose project and collect environmental and social input of the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	12 th /11/2022 5:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Sensitization	The community indicated that the ministry should sensitize the community about how the management operation and maintenance of the scheme will be after its establishment.	The ministry has plans of sensitizing benefiting communities before the scheme starts running. Sensitisation will surely be done.
Inquiry	An inquiry was made as to whether community land where the pipes will pass would be bought by the government	The government is seeking consent of land owners and will not necessarily purchase the land but will pay for what is on the affected land. The RAP team will expound on resettlement related issues.
Project design	Community members asked whether the government is giving water to people who are only staying where the line will pass	No, public stands or access points will be put in centers such as this where a number of households can easily access water.
Connection to households	They wanted to know whether there was provision to extend water to their respective homes under this project.	Extension to households shall be achieved later but for now, the target is centres and public areas.
Previous water project	The community also wanted to know why M.W.E deceived the public about water which they later implemented and after, the points were closed, off	We will inform them about this and if they have any explanations, they will come through with them
Relocation of graves	The community wanted to know how graves would be treated if affected by the project.	Yes, the graves will be compensated and also be relocated to other safer places in the event that they are affected.
Employment	Inquiry was made as to whether some community members would get employment opportunities.	Yes a few people will be given jobs that do not need expertise





5:00pm

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**CONSULTATIVE ENGAGEMENT FORM FOR THE
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY
AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA
(MADI OKOLLO AND TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT ..12th / ..11 / ..2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
		VILLAGE		
01	KISA ISAACORAS	ATIJU	0783009565	<i>[Signature]</i>
02	ANSON HILLION	AYIJU	0775570050	<i>[Signature]</i>
03	ALLI MUHAMAD	AYIJU	0773661559	<i>[Signature]</i>
04	ANGUANDIA BRUNO	LCI AYIJU	0787584837	<i>[Signature]</i>
05	AFIDRA GORDEAL	ATIJU	0781404714	<i>[Signature]</i>
06	LEMAKU	PATRIC	—	<i>[Signature]</i>
07	ONDIA DISON	AYIJU	—	<i>[Signature]</i>
08	MUGISHAG	CHARLES	—	<i>[Signature]</i>
09	BACIA GLORIA	ATIJU	—	<i>[Signature]</i>
10	AJIDIRU RITA	AYIJU	—	<i>[Signature]</i>
11	ALIANA ALBERG	ATIJU	0741929180	<i>[Signature]</i>
12	ADLIKO RONALD	ATIJU	0797905366	<i>[Signature]</i>
13	ONZIMA NELSON	ATIJU	0770605444	<i>[Signature]</i>
14	ARAIKA GORDEAL	AYIJU	—	<i>[Signature]</i>



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AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA
(MADI OKOLLO AND TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT ..12th / ..11 / ..2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
15	BULIBILA	AYITU	—	[Signature]
16	ONDIA OMAR SAID	AYITU	0772929748	[Signature]
17	ONELLO GEORGE	AYITU	0789224382	[Signature]
18	AMANINGO SALAMA	AYITU	0789010894	A.Salama
19	EKOTARI HARRIET	AYITU	—	HARRIET
20	AYIKORU HARRIET AKOR	AYITU	07833033 59	AYIKORU
21	ASERU PAULA	AYITU	0786411925	Paula
22	AMIA EVALIN	AYITU		AMIA
23	ANIKURU LILIAN	AYITU		
24	ASERU DEBBY	AYITU		
25	DIBAKURU FLORENCE	AYITU		

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Baribu and Drajinii villages	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	10 th /11/2022 3:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Compensation	The community wanted to understand why the ministry has not considered paying for land yet their crops and property is likely to be affected.	The ministry will not compensate for land because land will still belong to the owner. It is only seeking consent to use part of the land. The tank and reservoir area will be compensated for because the owners will no longer use it.
Taps	They wanted to know whether water could be extended to individual households under this scheme	Under this project this may not be achieved however after the scheme is up and running, an individual could apply for extension of water to their property from the service provider
Project design	Inquiry was made about the possibility of changing the design if a building is affected.	The design team tried as much as possible to avoid buildings but in the event that it is inevitable, then such property will be assessed and compensated for.
Compensation	The community also wanted to know what happens to their crops if destroyed during the implementation	Compensation will be for perennial crops and for annual crops, the owners will be given time to harvest before the project starts.
Project Timeline	An inquiry was made about when the project will commence	The project has already started and that is why we are engaging you as stakeholders. Actual works are expected to start once the necessary permissions have been acquired.
Money usage	The community wanted to know who would collect money and why it would be collected	Once the project is finished the MWE will hand it over to a service provider and all this information about fees, operation and maintenance will be communicated to communities.
Employment	The community wanted to know who will excavate where the pipes will laid	It will be a few people from the village or district because not everyone can be employed.





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3:00pm
 Drajini / Baribu

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT 10th / 11 / 2022

S/N	NAME	DESIGNATION- VILLAGE	CONTACT	SIGNATURE
01	AJUMANI GILBERT	BARIBU/DRAJINI VILLAGE	0786624634 075162761	
02	CANDIKOBO ISAAC	"	0793034545 0783866149	
03	ABU-IO DENIS	"	0786285232	
04	DEAMADI SERAFIN	"		
05	AYIKO BURE	"	0780295724	
06	DRIBI JOHN	"	0786197442	
07	EYOCI PETER	Baribu/Drajini	0781646682	
08	AVADE NICKSON	"	0784497072	
09	AUMAKU SUNDAT	"	0774500034 077240637	
10	ATIBRA JOSEPH	Baribu/Drajini	0780187557	
11	ANGUNDU SIMON	Baribu	0780868724	
	KARTHICK KHOLI	"	-	
13	ADIA JUPENOS	"		
14	CHAMBER ROMUS	"	0755436697	



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3:00pm
 Baribu / Drain

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT (Sth / ... / 2022)

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
15	ONDOGA ISAAC	BARIBU	0787567906	[Signature]
16	AMGURI VALENTINE	BARIBU	0760666038	[Signature]
17	YOWERI BAMBWE	"	0781558562	[Signature]
18	KRUMADRI IVAN	"		[Signature]
19	DRAVULE FRANCIS	"		[Signature]
10	AMUCBWA SOVAU	BARIBU	0775847321	[Signature]
11	EYOTAPU	TEREKOKA	0785084029	[Signature]
12	FETI SALUM	BARIBU	0775004055	[Signature]
13	AJIDRA BONIFACE	BARIBU		[Signature]
14	ESABURU	LYIDA		[Signature]
15	Abuhq	ANGELO		[Signature]
16	ALILE	ROGERS	0775761006	[Signature]
17	AVADEBO Cosmas	SO-11		[Signature]
18	OBIDA SUNDAY	BARIBU		[Signature]

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Ndriba Adabu and Ibbi village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	12 th /11/2022 3:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	11. Prayer 12. Remarks from the L.C.1 chairperson 13. Communication from the Ecoserv team 14. Concerns/ views/Issues 15. Closure	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Cost	The community wanted to know how much the water will cost	This team cannot tell with precision what the cost will be but the MWE together with the service provider or operator will discuss this with benefiting communities before the project starts running.
Water stressed	The ESIA team was notified about how water stressed these areas are and the only available clean water sources are as far as 3km from some households.	This is noted. The project intends to reduce on the burden of limited access to clean water through this scheme.
Diseases	A number of water related diseases such as bilharzia and typhoid were reported to be common within their community due to lack of clean water.	Noted
Water flow	They wanted to know who the water would reach all the villages covered under this scheme.	The project is a gravity flow scheme which means the water will flow naturally following the principle that the source or tank is higher than the areas to be served.
Extension to households	The community wanted to know if water can be extended for those that stay far away from the points	Once implementation is done, operations will be handed over to a service provider and that is when community members can request for taps in their respective homes.
Project Timeline	An inquiry was made about when the project would commence	The fact that we are here shows that the project has already started because we are conducting an ESIA
Employment	The community expressed the need to know if the contractor would bring their own technicians or if they will work with the local community	For the experts, they will have to be brought from other regions but for work that they can do, they community members will be given priority
Compensation	The community (landowners) wanted to know how the government will value their land	Another team will come and open up the extent of the line so that we know who and what is affected.

that will be used during project implementation



3:00pm



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT12th...../.....11...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ATIKOBIA COLLINS	Ndribo / Alubi	-	
02	AMICIRI ROSE	Ndribo/Ocebu	-	
03	OPALAFHANSAN	Ndribo/Ocebu	-	
04	ARUMADRI	Ndribo	-	
05	AWA II	Ndribo	-	
06	MATA SUNDAY	Ndribo/Ibbi	-	
07	LUMAKA SIME	Ndribo	-	
08	ABINDA ALEX	Ndribo/Ibbi	-	
09	DRAMANI HURRI	Ndribo/Ocebu	-	
10	WIKRU AGNES	Ndribo/Ibbi	-	
11	ELONIE FRED	Ndribo/Ocebu	-	
12	ADANI EMMA	Ndribo/Ibbi	-	
13	QUMANA BUNAWA	Ndribo	-	
14	RAMANI HURRI	Ndribo	-	
15	ELONIE ALEX	Ndribo	-	
16	MURRAY	Summary	07820450	
17	EZATI	STEPHEN		
18	MAWA IWA	Ibbi	070155080	

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Ndubu village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 2:47 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Water stressed	The community informed the ESIA team that their entire sub county was water stressed which has caused them a lot of suffering	Noted
Employment	Inquiry was made about the possibility of some community members getting employed during project implementation.	A few opportunities will be available especially for casual work. Community members were encouraged to exhibit good code of conduct if chance is given to them.
Fee	They wanted to know whether the water would be for paying for or free of charge because it is a government initiative	The ESIA team informed the community that the water would be for paying for but the charges are usually fair.
Source of water	Community memmbers wanted to know where the water would come from since Arua which had running water is not part of this scheme.	It's a gravity flow scheme and the abstraction point is on River Nyagaka in Awedi keli village.
Suspicious activities by the Feasibility team	The community expressed concern about teams that would occasional visit their area and drill around. They added that the community suspected them to be looking for minerals.	They were informed that that was the feasibility team which had been picking samples and not exploring for minerals as alleged.
Uncooperative land owners	Inquiry was made about what would be done in case some community members don't let the line go through their land.	We shall engage such people through all existing structure to ensure that they understand and appreciate the project. We believe they all people will cooperate.



2:47 pm



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CONSULTATIVE ENGAGEMENT FORM FOR THE ^{ESIA}
 SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.

DATE OF ENGAGEMENT ²⁴ / ¹¹ / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ARAKA	=	ARAKA	<i>[Signature]</i>
02	Ezama mark	NDUBU	-	<i>[Signature]</i>
03	AKUA JOHN	NDUBU	-	<i>[Signature]</i>
04	APANGWA KIZITO	11	0761032003	<i>[Signature]</i>
05	ALUA VINICENT	NDUBU	-	<i>[Signature]</i>
06	MATIWA JUSTINE	NDUBU	-	<i>[Signature]</i>
	MATIAS VINICENT	NDUBU	0781175525 0783698844	<i>[Signature]</i>
08	OUZIMA PATRICK	NDUBU	0783883444	P.K
09	ANIKU	DENIS	0777719089	<i>[Signature]</i>
10	ATIMAKU DENIS	NDUBU	0777672040	<i>[Signature]</i>
11	ADIA	NDUBU	-	<i>[Signature]</i>
12	LENIA SCOVIA	NDUBU	- - -	<i>[Signature]</i>
13	AKOCH CATHY	NDUBU	- - -	<i>[Signature]</i>
14	Zaitan	NDUBU	0787775180	<i>[Signature]</i>

15-ESERIMA NDUBU 0762184287 *[Signature]*
 16-CILIA BEN 11 0787557986 *[Signature]*
 17-KIDUMA MORISHA 11 0760347582 *[Signature]*
 18-OROBIA JOHN 11 0781944530

2:47 pm



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**CONSULTATIVE ENGAGEMENT FORM FOR THE
SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
TEREGO) AND YUMBE.**

MADI OKOLLO

DATE OF ENGAGEMENT...^{8th}...../.....¹¹...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ALIKU KASSIANO	Ndubu East	0739990795	
02	MUNDELA JAMES	NDUBU EAST	0785885601	
03	JIBUA. ALEX	PANZORO	0779478327	
04	ANICIA LOILE	ndubu	0776641365	
05	OLEAMA DEKUIS	Ndubu Cep	0777299796	
06	AFOYORWOITH ANGI	Ndubu	0761916739	
07	SINIA JEMIPHER	Ndubu	0777333552	
08	ABIKO DORISH	NDUBU	0776262077	
09	AYAKA ROSE	ndubu	0781646126	A.R
10	AYAKA JURUTI	ndubu	--	A J
11	ADRIKO MASENSIO	Ndubu	0787388242	
12	MANA SUNDYA	Ndubu	0781083275	MANA
13	ELMA SUNDYA	NDUBU	0785407200	
14	Ondrio	MASENSIO	-	
15	Omenchem	Goodfred	-	
16	BRATELE Emilio	NDUBU	-	

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Ojiba village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	10 th /11/2022 1:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Compensation	An inquiry was made as to whether the MWE would compensate for the entire corridor. They wanted to know what would happen if someone's house is affected	Compensation for land will only be for areas where the tanks and reservoirs shall be located. Where the lines will pass, the ministry will only pay for what will be destroyed on the land such as crops and trees. In the event that a house is within the corridor, it will be valued and paid for.
Collected money	The community wanted to know who will be in charge of the money collected from sell of water. that will be collected	Once the project is implemented, the M.W.E will hand over the operation to a selected service provider. The MWE together with the service provider will establish structure for management of the water point including who collects the money.
Water treatment	Mention was made of river water being contaminated hence the community wanted to know whether they water would be treated before it is shared with the population.	M.W.E is extracting water from River Nyagak and it will be treated before distribution
Employment	They wanted to know if the ministry will offer them casual work to local people since they are offering their land	Yes some few people will be taken especially for casual work. However not everyone interested will get the opportunity because the slots are limited.
Community representatives	An inquiry was made on whether the few people that attended the meeting would be the representatives for the rest of the project for the community	We believe there are more people in the community and the reason we meet a few is that the few will be able to spread the project to the rest of the community this being an entry meeting, we have more and better mobilization will be done in the next meetings
Employment	The community suggested that casual workers be employed from each village so that all affected villages benefit equally	Labour laws do not allow this. This is a world bank funded project were all workers are expected to be given contracts. So the contractor cannot issue contracts every after a few days. The turnover would be too high which wouldn't be good for the project.





1.00pm

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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...10th/...11...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ANGUNDRI ISARE	OJIBA CELL	0489083549 0489083549	<i>[Signature]</i>
02	ZOZO BENJIS	"	0774746092	<i>[Signature]</i>
03	ABIMA SOGA	"	0773211540	<i>[Signature]</i>
04	OJATRE RICHARD		0774281160	<i>[Signature]</i>
05	MADRA EDWARD	OJIBA	0778703652	<i>[Signature]</i>
06	ARUMADRI ROBERT	OJIBA	0783088678	<i>[Signature]</i>
07	ABOBUYO EMMA	OJIBA	0773168242	<i>[Signature]</i>
08	ZUMARA RASHID	OJIBA	0762132487	<i>[Signature]</i>
09	AJIDRA ROBERT	OJIBA	—	<i>[Signature]</i>
10	ABASIKU PLIAM	OJIBA	—	<i>[Signature]</i>
11	ISINDU BIRCHAY	OJIBA	—	<i>[Signature]</i>
12	Edema Arikanyo	Ojiba	—	<i>[Signature]</i>
13	ALIONI KINGSTONE	Ojiba	0777966076	<i>[Signature]</i>
14	ETDIRE RICHARD	OJIBA	0788859579	<i>[Signature]</i>

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Okollo TRC	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 6:00 pm Hall	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Target areas	An Inquiry was made as to whether the water will only be distributed in towns yet the pipes are passing in villages	Town and all major rural centers will get public water stand where the population can get water.
Pipe Distribution	Community wanted to know whether every household would get a water connection.	Under this scheme the arrangement is to first take water to all major centers by providing public access points. Distribution will be at a later stage after arrangement with the service provider. The cost of such extensions will be borne by the one who requests for such extension,
Cost	The community wanted to know how much the water will cost	The ESIA team is not certain. This will be disclosed before the scheme starts running.
Operation	Community members also needed to know who would operate and undertake repairs on the water system during operation.	This project will be handed over to NWSC and they will be in charge once implementation is done.
Time frame	They wanted to know when the project will commence because there are a number of people in the town in need of this water	The project already commenced and different groups have been coming to collect different data from the different villages we are here to conduct an ESIA which will be submitted to NEMA for review. Upon obtaining the NEMA certificate and other clearance from relevant agencies the construction will begin.
Query on studies undertaken	The community reported sometimes teams don't inform local leadership of what they are doing and could meet resistance from the community.	The people that came were conducting a feasibility study from which a draft design was made. on how the water will flow.
Employment	The community expressed the need to know if the contractor would bring their own technicians or if the work will offered to the local community	Certainly the contractor will come with skilled laborers such as technicians but casual laborers and other works

		were capacity is locally available, local people will be considered.
Compensation	The community (landowners) wanted to know how the government will value their land that will be used during implementation	Another team will come and hand all land acquisition and resettlement issues. Important to note though is that land shall not be paid for but rather what is on the land.



6:00 pm



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**CONSULTATIVE ENGAGEMENT FORM FOR THE ESIA
SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
TEREGO) AND YUMBE.**

DATE OF ENGAGEMENT 5th / 11 / 2022

Chairman *

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	AGBARA CHARIS	OKOLLO T/C	0786250030	
02	ACIDRI SAM	OKOLLO	-	
03	AFAYUA VINCENT	PARABU	0758462039	
04	ONZIKUA	OKOLLO	-	
05	OPIRA	OKOLLO	0771388871	
06	OPINUA WILLIAM	OKOLLO T/C	0784564525	
07	SUSAN ALITHA	OKOLLO T/C	07707060	06
08	ASEA KENNETH	OKOLLO T/C	0784520945	
09	ERIMA EMMANUEL	OKOLLO T/C	0780726695	
10	DAMA GILBERT	OKOLLO T/C	-	
11	ALUBUA DENIS	OKOLLO T/C	0786469271	
12	ASII EMMANUEL	OKOLLO T/C	0773114773	
13	OLEA RICHARD	OPIBU	0783409641	
14	ATIKOBUA BENTA	PARABU	0784322506	

6:00pm



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**CONSULTATIVE ENGAGEMENT FORM FOR THE ^{ESIA}
~~SOURCE PROTECTION PLANS (SPP)~~ FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT.....^{8th}...../.....¹¹...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
15	KISA James	Okollo TIC	0772097221	<i>[Signature]</i>
16	ANYAKA BONY	Okollo TIC		<i>[Signature]</i>
17	OLEAMA VINCENT	OKOLLO TIC	078712346	<i>[Signature]</i>
18	AYOMA FRED	OKOLLO TIC	0776169474	<i>[Signature]</i>
19	ANDRUA SUDANY	OKOLLO TIC	-	<i>[Signature]</i>
20	MUNDUA ROBERT	OKOLLO TIC	07498465	<i>[Signature]</i>
21	MARIA PHUEL	OKOLLO TIC	0780614312	<i>[Signature]</i>
22	AND ANADIGNS	Okollo TIC		<i>[Signature]</i>
23	ALBERT ROBERT	Okollo TIC	0781632749	<i>[Signature]</i>
24	AGUMELU HORREH	OKOLLO	0718032510	<i>[Signature]</i>
25	ADOMATRIVAN	Okollo TIC	0775147301	<i>[Signature]</i>
26	AFIOKA SUNDAT	OKOLLO TIC	0783892587	SUNDAT

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Osabu, Anyora villages	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	12 th /11/2022 11:00 am Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Project design	Concern was raised about the likelihood of damaging the water pipes that shall be buried within their gardens as they dig.	The pipes will be buried at a reasonable depth to minimise the likelihood of being damaged.
Employment	They wanted to know where the people to work on the project would be got from.	The contractor will most likely come with skilled laborers to conduct the technical works. However for activities that do not require technical skill, employees will be got from along the project area.
Water Distribution	Inquiry was made as to how people who are far from trading centers would get water. Some community members expressed the need to have water extended to their households.	For now, the study is assessing the areas according to the proposed scope, however after the water reaching the main centers, extension to individual households could be considered. Now water will be in major centers for a wider public.
Cost	They wanted to know whether the water would be for paying for or not	The water will not be free of charge. A small fee will be charged to cater for operation and maintenance costs.
Concern	The community wanted to know why they are paying for water yet they are offering land for the pipes to pass through	Because if land was assessed for payment across the entire scheme then the cost of the project would be too high. The community should know that the project is donor funded but the funds do not cater for land acquisition that is why consent will be sought from land owners so as to obtain permission to access their land.





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1:00 pm

**CONSULTATIVE ENGAGEMENT FORM FOR THE
 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY
 AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA
 (MADI OKOLLO AND TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT 12th / 11 / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
1	AYADEBU CHRIS	AYIBU	-	
2	MATUA GODWIN	AYIBU / OSABU	-	
3	GERIA MARYIA	AYIBU	-	
4	DRASIKU ROSE	0789586840	0789586840	
5	MURKES STEPHEN		0788666618	
6	ODUMA WAN	OSABU / AYIBU	-	
7	ENJAMA HENRY	OSABU	078237332	
8	ADIBO INNOCENT	Abeli / Angesi	-	

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Pamura village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 11:00 am L..C.1 residence	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Compensation	The community members wanted to know if the government will access their affected property for compensation.	The RAP team will explain to all affected communities land acquisition process and what shall be paid for under this scheme. What the community needs to know is that land shall not be paid for but rather the property on the land such as perennial crops and trees.
Security	The community expressed the need for security or a committee that will be in charge of the materials stock pile	This is noted and shall be emphasised in the ESIA report.
Project Timeline	Community members wanted to know how long the project would take before implemented	The project will start as soon as all the necessary certificate and clearance from relevant agencies. For example this study will generate a report that will be submitted to NEMA.
Water stressed	They indicated that the community does not have clean water sources and the available sources are shared with animals.	Noted. This project is intended to improve access to clean water for targeted places
Other water points	The community pointed out the fact that the only boreholes that served the community had been spoilt for over 10 years. They made a request for another borehole to be drilled for them.	This project doesn't handle boreholes but this has been noted and will be used to further stress the need for the project in the area.
Expectation	The community wanted to know if the government will provide them with seeds and schools for their children.	No, this is MWE but we can forward your issues to them through the report we shall deliver to them



11:00 am



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**CONSULTATIVE ENGAGEMENT FORM FOR THE ESIA
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 IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREGO) AND YUMBE.**

DATE OF ENGAGEMENT 8th / 11 / 2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
		VILLAGE		
01	Lawrence Candity Law	Pamuru	0761888358	[Signature]
02	Lekuru Judith	Pamuru	0777865438	[Signature]
03	Amadrony Josephine	Pamuru		[Signature]
04	Amadrony Beatrice	Pamuru		[Signature]
05	ABUTIRU SHADELLA	PAMURA	0778275934	[Signature]
06	ARIKA DENIS	"		[Signature]
07	OMUTORU SUZAN	"		[Signature]
08	RUGA JOSEPH	"	-	[Signature]
09	ABIRIA CHRISPA	"	-	[Signature]
10	ELIMARU VERONICA	"		[Signature]
11	OBUNI JUSTIN	"		[Signature]
12	AJIDIRU BEATRICE	"		[Signature]
13	ERIMA BONIFACE	"		[Signature]
14	ADAMA ABIBAU	"		[Signature]

11:00am



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 TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT ...th8.../.....th11...../2022

S/N	NAME	DESIGNATION- VILLAGE	CONTACT	SIGNATURE
01	NGUMA LEONARD	PAMURA	0783116381	<i>[Signature]</i>
2	EGIMA ROLEX	PAMURA	0788445227	<i>[Signature]</i>
3-	Edma Valery	"	-	<i>[Signature]</i>
4	Okusa James	PAMURA	0786835719	<i>[Signature]</i>
5	RUBAJOJA MUBISI	PAMURA	0778302020	<i>[Signature]</i>
6	EGIMA RICHARD	PAMURA	-	<i>[Signature]</i>
7.	ABRONI ALEX	PAMURA	078514557	<i>[Signature]</i>
8	Dratibi K	pamura		<i>[Signature]</i>
9	ANGU-AMANI ZACHARIA	PAMURA	0753573158	<i>[Signature]</i>
10	EDUMA SAIMAN	PAMURA	0788444437	<i>[Signature]</i>
11	ANRITTA HENA	PAMURA	0779555725	<i>[Signature]</i>
12	DRADRIA WALTER	PAMURA	0789429782	<i>[Signature]</i>
13	ACIDI YASIN	PAMURA	2787141538	<i>[Signature]</i>

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Pamva, Omveko villages	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	9 th /11/2022 5:00 am Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Project design	Inquiry was made about how deep the water pipes would be because most people are farmers hence could accidentally damage the pipes as they undertake their activities.	About 3-5 feet. It should be noted that the line mostly follows the road and is not deep into people's gardens.
Employment	They inquired about where the labour for excavating areas were the pipes would be laid would come from.	It is expected that some casual laborers shall be got from the community. However not everyone will be taken on because slots will be limited and the recruitment will be on a first come first serve basis.
Water Distribution	The community asked how water will reach some of them that stay far away from the main road since the main pipes are at the main road and needed water to be put in their homes	Later if you request they will but for now, they will majorly place the water points at centres
Cost of water	They wanted to know whether the water would be free of charge.	No, it will not be free of charge. A small fee will be charged to cater for operation and maintenance costs.
Concern	The community wanted to know why they are paying for water yet they are offering land for the pipes to pass through	The community contribution in terms land offered is greatly appreciated but this is not comparable to the cost government is going to occur in extending this service.



5:00pm



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT 9th / 11 / 2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
	APAPARI MARTIN	VILLAGE ANYARA/OSABU EAT	0701819029	
	AMYOAM			
	MATWA BENARD	Orabu/Anyara	07760 ⁴ 7796	
	BOSCO BRAZIEL RAMUA		0775902702	
	OKUDABU LINDA PAWDA		0772530880	
	AGUKA ROBIK RAMUA			
	BETHA FRED	Fred Birma		
	ANKAKA JOHN	JOHN OSABU		
	EYOTRE ROBIN	YOYOMU	0771657202	
	BUNDA GATA	ONYAU		
	ABIMIA	DONALD	07866 ³ 1153	
	EMERSON	J. RAMUA		
	ADLEBO COSMAS	RAMUA	077181994	
	OMVIKO	YASINI OSABU		

5:00pm



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT 9th / 11 / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
	ADIBO KALI			
	ANGU YA COLLEGE KALI		0776091691	
	ARUBAKU ENDRU KALI			
	EDEMABA SAPI			

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Panzoro Village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 4:00 pm Center	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Extension of water to households	Community members wanted to know if pipes will be extended to their homes because they stay quite far from the road	Currently, the ESIA team is conducting consultations as per provided scope. The intention is to first extend water to major centres to serve a wider population. Extension to households will be at a later stage and the associated costs for extension will be borne by the one who requests for such extension.
Distribution	An inquiry was made as to whether the whole village would be able to receive water from the tank at Goli	The feasibility study established that areas near and around this tank shall be served properly.
Institutions	They indicated that there is an archdeaconry training institution in their village which they would wish to be considered for extension of water.	This will be communicated to the MWE
Payment for water	Community members wanted to know if the water would be for paying regular monthly bills.	Because most of these will be public water stands, payment will be per Jerri can that one draws. The exact cost will be communicated by the MWE in conjunction with an identified service provider.
Diseases	The community raised a concern about them suffering from waterborne diseases like bilharzia	Noted
Water stressed	They indicated that much as the community is surrounded by streams and wetland, access to clean water is still limited to a few who are close to the only borehole that serves the whole village.	Noted, we shall let the M.W.E know about this



4:00 pm



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**CONSULTATIVE ENGAGEMENT FORM FOR THE EIA
 SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.**

DATE OF ENGAGEMENT 8th / 11 / / 2022

MADI OKOLLO

S/N	NAME	DESIGNATION- VILLAGE	CONTACT	SIGNATURE
01	MANWA ALWIN	DANZORO	0775757306	[Signature]
02	GAWONEN JOSEPH	"	0762280563	[Signature]
03	AJUA Richard	"	NIL	[Signature]
04	KULAST KATE	"	0761035795	[Signature]
05	MURAGUNZA MOSES	"	0774993735	[Signature]
06	WATA BWA RICHARD	"	0796627066	[Signature]
07	ALIA ROBERT	"	0777441239	Alia N.
08	ARIJUA Stephen	DANZORO	0777063677	[Signature]
09	ARINCA ALEX PETER	- DO -	0777609305	[Signature]
10	ASUMWAN Godfrey	- DO -	0778160899	[Signature]
11	DRAMUKU ELSON	- DO -	07798121029	[Signature]
12	AYAKARA RUTH SIMONE	DANZORO	-	[Signature]
13	ADUJA YOSIA	"	0779475261	[Signature]
14	DKDTH - A. DWESMUR	SEC. SOCIAL SERVICES " TC	0781476154	[Signature]

4:00 pm.



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**CONSULTATIVE ENGAGEMENT FORM FOR THE ESIA
SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
TEREGO) AND YUMBE.**

DATE OF ENGAGEMENT^{8th}...../.....¹¹...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ERESITHO DLALE	PANZORO	0762290563	<i>[Signature]</i>
02	JIBUA ALEX	PANZORO	0779478627	<i>[Signature]</i>
03	SUNDAY PHILIP	PANZORO	071837325	<i>[Signature]</i>
04	MUSEMMA ZEVI	STUDENT	0762602850	<i>[Signature]</i>
05	FANI KENNEDY	LCI C/PERSON	0777878116	<i>[Signature]</i>
06	OCOKORO MORINE	PANZORO	N/A	MORINE
07	ANTCHANSIPORA	N/A	0789208409	<i>[Signature]</i>
08	ANGUBORO FEN	PANZORO	0756652426	<i>[Signature]</i>
09	AYOMA FRANCIS	-do-	0780404685	A.F.

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Parabu and Opibu Villages	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	10 th /11/2022 6:00 pm Center	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Faulty taps	The community wanted to know whether this project would repair some taps that had been installed some time back.	Those taps are not part of this project hence they will not be repaired.
Employment	The community wanted to know if the contractor would bring their own technicians or if they will work with the local community	For the experts, they will have to be brought from other regions but for work that community members can do, they will be given priority during recruitment.
Water stressed	The ESIA team was notified about how the area is water stressed and they wanted to know how many other villages are included on this scheme.	A number of villages and centers are covered as per a copy of the scheme we have shared with you. All the villages indicated will be served.
Commencement of the project	Community members also wanted to know when the project or work will commence	This and other studies are what precede project implementation. Once all the necessary permits and clearances are obtained from key agencies then the actual works will begin. The project already started.
Treatment	Concern about how water would be purified before supply or distribution was made. They added that water from Nyagaka was dirty hence may not be suitable for direct consumption.	A treatment plant will be established where this water will be cleaned and treated before it is transmitted to the different tanks for distribution.
Compensation	The community (landowners) wanted to know how the government will value the land they will offer for use	The RAP team will follow shortly to explain all land acquisition related issues and what and how compensation will be handled. However land will not be compensated for under this project.





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6:00pm

CONSULTATIVE ENGAGEMENT FORM FOR THE
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 AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA
 (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT.....10th...../.....11...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
1	GIRISIM ANGI	PARABU	-	<i>[Signature]</i>
2	MALAKA DAVID BISOYO	LCI/IMBU PARABU	0777451491	<i>[Signature]</i>
3	WUSRI TICHALIB	DAMABU	-	<i>[Signature]</i>
4	MAWA KEWEN	OPIBU	-	<i>[Signature]</i>
5	SAMUEL BAKER	OPIBU	078042856	<i>[Signature]</i>
6	Afaka MOSES	OPIBU	0760059490	<i>[Signature]</i>
7	NYONI MIRIUK	OPIBU	-	<i>[Signature]</i>
8	MARTINE CHRISTOPHER	OPIBU		<i>[Signature]</i>
9	ATOMA GUBBER	OPIBU	0785180938	<i>[Signature]</i>
10	AKELLO EMILY	PARABU	0774099945	<i>[Signature]</i>
11	ESERIMA VINCENT	PARABU	0780678872	<i>[Signature]</i>
12	OLEMA DICKSON	LCI OPIBU	078171529	<i>[Signature]</i>
13				
14				

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Patru village	
Purpose of meeting	Disclose project and collect environmental and social input of the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 1:00 pm L.C.1 residence	
Present	List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Project design	Inquiry was made as to whether the water pipes would be made to cross the road so that people from either side are served.	The pipe is stopping as and where the map directs and if the network has been designed as such, then it will cross the road because these pipes are passing through the ground.
Household taps	Community members asked if the water would be extended up to everyone's home.	The contractor will put the water in the major centers but later it will be distributed to different home steads by the operator or service provider at a cost of whoever wants the water extended.
Payment for water	Inquiry was made as to whether the water will be free once construction is done.	No, the water will not be for free there will be a small amount that will be paid per jerry can. This will be used for meeting the operation and maintenance costs.
Funding	The community wanted to know if they are required to make any financial contribution for the water to be extended to their areas.	No, it's a government of Uganda project so the cost of extending water to all areas as shown on the map rests with the MWE.
Employment	Concern was expressed as to whether the gravity scheme project will use machines or engage local labour and if so, will they be paid?	Local people will be needed for work that is not technical. The opportunities maybe limited in number so not everyone will be taken on. The project is world bank funded and one of the requirements during implementation is adherence to national and international labour laws hence whoever works will be paid.
Project timelines	The community wanted to know how long the project will take to commence.	The project already started. Actual works will begin once all the necessary permits and clearances are obtained from the responsible agencies.
Water stand points	An inquiry was made as to how many stand points each village would have	As for now, we cannot know where the points will be but they will where there are concentrated settlements to ensure that a number of people get clean water.

Implementation	The community asked if a similar project had been implemented elsewhere	Yes, this has been implemented in many other districts
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1:00pm

**CONSULTATIVE ENGAGEMENT FORM FOR THE ECIA
SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
TEREGO) AND YUMBE.**

MADI OKOLLO

DATE OF ENGAGEMENT 8th / 11 / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	ALIONI PATRICK	PATRU	0761904916	<i>[Signature]</i>
02	DRAZA ALEX	PATRU	0785233965 07741192931	<i>[Signature]</i>
03	MUSUBU JOHN	"	0781931240	<i>[Signature]</i>
04	MOSSES ODUU	PATRU	0788976617	<i>[Signature]</i>
05	ACIDRI ISSAC	PATRU		<i>[Signature]</i>
06	SURUA VINCENT	PATRU	0789405149	<i>[Signature]</i>
07	ATDIA JOSEPH	PATRU	0779874569	<i>[Signature]</i>
08	MATUA HILLARY	PATRU		<i>[Signature]</i>
09	OBETIA GIFT	PATRU		<i>[Signature]</i>
10	FEMI HILLARY	PATRU		<i>[Signature]</i>
11	AKCA DORISH	PATRU		<i>[Signature]</i>
12	BULEA BENNIS	PATRU	0785576663	<i>[Signature]</i>
13	PASKOLE ACIDRI	PATRU	-	<i>[Signature]</i>
14	ALENT OSEBU	PATRU	0789902868	<i>[Signature]</i>



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1:00 pm

**CONSULTATIVE ENGAGEMENT FORM FOR THE ESIA
 SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.**

MADI OKOLLO

DATE OF ENGAGEMENT 5th / 11 / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
1	BACIA JEAN	PAIRU	—	[Signature]
2	PASKULINA AFRICA	PAIRU	—	[Signature]
3	ROBSON ROBSON	PAIRU	077713237	[Signature]
4	LETARU COMFORT	PAIRU	0772980097	[Signature]
5	DRANDUA	MASENIDSE		[Signature]
6	AIRAMA	SIMOT	0774672163	[Signature]
7	DRANDUA MASENIDSE	PAIRU	0775335348	[Signature]
8	KISA JIREVI	LCI PAIRU	0788124489	[Signature]

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Vuu village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	10 th /11/2022 5:00 pm Centre	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Compensation	Concern was expressed about how the damage to crops would be handled given that this is a rural setting and people derive their livelihood from farming. They wanted assurance that damage to crops would be paid for.	Compensation will be awarded for perennial crops. However for annual crops the affected persons will be given time to harvest. The RAP team will offer further guidance on compensation.
Water charges	An inquiry was made about how often the money charged will be paid	The water will be paid per jerry can whenever one fetches.
Coverage	The community wanted to know if the project is covering the whole of Madi okollo and when it would commence	The project is covering most villages in Madi okollo and once the exercise we are conducting is done, NEMA will receive a report and upon issuance of the certificate and the ministry obtaining clearance from other agencies, the project will commence.
Maintenance	The community raised concern of the water bill being paid for and asked who would repair the system in case there is damage	The money that will be paid will be used to repair and maintain the water system.
Employment	Community members asked if they would be employed by the contractor	A few community members will be given jobs. Note should be taken that not everyone will be taken because the slots are limited.
Complaint	The people raised a concern about how NWSC doesn't maintain the taps and pipes of the already existing water sources and yet they pay for the services	Noted and we shall inform M.W.E so that the same mistake is not repeated under this scheme.





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5:00pm

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DATE OF ENGAGEMENT...10th / / 2022

L.G.I

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	AHONT BEN MICHAEL	VUU	0774071320	<i>[Signature]</i>
02	KIRIA B. GILBERT	VUU	0789377887	<i>[Signature]</i>
03	DRAIE JOHN	GAITO	0771275371	<i>[Signature]</i>
04	BURU ALFREDO	VUU	0778310353	<i>[Signature]</i>
05	ADIA JACKSON	VUU	0773321490	<i>[Signature]</i>
06	AYUMA MURRAY	VUU	0758145511	<i>[Signature]</i>
07	AYIKOCIA JULIET	VUU	0787765412	<i>[Signature]</i>
08	DROMA ISAAC	VUU	0776290854	<i>[Signature]</i>
09	OLERU CRISTINE	VUU	0783430223	<i>[Signature]</i>
10	ONDIRI GHORIA	VUU	0761040108	<i>[Signature]</i>
11	LUZIGURU WANG	VUU	0777167050	<i>[Signature]</i>
12	ASEGA BRIAN	VUU	0777738601	<i>[Signature]</i>
13	SITABAYA VIOLAH	VUU		<i>[Signature]</i>
14	AMVIKO LIBERTI	VUU	0762378696	<i>[Signature]</i>



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5:00 pm

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 AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA
 (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT ^{10th} / ¹¹ / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
15	LEKURE BRENDA	VUU	078550180	lekure
16	AMVIKO CASHER	VUU	0782 ² 98547	casher
17	DRATELE PHILLIAM	VUU	-	dratele
18	DRIBIRI JACSON	VUU	-	JJ.
19	KUGABU ASAMUEG	VUU	0770599161	Asamueg
20	ERIMA	VUU	077053 ¹⁰³	Erima
21	ARIKA ELISA	VUU	-	Arika
22	ODIO ESTAWU	VUU	-	Estawu
23	BUGA STEPHEN	VUU	-	Buga
24	ABUKO JOHN	VUU	0784649343	Abuko
25	KADRIGA JOMAN	VUU	0719904810	Joman
26	BOB IYAU	VUU	0785501172	Iyau

Meeting held with communities of Anibu and Pajuru

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Anibu Pajuru	
Purpose of the meeting	To disclose the project and collect social and environment input into the proposed river Nyagak gravity flow scheme	
Date, time, place of the meeting	9:30am center	
present agenda	A list of the stake holders is appended to the report	
	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from chairman 3. Communication from Ecoserv 4. Concerns/views 5. closure 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN RAISED	RESPONSE/GUIDANCE
Labour	The community wanted to know whether they will be considered for employment during the construction stage	The community will be given first priority when it comes to casual labour.
Payment of water	Members of the community inquired if they would be paying for the water going to be availed	Public taps will be put in centers and areas where people converge and water will be at a cost. The MWE will share more information about the cost of water as the project advances.
Water distribution	The community wanted to know how the population in areas off the road were going to access water if the public stands are only put in trading centers.	At the beginning the water will be in centers but with time the network will spread.
Project timeline	They wanted to know when the project would start.	The project will start after all necessary certificates and permits are obtained and the ESIA certificate is one of them. We can't tell with certainty but probably mid next year.

Meeting held with Anibu, Arasi and Ayira villages

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Anibu/Arasi/Ayira village	
Purpose of the meeting	To disclose the project and collect social and environment input into the proposed river Nyagak gravity scheme.	
Date, time, place of meeting	12:00am center	
present agenda	A list of stake holders is appended to the report	
	<ol style="list-style-type: none"> 1. prayer 2. remarks from the LC1 chairman 3. communication from Ecoserve 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN RAISED	RESONSE

Water payment	The community wanted to know whether water under the proposed project would be free of charge.	The water will not be free, a small fee will be collected for operation and maintenance purposes
Compensation	The community wanted how acquisition of the corridor would be handled under this project. Additionally they wanted to know what would be done if crops and houses are damaged.	Land will not be paid for under this project. However if property such as crops trees and structures are affected, these shall be paid for.
Project design	The members wanted to know whether the pipes will be designed home to home or if they would be placed at one central place.	The MWE plans to implement this through the use of central points where a given number of taps will be placed in an agreed area accessible by many.
Employment	An inquiry was made if the local community would be considered for casual jobs like excavation	Priority will be given priority to the local community once construction starts

Meeting held with communities of Ayira

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Ayira village	
Purpose of meeting	To disclose the project and collect social and environment input into the proposed river Nyagak gravity flow scheme	
Date, time, place of meeting	01:6pm LC1 residence	
present	A list of stake holders is appended to the report	
agenda	<ol style="list-style-type: none"> 1. prayer 2. remarks from the LC1 chairman 3. communication from Ecoserve 4. concern/issues/views 5. closure 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN RAISED	RESPONSE/ GUIDANCE
Water payment	The community wanted to know whether the water would be for paying for or if it shall be free of charge.	The water will be provided at a cost. This will be determined and communicated to the general populace before the project is commissioned.
Money usage	Members wanted to know who would be collecting the water fee and for what purpose.	Once the project is handed over to NWSC for operations, they will communicate who will be in charge of the collections. This will be expounded on by the ministry through meeting that will be conducted later as the project advance..
Labour	The members inquired if they would be considered for some jobs during project construction.	Yes. A few members from the villages and districts because not everyone because the opportunities are limited.
Project timeline	The community inquired about when the project would commence.	The project has already begun that's why the ESIA team is on ground. Actual physical work will begin after all permits

		and clearances from relevant agencies are in place.
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Meeting held with Kango and Anyora Villages

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Kango Anyora	
Purpose of the meeting	To disclose the project and collect social and environment input into the proposed River Nyagak gravity scheme	
Date, time, place of the meeting	11:00am center	
present	A list of stake holders is appended to the report	
agenda	<ol style="list-style-type: none"> 1. prayer 2. remarks from the LC1 Chairman 3. communication from Ecoserve 4. concerns/views 5. closure 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN RAISED	RESPONSE/GUIDANCE OFFERED
Delay in information sharing	The chairperson wanted to know why the local leadership was not informed about the project prior to this meeting with the entire community.	Apologies, the feasibility team conducted some preliminary studies before but hence forth, the local leaders will be informed of all planned and ongoing project activities.
Compensation	Community members wanted to know if land owners would be compensated	Another team will come and explain in detail the land acquisition procedure. Important to note is that land shall not be paid for save for where the tank and reservoir will be.
Water stressed	The community stressed that they do not have clean safe drinking water and that they are at risks of getting diseases	Noted. The project if successfully implemented will solve this and many more water related problems
Costs of water	Members inquired whether they will be a cost for the water	Yes, there will be a cost but it will be determined at alter stage. It will be affordable
Level of education for labour	The members wanted to know what level of education will be required for one to be considered for casual labour	Once the contactor comes, they will let the community know what kind of work is available and can be done by community members. It is then that the required knowledge and skills will be defined.

Minutes of meeting held with members of Mabanda Village Pawor Sub County

project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM
Category of stake holders	Project affected people of Mabanda village Pawaor subcounty.
Purpose of the meeting	Disclose the project and collect social and environment input into the proposed R. Nyagak gravity flow scheme

Date, time, place of meeting	9 th /11/2022 2:20PM CENTER	
Present	A list of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. prayer 2. remarks from LC1 chairman 3. communication from Ecoserv team 4. concerns /views/issues 5. closure 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN RAISED	RESPONSE
Water situation	Community members indicated that their village did not have any clean water source be it borehole or piped water. Currently River Nile is their principle water source.	Public taps will be put in places where everyone can be able to access and with that members will also be able to have clean and safe drinking water.
Project timeline	They inquired about when the actual physical works of laying the pipes and putting up tanks would start.	The project will start as soon as all the necessary clearances and certificates are obtained. However the ESIA team cannot determine with certainty because our assignment stops at delivering ESIA report.
Employment	Community members asserted that they expect the project to offer employment opportunities to the youth.	The need to prioritize the local community during recruitment will be emphasised in the ESIA report.

Minutes for meeting held with Odhure village members

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Odhure village	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	11 th /11/2022 6:00 pm L.C.1 residence	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 16. Prayer 17. Remarks from the L.C.1 chairperson 18. Communication from the Ecoserv team 19. Concerns/ views/Issues 20. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Compensation	The community wanted to know how landowners will benefit from offering their land for this project	There is no compensation for land. Government will seek consent from land owners to use their land. Property such as trees and crops and any built structure if encountered will be compensated for.
Pipeline distribution	The community wanted to know if the pipes will be placed in their respective	Well, for now, the project is looking at distributing water in centres where a

	homes at no cost because their homes are far away from the centres	number of people can access clean safe water. Distribution to individual households will be at a later stage.
Employment	A request was made by community member to employ the youth during the construction phase to reduce on idle time and earn them some income for a while.	This issue has been raised in most villages and to be honest, not everyone will get employed because a few people will be picked.
Pipe passage	An inquiry was made about what will be done if the landowner denies passage of the pipe and how this will be resolved	We are here to inform you about the project so that you see the need for it in the village, such landowners will be talked to so that they understand and appreciate the project.
Project commencement	The community expressed the need to know when the project will commence because the elders have to meet with the contractors once on ground	The project started some time back which is why you kept seeing different groups collecting different information and carrying out different studies. The actual physical works will begin once the required certificated and permits are acquired.
Personal taps	The community wanted to know if the people in centres can get their personal taps	Yes they can but after the project has been handed over to NWSC. Extension shall be at the cost of the one requesting for water.





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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT ...11/...11/2022

S/N	NAME	DESIGNATION / Village	CONTACT	SIGNATURE
		ODHURE		
	OLAYIA PAPA	ODHURE	---	
	MOSES NYAYE	ODHURE		
	WANAK STEPHEN	ODHURE	---	
	Owachtgin	Sunday	---	
	PATUWA	BAVAN	0761539204	
	Omwu Fredy	Odhure	0770571388	
	Bwoli mgyio	KIZITO	0161277538	
	ovona Alfred	odhure	---	
	Obeni KASIM	odhure	0761195473	
	Mungusaka Innocent	Odhure	0786909619	
	OYIRUMTH STIVIN	odhure	---	
	Joiyee Akach	odhure	Kama	
	Jenisa Anithoot		---	
	Kumakech Festo Afuka	odhure	0785264203	
	Afuka Leonard	odhure	0771146837	
	Afuka dommick	odhure	0754393859	
	Wanaka Stephen	odhure	---	

Meeting held with communities of Okollo Town Council

Project Name	River Nyagak & Enyau gravity flow scheme	
Category of stakeholders	Project Affected Persons of Okollo TRC	
Purpose of meeting	Disclose the project and collect environmental and social input on the proposed River Nyagak gravity flow scheme	
Date, time and place of meeting	8 th /11/2022 6:00 pm Hall	
Present	A List of stakeholders is appended to the report	
Agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from the L.C.1 chairperson 3. Communication from the Ecoserv team 4. Concerns/ views/Issues 5. Closure 	
Summary of meeting proceedings		
Theme	Issue/Concern raised	Response/guidance offered
Target areas	An Inquiry was made as to whether the water will only be distributed in towns yet the pipes are passing in villages	Town and all major rural centers will get public water stand where the population can get water.
Pipe Distribution	Community wanted to know whether every household would get a water connection.	Under this scheme the arrangement is to first take water to all major centers by providing public access points. Distribution will be at a later stage after arrangement with the service provider. The cost of such extensions will be borne by the one who requests for such extension,
Cost	The community wanted to know how much the water will cost	The ESIA team is not certain. This will be disclosed before the scheme starts running.
Operation	Community members also needed to know who would operate and undertake repairs on the water system during operation.	This project will be handed over to NWSC and they will be in charge once implementation is done.
Time frame	They wanted to know when the project will commence because there are a number of people in the town in need of this water	The project already commenced and different groups have been coming to collect different data from the different villages we are here to conduct an ESIA which will be submitted to NEMA for review. Upon obtaining the NEMA certificate and other clearance from relevant agencies the construction will begin.
Query on studies undertaken	The community reported sometimes teams don't inform local leadership of what they are doing and could meet resistance from the community.	The people that came were conducting a feasibility study from which a draft design was made. on how the water will flow.
Employment	The community expressed the need to know if the contractor would bring	Certainly the contractor will come with skilled laborers such as technicians but casual laborers and other works

	their own technicians or if the work will offered to the local community	were capacity is locally available, local people will be considered.
Compensation	The community (landowners) wanted to know how the government will value their land that will be used during implementation	Another team will come and hand all land acquisition and resettlement issues. Important to note though is that land shall not be paid for but rather what is on the land.



6:00 pm



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CONSULTATIVE ENGAGEMENT FORM FOR THE ESIA
 SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.

DATE OF ENGAGEMENT 8th / 11 / 2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
01	AGBARA CHARIS	OKOLO T/C	0786250030	<i>[Signature]</i>
02	ACIDRI SAM	OKOLO	-	<i>[Signature]</i>
03	AFAYUA VINCENT	PARABU	0758462039	<i>[Signature]</i>
04	ONZIKUA	OLII	-	<i>[Signature]</i>
05	OPIRA	Okollo	0771388891	<i>[Signature]</i>
06	OPINIA HILLARY	OKOLO T/C	078565525	<i>[Signature]</i>
07	SUSAN ALITHA	OKOLO T/C	07707060	06 <i>[Signature]</i>
08	ASEA KENNETH	Okollo T/c	0784520945	<i>[Signature]</i>
09	ERIMA EMMANUEL	OKOLO T/C	0780726695	<i>[Signature]</i>
10	ODAMA GILBERT	OKOLO T/C	-	<i>[Signature]</i>
11	ALUBUA DENIS	OKOLO T/c	0786469271	<i>[Signature]</i>
12	ASII EMMANUEL	OKOLO T/C	0773114773	<i>[Signature]</i>
13	OLEA RICHARD	OPIBU	0783409641	<i>[Signature]</i>
14	ATIKOBUA BENTA	PARABU	0784322506	<i>[Signature]</i>



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6:00pm

CONSULTATIVE ENGAGEMENT FORM FOR THE ^{ESIA}
~~SOURCE PROTECTION PLANS (SPP)~~ FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS
 IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND
 TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...^{8th}.....¹¹...../2022

S/N	NAME	DESIGNATION VILLAGE	CONTACT	SIGNATURE
15	KISA James	Okollo TIC	0772097221	Kisa
16	ANAYAKA BONNY	Okollo ilc		Bonny
17	OLEAMA VINCENT	OKOLLO TIC	078712346	Oleama
18	AYOMA FRED	OKOLLO TIC	0775169474	Ayoma
19	ANDRUA SUDANY	OKOLLO TIC	-	Andrua
20	MUNDUA ROBERTA	OKOLLO TIC	07498465	Mundua
21	MIRIA PHUEL	OKOLLO TIC	078061422	Miria
22	AND ANJIDENS	Okollo TIC		And Anjiden
23	ANJON ROBERT	Okollo TIC	0781632949	Anjon
24	AGUNDU HORESA	OKOLLO	0778032510	Agundu
25	ADEMATI IVAN	Okollo TIC	0775147301	Ademati
26	AFIORA SUNDAT	OKOLO TIC	078389287	SUNDAT

A meeting held with communities of Pajobi/Arasi

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Pajobi/Arasi	
Purpose of meeting	To disclose the project and collect environment and social input on the proposed River Nyagak	
Date, time, place of meeting	3:23pm Center	
present agenda	A list of stakeholders is appended to the report	
	<ol style="list-style-type: none"> 1. prayer 2. remarks from LC1 chairman 3. communication from Ecoserve 4. concerns/views/issues 5. closure 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUES/VIEWS/ CONCERNS RAISED	RESPONSES/GUIDANCE
Project design	An inquiry was made about where the pipes will pass	The pipes will mainly pass through the road reserve. The RAP team will have a surveyor who will demarcate exactly where the line will pass
Water source	The community wanted to know why water will be extracted from River Nyagak	The project is gravity flow scheme and River Nyagak is at a high elevation.
Employment	The community inquired whether the locals would be given jobs during the construction stage when it commences or the ministry will bring its own people.	Community members will be given first priority for work they can execute.
Dishonesty	A complaint was raised about several companies that have talked about extending clean water but they disappear without a trace.	The project will surely be executed but before a number of activities and study have to be conducted before construction.
Water costs	The members inquired whether the water would be provided for free	The water will not be free. A small fee will be collected for maintenance

Meeting held with communities of Pajuru Ovibu

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM	
Category of stake holders	Project affected persons of Pajuru Ovibu	
Purpose of the meeting	To disclose the project and collect social and environment input into the proposed river Nyagak	
Date, time, place of meeting	4:30pm Community church	
present agenda	A list of stakeholders is appended to the report	
	<ol style="list-style-type: none"> 1.prayer 2.remarks from the LC1 chairman 3.comunication from Ecoserve team 4. issue/concerns 5. closure 	

SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUE/CONCERN	RESPONSE
Project coverage	A member wanted to know if taps would be extended to each household	Under this project its not possible but once its handed over to NWSC one can request and apply for one
Water stressed	Community members thanked the ESAI team for informing them about the project and affirmed that it is very much needed in the area.	Noted.
Compensation	The community inquired if there would be compensation for land owners along the road reserve	Land shall not be paid for except for where the tanks will be. However whatever property on the land that gets damaged will be compensated for.
Employment	They wanted to know if employment opportunities would be offered to local people during implementation of the project.	The ESIA report will recommend that local people are given priority during recruitment.

Meeting Held With Parabour Upper Village Members.

Project name	ALA-ORA WATER SUPPLY AND SANITATION SYSTEM
Category of stake holders	Project affected people of Parabour upper village
Purpose of meeting	To disclose the project and collect social and environment input into the proposed River Nyagak gravity flow scheme.
Date, time, place of meeting	9 th /11/2022 2:00pm center
present	List of stakeholders is appended to the report
agenda	<ol style="list-style-type: none"> 1. Prayer 2. Remarks from chairman LC1 3. Communication from Ecoserv team 4. Concerns / issues or views 5. closure

SUMMARY OF MEETING PROCEEDINGS		
Theme	Issue/ concern raised	Response /guidance offered
employment	Inquiry was made as to whether community members would be employed during the construction	The ESIA report will recommend that priority be given to local people to undertake work that may require skills available among the community. It should be noted that not everyone will be employed because the opportunities will be limited hence the first come first serve basis will be followed for those who meet the criteria.
Unreliable water sources	Then community informed the ESIA team about the available water sources that dry up during the dry season save for the Nile. They also notified the team that the available	Noted.

	water sources are not sufficient for everyone	
Water payment /costs	A concern was raised about the high costs for the existing scheme. Based on this they said the cost of water under this scheme should be affordable otherwise people would continue using unsustainable sources despite the water extension.	The cost will be set by the operator with guidance from the ministry. It will certainly be affordable for the objective of increasing access to clean water to be achieved.
Compensation	Clarification was sought as to whether they land would be affected and if so how government has planned to handle land related matters	The transmission lines will largely be along the road. However where personal property is affected. Consent shall be sought from land owners. However it should be noted that payment will only be for what is on land such as crops and trees. Structures have been avoided but in the event that a structure is affected, it will be assessed and compensated for. The RAP team will detail the land acquisition process. road reserve and therefore won't affect their land, but if any crops are destroyed they will be compensated. more so the pipes will be buried in the ground.
Distribution of water	One of the elders in the community raised a concern about the existing piped water scheme not having extended water to their households	Under this scheme, water will not be extended to households either but rather to major centers. This is intended to serve a wider community for public stand pipes.

Minutes for meeting held in Pauni village

Project name	ALA-ORA WATER SUPPLY AND SANITATION SUPPLY	
category of stakeholders	Project affected persons of Pauni village	
Purpose of meeting	To disclose the project and collect social and environment input on the proposed River Nyagak gravity flow scheme	
Date, time, place of meeting	12 th /11/2022 4:30pm LC1 chairman residence	
present	A list of stake holders is appended to the report	
agenda	<ol style="list-style-type: none"> 1. prayers 2. remarks from LC1 chairman 3. communication from Ecoserve 4. concerns/views/ issues 	
SUMMARY OF MEETING PROCEEDINGS		
THEME	ISSUES/VIEWS	RESPONSE
Water costs	The community wanted to know how much the water would cost	The ESIA team is not in position to know what the cost of water will be but we shall advise MWE that the cost should be affordable for community.

Transmission lines and distribution lines	The community wanted to know whether the transmission and distribution lines would affect their land.	Land will not be paid for. An assessment for what is on land will be made and that is what will be paid for.
Labour	The LC1 requested that community members be given priority during recruitment	A few of the locals will be selected for particular types of work like excavation.
Monitoring	They wanted to know about who would conduct maintenance in case there is damage to the water pipe pipes	The operating company will work to ensure that the scheme runs as expected by among others maintain the water transmission lines



Pamua

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DATE OF ENGAGEMENT.....9/.....Nov/2022

Youth Leader →

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
15	ABASIKU JERAM	PAMVA	0775347887	[Signature]
16	AIUSOBU SIEHA	PAMVA	-	[Signature]
17	ABBONS HASSAN	PAMVA	0782100371	[Signature]
18	SIEHA AMYU	PAMVA	- - -	[Signature]
19	DIAMANI RONAKI	PAMVA	0788502271	[Signature]
20	MUNGURU AICE	PAMVA	- -	[Signature]
21	AMUMARI JOHN	PAMVA	-	[Signature]
22	ALIKI GIBESI	PAMVA	0778833421	[Signature]



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Pamva

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DATE OF ENGAGEMENT... 9 / Nov / 2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	BOYO JOHAN	OTRUTRU	-	
2	OMZIMA DRESTE	OTRUTRU	-	
3	ENZAMA	JOHN	-	
4	ORMATI ROY	ROY PAMVA	0780789544	
5	ASIRI JORAM	OTRUTRU	-	
6	APANGU HILLARY	AA	0778904466	
7	Onziga Sam	PAMVA	-	
8	LEWIS ADIMA	PAMVA	-	
9	ANBICA HUDSON	PAMVA	-	
10	OPONG GAY	11	-	
11	SIKO NESIA	11	-	
12	ONZIA MARY	11	-	
13	WIKORO BAIFA	11	-	
14	ARIAKA SILVER	11	-	



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DATE OF ENGAGEMENT 12/11/2022

PAJURU-OVIBU

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	OBOTE CHRISTOPHER	PAJURU-OVIBU	0780459171	
2	ORIM ALFRED	PAJURU-OVIBU	0783600802	
3	Aliona Ruben	PAJURU-OVIBU	—	
4	Droma MUHAMAD	PAJURU-OVIBU	0762675008	
5	MATUA ALEX	OVIBU	—	
6	JOHN TOKO	OVIBU	—	
7	JAWAMBE ALAN	OVIBU	—	
8	JIKII EDSON	OVIBU	0775932002	
9	IGITA FLORENCE	OVIBU	—	
10	CANDIA STEPHEN	WCI C/M	0784253281	



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Oyeke (Ayira)

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DATE OF ENGAGEMENT 12 / 11 / 2022

S/N	NAME	DESIGNATION / VILLAGE	CONTACT	SIGNATURE
1	ASEM CHRISTOPH	OYEKE	077036301	<i>[Signature]</i>
2	Nguma Simon	OYEKE	07620617572	<i>[Signature]</i>
3	KOROO DISIDU	OYEKE	-	<i>[Signature]</i>
4	ADRON KASIM	OYEKE	-	<i>[Signature]</i>
5	AMAZA NOBERS	OYEKE	0772722272	<i>[Signature]</i>
6	OPIO BOSCO	OYEKE	0761632875	<i>[Signature]</i>
7	MADIMU RICHARD	OYEKE	077144927	<i>[Signature]</i>
8	KUMARECH FRED	OYEKE (Ayira)	-	-
9	ABIDRAGO ALBENS	OYEKE	-	-
10	KEUTISA NYIRAU	OYEKE	-	<i>[Signature]</i>
11	CANDIA GDS FRED	OYEKE	-	-
12	CANDIRU SLOVIA	OYEKE	-	<i>[Signature]</i>
13	DRISARU ALICE	OYEKE	-	-
14	AMANIYO MONIKA	OYEKE	-	<i>[Signature]</i>



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DATE OF ENGAGEMENT 12/11/2022

AMIRA

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	ASEBA CHRISTOPHER	OYEKU	0770363009	<i>[Signature]</i>
2	PASTOR E AIRIA	OYEKU	-	<i>[Signature]</i>
3	BROMA MARINA	OYEKU	-	<i>[Signature]</i>
4	DKITO RENUJO	OYEKU	-	<i>[Signature]</i>
5	ANDRUA MICHAEL	OYEKU	-	<i>[Signature]</i>
6	ONADOMA JIMMY	OYEKU	-	<i>[Signature]</i>
7	ANDEOYE JIMMY	OYEKU	-	
8	KISA SAVIDA	OYEKU	-	<i>[Signature]</i>
9	OSUMBEY JOYCE	OYEKU	-	
10	AYENYU MARGRETH	OYEKU	-	<i>[Signature]</i>
11	AMIA GRACE	OYEKU	-	<i>[Signature]</i>
12	AFOYUCAN IRIM	OYEKU	-	<i>[Signature]</i>
13	ATINYANG GRACE	OYEKU	-	<i>[Signature]</i>
14	PARIMU HABES	OYEKU	-	<i>[Signature]</i>



ESL

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Pauni

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT th 12 / 11 / 2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01	DNZIKRA ALBERT	Chief	0787796992	<i>[Signature]</i>
2	CANDIRU CIANGAUDE	PAUNI		<i>[Signature]</i>
3	Adiri Gilds	PAUNI		<i>[Signature]</i>
4	Munglani MISSINA	PAUNI		<i>[Signature]</i>



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Pajuru and Anyibu

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT *11/ May* /2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	<i>Dr Jean Jubitih</i>	<i>Pajuru village</i>	<i>0788633338</i>	<i>[Signature]</i>
2	<i>Elizabethy tortu</i>	<i>Anyibu village</i>		<i>[Signature]</i>
3	<i>Mundua denis</i>	<i>Pajuru village</i>		<i>[Signature]</i>
4	<i>DAVID AMARA</i>	<i>Pajuru Village</i>	<i>—</i>	<i>[Signature]</i>



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Pajuru / Anibus

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...11/...Nov/2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	Azama M	PAJURU	-	
2	ARIMA CHARLES	PAJURU	075509982	
3	AMAZA. Gordon	Anibus	-	
*4	LEWALY MOSES	PAJURU	0784202096	
5	AMADEO DAVID	PAJURU	-	
6	ADDUNA JOHN	PAJURU	078233384	
7	ASWOTER ABURU	PAJURU	-	
8	ADAMIA LUCIANI	PAJURU	-	
9.	OLA MARY	PAJURU	-	
10	Bulia ALFRED	Anibus	-	
11	BADARU BEATH	PAJURU	-	
12	CHANDA VINCENT	PAJURU	-	
B	Awudo Dominic	PAJURU	-	
14	Okecha F.	ANIBU	0760943407	



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DATE OF ENGAGEMENT...12/.....11...../2022 *Arribu town*

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	<i>AALUWAZI ZAD</i>	<i>KEJ VABRIBU</i>	<i>0775482666</i>	<i>[Signature]</i>
2	<i>Madina Johnstone</i>	<i>senior citizen</i>	<i>0751742558</i>	<i>[Signature]</i>



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Zombo - Atto
 Waterpointe
 Pailha s/c

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT ...11.../.....11.../2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
	Batemyele Jera	CAO	077246970	
	Ruvakuma Lawrence	A.W.O	077274588	
	OKWIKWENGU WILFRED	SUB COUNTY CHIEF	0777907677	
	AKACHINGO GRACE	CDD	0787156900	Grace
	UKEITHI WILLIAM	LC III C/P	0777943670	
	ADUBANGO NICK	P/CHIEF - AMET	0783386308	
	ABEDICAW PATRICIA	P/CHIEF TEREKO	0778888794	
	MASENDI JENNIFER	P/CHIEF	0779216813	



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Mubanda
 Village

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT 9, May /...../2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	AROMBORACH JACQUELINE	MUBANDA	0785317908	<i>[Signature]</i>
2	AZIKU GEORGE	MUBANDA	—	<i>[Signature]</i>
3	ORESTHO	MUBANDA	—	<i>[Signature]</i>
4	MICHAEL LOMAK	MUBANDA	—	<i>[Signature]</i>
5	JAKO ALFRED	MUBANDA	—	<i>[Signature]</i>
6	OPIO JOSHUA	MUBANDA	—	<i>[Signature]</i>
7	OLOKI GEORGE	MUBANDA	—	<i>[Signature]</i>
8	ACANI MARATH	MUBANDA	—	<i>[Signature]</i>
9	ROBAT OROMA	MUBANDA	07-77820720	<i>[Signature]</i>



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Upper Parabok Village

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GFS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

DATE OF ENGAGEMENT 9, Nov /2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
1	ACHARA J.	UPPER PARABOK	0787157611	[Signature]
2	ADAMICHI JOSEPH	UP PARABOK	—	[Signature]
3	OPIU INNOCENT	UPPER PARABOK	078684154	[Signature]
4	ONKWEHAN CHAMEL	UPPER PARABOK	—	[Signature]
5	EMMACULITE	FAIDA UPPER	—	[Signature]
6	OJENY BOL	UPPER PARABOK	—	[Signature]
7	OLOKI INNOCENT	U-Parabok	—	[Signature]
8	NYAKWARAFOYO WALIER	UPPER-P	0771951970	[Signature]
9	AGNES AKURUBA	UPPER-	—	[Signature]
10	OHIM JULIE	THAMHELE	0775290005	[Signature]
11	AFOYOCAM GRACE	THAMHELE	—	[Signature]
12	ACEA HARIEN	THAMHELE	—	[Signature]
13	OROTH SANTA	THAMHELE	—	[Signature]
14	AMIDOH CHRIS	THAMHELE	0776100322	[Signature]



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*Upper Parabok
 Leaders*

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT...../...../2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01.	JOEN MARCELO	ELDER	0781039705 0756155037	<i>[Signature]</i>
02.	AKERA O. ENORA	ELDER	0784657210	<i>[Signature]</i>
03.	OSONGURA XAVIER	P/ CHIEF	0783199100	<i>[Signature]</i>
04.	THOWEKA FELIX	C/MANU LCI	0782151858	<i>[Signature]</i>
05.	OSONGURA RONALD	TOIT	07885022	



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CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT 12/11/2022

Madi-Okollo District

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01	Dr. Dravu Ceaser	medical officer	0725591739	<i>Dravu</i>
02	MATUA KIWASHI	SAS ANYIACRU	0982077365	<i>[Signature]</i>
03	DRABE ISMAIL	DLC V	0772511399	<i>[Signature]</i>
04	TOKO SITUAG	RDC	0782842115	<i>[Signature]</i>
05	EZARUKU KAZIIRA	CAO	0712829692	<i>[Signature]</i>
06	ARUMADEI ERIC	DWD	0777629862 07772986	<i>[Signature]</i>
07	DRITO FREDIE	INDR TOWN CLARK	0788116887	<i>[Signature]</i>
08	ALFRED OCHAN	Amic AFAI	077322077	<i>[Signature]</i>
09	Amamya Anile	Ecological Monitoring & Research OFFAKA	0774976821	<i>[Signature]</i>
10	DRAMAA PLIMO	LCIII C/MAN OFFAKA	0782912694	<i>[Signature]</i>
11	ONZIMA SUNDAY	SUB COUNTY CHIEF	0782286924	
12	DRAST LINDO	Ag. Koyiribw Lukusw Skry	0771969504	<i>[Signature]</i>
13	ACEWA COSMAS	PCHIEF	0774444105	<i>[Signature]</i>

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MINISTRY OF WATER AND
ENVIRONMENT
P. O. BOX 20026
KAMPALA - UGANDA

In any correspondence on
this subject please quote Ref. No. ADM/164/05

26th October, 2022

The Chief Administrative Officer
Madi Okollo District



CONSULTANCY SERVICES TO UNDERTAKE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), RESETTLEMENT ACTION PLAN (RAP) AND SOURCE PROTECTION PLANS (SPP) FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICTS OF ARUA (MADI OKOLLO AND TEREGO) AND YUMBE.

INTRODUCTION OF ECOSERV LTD

The Government of Uganda (GOU) through the Ministry of Water and Environment (MWE) received funds from the World Bank and intends to use part of the funds for implementing the Integrated Water Management and Development Project (IWMDP). The development objective (PDO) of this project is to improve (i) access to water supply and sanitation services and (ii) integrated water resources, planning and management in Uganda. The IWMDP shall involve construction of Water Supply and Sanitation infrastructure in Rural Communities, Rural Growth Centres and in refugees and host communities. These infrastructures include; Large Gravity Flow Schemes, Large solar powered piped water supply systems and Public/institutional sanitation facilities.

Under the Rural Water Supply and sanitation sub component 1.2- Support to Refugees and host Communities, Ala-Ora GPS with two schemes of Nyagak and Enyau Water Supplies and Sanitations Systems has been planned in the districts of Madi - Okollo, Terego and Yumbe.

To actualize this plan, MWE procured a consultant (M/S ECOSERV LTD) to carry out Environmental and Social Impact Assessment (ESIA) Resettlement Action Plan (RAP) and Source Protection Plans (SPP) for Ala-Ora Water Supply and Sanitation Systems in Enyau and Nyagak GPS in Refugee Host Districts of Arua (Madi Okollo and Terego) and Yumbe.

This communication serves to introduce to you the consultant and also ask you to accord the consultant any support that may be required from time to time.

Eric Ssegona Jwales

FOR PERMANENT SECRETARY

CC: LC, V. Enyau (on Madi Okollo District)

CC: WTC, Madi Okollo (on file)



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Nebbi sk

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DATE OF ENGAGEMENT 11 / Nov / 2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01	UKETHWENGU ERIC JIMMY	SAS - Nebbi SIC	0772515383	
02	OKENHO BENSON	HRA - NEBBI SIC	0773122789	
3	LUPINY EDWARD	SAA - Madi Okollo	077658458	
4	OKETHWENGU DJUKU RICHARD	DISTRICT ENVIRONMENT OFFICER	0772625908	
5	ANICHAN EVALINE	DISTRICT WATER OFFICER	0782003727	
6	Wambui David	CAS	0782966450	



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Angiribu slc

CONSULTATIVE ENGAGEMENT FORM FOR THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA), FOR ALA-ORA WATER SUPPLY AND SANITATION SYSTEMS IN ENYAU AND NYAGAK GPS IN REFUGEE HOST DISTRICT OF ARUA (MADI OKOLLO AND TEREKO) AND YUMBE.

DATE OF ENGAGEMENT ...10/...11.../2022

S/N	NAME	DESIGNATION	CONTACT	SIGNATURE
01	KOMAKRECH PATRICK	PARISH CHIEF	0772034400	
02	ANGULU GODFREY	COO Angiribu	0774415303	

ANNEX 3: WATER TEST RESULTS



NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY - BUGOLOBI
 P.O. BOX 7053 KAMPALA Email: waterquality@nwsco.co.ug

CERTIFICATE OF ANALYSIS

CLIENT: Ecoserv Limited
Address: Kololo, Uganda
Sampled by: Client Staff
Date Sample Received: 09/11/2022

Document No: NWSC/WQ/QF/21.2A
Invoice No: LS131/INV/2022/1134
Date of Report: 05/12/2022


Parameters	Units	Nyagak Downstream River E: 277645, N: 282630	National Standards for Untreated Potable water
Sample Number	--	3072/2022/C/B	
Alkalinity: Total	mg/L	54.8	500
Bact: Faecal coliforms	CFU/100mL	30	0
COD	mg/L	51	Not Specified
Electrical Conductivity (EC)	µS/cm	104.9	2500
Hardness: Total	mg/l,	54.4	600
pH(Physical-Chemical)	-----	7.19	5.5 – 9.5
Total Dissolved Solids(TDS)	mg/L	67.136	1500
Total Suspended Solids(TSS)	mg/L	27	0
Turbidity	NTU	31.18	25

Remarks
 Chemistry: The water sample showed complying physiochemical characteristics with exception of TSS and Turbidity as provided for by the National Standards for Untreated Potable water.
 Biology: The water sample showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: **Manager Central Laboratory Services:**

APPROVED BY: **Senior Manager - Water Quality Management Department:**

The NWSC certificate of analysis by no means constitutes a permit to any person or company undertaking to conduct business
 *** This report reflects results of the sample as received at the laboratory premises.





NATIONAL WATER AND SEWERAGE CORPORATION
CENTRAL LABORATORY - BUGOLOBI

P.O BOX 7053 KAMPALA Email: waterquality@nwsco.ug

CERTIFICATE OF ANALYSIS

CLIENT: Ecoserv Limited

Address: Kololo, Uganda

Sampled by: Client Staff

Date Sample Received: 09/11/2022

Document No: NWSC/WQ/QF/21.2A

Invoice No: LS131/INV/2022/1134

Date of Report: 05/12/2022

Parameters	Units	Nyagak Upstream River E: 276430, N: 276055	National Standards for Untreated Potable water
Sample Number	--	3071/2022/C/B	
Alkalinity: Total	mg/L	49.2	500
Bact: Faecal coliforms	CFU/100mL	36	0
COD	mg/L	13	Not Specified
Electrical Conductivity (EC)	uS/cm	111.0	2500
Hardness: Total	mg/L	44.4	600
pH(Physical-Chemical)	-----	6.93	5.5 – 9.5
Total Dissolved Solids(TDS)	mg/L	71.04	1500
Total Suspended Solids(TSS)	mg/L	21	0
Turbidity	NTU	19.38	25

Remarks

Chemistry: The water sample showed complying physiochemical characteristics with exception of TSS as provided for by the National Standards for Untreated Potable water.

Biology: The water sample showed uncomplying bacteriological characteristics as provided for by the National Standards for Untreated Potable water.

AUTHORISED BY: Manager Central Laboratory Services: 

APPROVED BY: Senior Manager - Water Quality Management Department: 

The NWSC certificate of analysis by no means constitutes a permit to any person or company undertaking to conduct business

*** This report reflects results of the sample as received at the laboratory premises.



ANNEX 4: DAILY VEHICLE INSPECTION FORM

VEHICLE REGISTRATION NUMBER: _____

WEEK ENDING DATE _____

	ITEM DESCRIPTION	G= GOOD ORDER B= BAD CONDITION						
		MON	TUE	WED	THU	FRI	SAT	SUN
1	LEAKS – WATER / FUEL							
2	OIL LEAKS – ENGINE / DIFFERENTIAL / GEARBOX / HYDRAULIC							
3	TYRES – FRONT / REAR / SPARE / PRESSURE / NUTS							
4	WINDSCREEN / WINDOWS / MIRRORS							
5	BODY WORK – DOORS / HANDLES / CHASSIS / PANALS							
6	VEHICLE LICENCE / REGISTRATION PLATES - VALIDITY							
7	EXHAUST – ENGINE SMOKE / PROPERLY SECURED							
8	LEVELS – OIL / WATER / BRAKES / CLUTCH / HYDRAULIC							
9	BATTERY – WATER LEVEL / CONNECTIONS / CABLES							
10	ABNORMAL WEAR ON STEERING							
11	BRAKES – FOOT / HAND / AIR							
12	LIGHTS – MAIN / STOP / PARK							
13	INDICATORS – FRONT / REAR							
14	REFLECTORS – FRONT / REAR AND REAR CHEVRONS							
15	JACK / WHEEL SPANNER / WARNING TRI-ANGLES							
16	HORN / WINDSCREEN WIPERS							
17	INTERIOR – SEATING / INSTRUMENTATION / HOUSEKEEPING							
18	FIRST AID KIT							
19	FIRE EXTINGUISHER							
20	LOADING AREA EQUIPMENT PROPERLY SECURED							
21	PROPER HOUSEKEEPING ON LOADING AREA							
20	VEHICLE ROADWORTHY							
21	REMARKS:							
22	NAMES OF PERSON CONDUCTING INSPECTION:							

DAILY VEHICLE LOGSHEET				
DATE	ODOMETER START OF TRIP READING	ODOMETER END OF TRIP READING	TRIP DISTANCE (KM)	TRIP DETAILS

Supervisor's Name: _____

Sign: _____

ANNEX 5: LIST OF PLANT SPECIES IDENTIFIED IN THE PROJECT AREA

		Conservation Status		
Family	Name	IUCN	National	Notes
Acanthaceae	<i>Asystasia gangetica</i> (L.) T. Anders.	LC	LC	
Acanthaceae	<i>Dyschoriste radicans</i> Nees	LC	LC	
Acanthaceae	<i>Hygrophila auriculata</i> (Schum.) Heine	LC	LC	
Amaranthaceae	<i>Achyranthes aspera</i> L.	LC	LC	
Anacardiaceae	<i>Lannea barteri</i> (Oliv.) Engl.	LC	LC	
Anacardiaceae	<i>Lannea humilis</i> (Oliv.) Engl.	LC	LC	
Anacardiaceae	<i>Lannea schimperi</i> (Hochst.ex A.Rich.) Engl.	LC	LC	
Anacardiaceae	<i>Lannea schweinfurthii</i> (Engl.) Engl.	LC	LC	
Anacardiaceae	<i>Mangifera indica</i> L.	LC	LC	
Anacardiaceae	<i>Ozoroa insigins</i> Del.	LC	LC	
Anacardiaceae	<i>Sclerocarya birrea</i> (A.Rich.) Hochst.	LC	LC	
Anacardiaceae	<i>Searsia natalensis</i> (Rhus natalensis Krauss.)	LC	LC	
Anacardiaceae	<i>Pseudospondias microcarpa</i> (A.Rich.) Engl.	VU	LC	
Annonace	<i>Annona muricata</i> L.	LC	LC	Fruit planted
Annonace	<i>Annona senegalensis</i> Pers.	LC	LC	
Apiaceae	<i>Centella asiatica</i> (L.) Urban.	LC	LC	
Apocynaceae	<i>Saba comorensis</i> (Boj.ex A.DC) Pichon	LC	LC	
Araliaceae	<i>Cussonia arborea</i> Hochst.ex A.Rich.	LC	LC	
Asclepiadaceae	<i>Pentarrhinum insipidum</i> E. May.	LC	LC	
Asteraceae	<i>Acanthospermum hispidum</i>	LC	LC	
Asteraceae	<i>Acmella caulirhiza</i> Del.	LC	LC	
Asteraceae	<i>Ageratum conyzoides</i> L.	LC	LC	
Asteraceae	<i>Aspilia kotschyi</i> (Sch.Bip.ex Hochst.) Oliv.	LC	LC	
Asteraceae	<i>Bidens pilosa</i> L.	LC	LC	
Asteraceae	<i>Chromolaena odorata</i> (L.) R.M.King & Robins	LC	LC	Invasive
Asteraceae	<i>Conyza sumatrensis</i> (Retz.) E.Walker	LC	LC	
Asteraceae	<i>Crassocephalum crepidioides</i> (Bernth.) S.Moore	LC	LC	
Asteraceae	<i>Emilia discifolius</i> Oliv.	LC	LC	
Asteraceae	<i>Erlangea cordifolia</i> (Benth.ex Oliv.) S. Moore	LC	LC	
Asteraceae	<i>Galinsoga parviflora</i> Cav.	LC	LC	
Asteraceae	<i>Helianthus annuus</i> L.	LC	LC	Cultivated
Asteraceae	<i>Melananthera scandens</i> (Schum. & Thonn.) Rob.	LC	LC	
Asteraceae	<i>Partenium hysterophorus</i> L.	LC	LC	Invasive
Asteraceae	<i>Synedrella nodiflora</i> (L.) Gaertn.	LC	LC	

Asteraceae	<i>Tithonia diversifolia</i> (Hemsl) A. Gray	LC	LC	Invasive
Asteraceae	<i>Tridax procumbens</i> L.	LC	LC	
Asteraceae	<i>Vernonia amygdalina</i> Del.	LC	LC	
Asteraceae	<i>Vernonia cinerea</i> (L.) Less	LC	LC	
Asteraceae	<i>Vernonia lasiopus</i> O.Hoffm.	LC	LC	
Balanitaceae	<i>Balanites aegyptiaca</i> (L.) Del.	LC	LC	
Bignoniaceae	<i>Kigelia africana</i> (Lam.) Benth.	LC	LC	
Bignoniaceae	<i>Stereospermum kunthianum</i> Cham	LC	LC	
Boraginaceae	<i>Cynoglossum lanceolatum</i> Forssk.	LC	LC	
Capparaceae	<i>Boscia salicifolia</i> Oliv.	LC	LC	
Capparaceae	<i>Cleome monophylla</i> L.	LC	LC	
Capparaceae	<i>Crateva adansonii</i> DC	LC	LC	
Caricaceae	<i>Carica papaya</i> Linn.	LC	LC	
Celastraceae	<i>Gymnosporia heterophylla</i> (Eckl. & Zeyh.) Loes.	LC	LC	
Celastraceae	<i>Gymnosporia senegalensis</i> (Lam.) Loes.	LC	LC	
Combretaceae	<i>Combretum collinum</i> Fresen.	LC	LC	
Combretaceae	<i>Combretum molle</i> (R.Br. ex G.Don.)Engl. & Diels	LC	LC	
Combretaceae	<i>Combretum paniculatum</i> Vent.	LC	LC	
Combretaceae	<i>Terminalia brownii</i> Fresen,	LC	LC	
Combretaceae	<i>Terminalia mollis</i> M.A.Lawson	LC	LC	
Commelinaceae	<i>Commelina africana</i> L.	LC	LC	
Commelinaceae	<i>Commelina benghalensis</i> L.	LC	LC	
Convolvulaceae	<i>Hewettia sublobata</i> (L.f.) O.Kuntze	LC	LC	
Convolvulaceae	<i>Ipomoea cairica</i> (L.) Sweet	LC	LC	
Cucurbitaceae	<i>Luffa cylindrica</i> (Linn.) M. J. Roem.	LC	LC	
Cucurbitaceae	<i>Momordica foetida</i> K. Schum.	LC	LC	
Cyperaceae	<i>Abildgaardia ovata</i> (Burm.f.) Kral.	LC	LC	
Cyperaceae	<i>Cyperus esculenta</i>	LC	LC	
Cyperaceae	<i>Cyperus cyperoides</i>	LC	LC	
Cyperaceae	<i>Cyperus denudatus</i> Linn.f.	LC	LC	
Cyperaceae	<i>Cyperus difformis</i> L.	LC	LC	
Cyperaceae	<i>Fimbristylis ferruginea</i> Vahl	LC	LC	
Cyperaceae	<i>Kyllinga alba</i> Nees	LC	LC	
Dichapetalaceae	<i>Tapura fischeri</i> Engl.	LC	LC	
Dioscoreaceae	<i>Dioscorea dumetorum</i>	LC	LC	
Dioscoreaceae	<i>Dioscorea sansibarensis</i> Pax	LC	LC	
Dioscoreaceae	<i>Dioscorea schimperiana</i> Hochst.ex Kunth	LC	LC	
Euphorbiaceae	<i>Acalypha bipartita</i> Mull. Arg.	LC	LC	
Euphorbiaceae	<i>Acalypha ciliata</i> Forsk.	LC	LC	

Euphorbiaceae	<i>Acalypha neptunica</i> Mull. Arg.	LC	LC	
Euphorbiaceae	<i>Acalypha ornata</i> A.Rich.	LC	LC	
Euphorbiaceae	<i>Acalypha</i> Villicaulis Hochst.	LC	LC	
Euphorbiaceae	<i>Bridelia brideliifolia</i> (Pax) Fedde	LC	LC	
Euphorbiaceae	<i>Bridelia scleronuera</i> Mll. Arg.	LC	LC	
Euphorbiaceae	<i>Croton macrostachyus</i> Hochst.	LC	LC	
Euphorbiaceae	<i>Erythrococca bongensis</i> Pax	LC	LC	
Euphorbiaceae	<i>Euphorbia heterophylla</i> L.	LC	LC	
Euphorbiaceae	<i>Flueggea virosa</i> Viogt.	LC	LC	
Euphorbiaceae	<i>Manihot esculenta</i> Crantz.	LC	LC	Cultivat ed
Euphorbiaceae	<i>Micrococca mercurialis</i> (L.) Benth.	LC	LC	
Euphorbiaceae	<i>Phyllanthus amarus</i> Schum & Thonn.	LC	LC	
Euphorbiaceae	<i>Ricinus communis</i> L.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Aeschynomene elaphroxylon</i> (Guill. & Perr.) Taub.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Aeschynomene indica</i> L.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Aeschynomene sensitiva</i> Swartz	LC	LC	
Fabaceae. Caesalpinioideae	<i>Caesalpinia decapetala</i> (Roth) Alston	LC	LC	
Fabaceae. Caesalpinioideae	<i>Leucaena leucocephala</i> (Lam.) de Wit.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Piliostigma thonningii</i> (Schum.) Milne- Redhead.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Senna hirsuta</i> (Lam.) H.S. Irwin & Barneby	LC	LC	
Fabaceae. Caesalpinioideae	<i>Senna occidentalis</i> (L.)Link	LC	LC	
Fabaceae. Caesalpinioideae	<i>Senna siamea</i> (Lam.) H.S. Irwin & Barneby	LC	LC	
Fabaceae. Caesalpinioideae	<i>Senna singueana</i> (Del.) Lock	LC	LC	
Fabaceae. Caesalpinioideae	<i>Sesbania macrantha</i> Phill. & Hutch.	LC	LC	
Fabaceae. Caesalpinioideae	<i>Sesbania sesban</i> (L.) Merr	LC	LC	
Fabaceae. Caesalpinioideae	<i>Tamarindus indica</i> L.	NE	VU	
Fabaceae. Caesalpinioideae	<i>Tylosema fassoglensis</i> Torre & Hillc.	LC	LC	
Fabaceae. Faboideae	<i>Alysicarpus glumaceus</i> (Vahl) DC	LC	LC	
Fabaceae. Faboideae	<i>Alysicarpus rugosus</i> (Willd.) DC	LC	LC	

Fabaceae. Faboideae	<i>Cajanus cajan</i> (L.) Huth	LC	LC	Cultivat ed
Fabaceae. Faboideae	<i>Clitoria ternata</i> L.	LC	LC	
Fabaceae. Faboideae	<i>Craibia brownii</i> Dunn	LC	LC	
Fabaceae. Faboideae	<i>Craibia laurentii</i> (De Wild.) De Wild.	LC	LC	
Fabaceae. Faboideae	<i>Crotalaria spinosa</i> Benth.	LC	LC	
Fabaceae. Faboideae	<i>Desmodium repandum</i> (Vahl) DC	LC	LC	
Fabaceae. Faboideae	<i>Desmodium salicifolium</i> (Poir.) DC.	LC	LC	
Fabaceae. Faboideae	<i>Desmodium triflorum</i> (L.) DC.	LC	LC	
Fabaceae. Faboideae	<i>Desmodium velutinum</i> (Willd.) DC	LC	LC	
Fabaceae. Faboideae	<i>Dolichos kilimandscharica</i> Taub.	LC	LC	
Fabaceae. Faboideae	<i>Glycine max</i> (L.) Merr.	LC	LC	Cultivat ed
Fabaceae. Faboideae	<i>Indigofera arrecta</i> Hochst. ex A. Rich.	LC	LC	
Fabaceae. Faboideae	<i>Indigofera spicata</i> Forssk.	LC	LC	
Fabaceae. Faboideae	<i>Lonchocarpus laxiflorus</i> Guill. & Perr.	LC	LC	
Fabaceae. Faboideae	<i>Pseudarthria hookeri</i> Wight & Arn.			
Fabaceae. Faboideae	<i>Rhynchosia hirta</i> (Andr.) Meik & Verdc.	LC	LC	
Fabaceae. Faboideae	<i>Tephrosia nana</i> Kotschy	LC	LC	
Fabaceae. Faboideae	<i>Tephrosia pumila</i> (Lam.) Pers.	LC	LC	
Fabaceae. Faboideae	<i>Tephrosia vogelii</i> Hook.f.	LC	LC	
Fabaceae. Faboideae	<i>Teramnus labialis</i> (L.f.) Spreng.	LC	LC	
Fabaceae. Faboideae	<i>Vigna unguiculata</i> (L.) Walp.			
Fabaceae. Faboideae	<i>Vigna vexillata</i> (L.) A.Rich.	LC	LC	
Fabaceae. Mimosioideae	<i>Aeschynomene abyssinica</i>	LC	LC	
Fabaceae. Mimosioideae	<i>Albizia zygia</i> J.F. Macbr.	LC	LC	
Fabaceae. Mimosoideae	<i>Chamaecrista mimosoides</i> Standl.	LC	LC	
Fabaceae. Mimosoideae	<i>Vachellia hockii</i> (De Wild.) Seigler & Ebinger	LC	LC	
Flacourtiaceae	<i>Dovyalis abyssinica</i>	LC	LC	
Lamiaceae	<i>Clerodendrum myricoides</i> (Hochst.) Wedd.	LC	LC	
Lamiaceae	<i>Clerodendrum rotundifolium</i> Oliv.	LC	LC	
Lamiaceae	<i>Gmelina arborea</i> Roxb.	LC	LC	
Lamiaceae	<i>Hyptis suaveolens</i>	LC	LC	
Lamiaceae	<i>Leonotis nepetifolia</i> (L.) Ait.f.	LC	LC	
Lamiaceae	<i>Orthosiphon australis</i>	LC	LC	
Lamiaceae	<i>Tectona grandis</i> L.f.	LC	LC	
Lamiaceae	<i>Vitex doniana</i> Sweet	LC	LC	
Loganiaceae	<i>Strychnos innocoua</i>	LC	LC	
Malvaceae	<i>Abutilon hirtum</i> (Lam.) Sweet	LC	LC	
Malvaceae	<i>Corchorus trilocularis</i> L.	LC	LC	
Malvaceae	<i>Hibiscus diversifolia</i>	LC	LC	

Malvaceae	<i>Sida rhombifolia</i> L.	LC	LC	
Malvaceae	<i>Sterculia setigera</i> Del	LC	LC	
Malvaceae	<i>Urena lobata</i> L	LC	LC	
Malvaceae	<i>unid (Malakwang) Hibiscus</i>	LC	LC	Cultivated
Melastomataceae	<i>Dissotis canescens</i>	LC	LC	
Meliaceae	<i>Azadirachta indica</i>	LC	LC	
Meliaceae	<i>Pseudocedrella kotschy</i>	LC	LC	
Menispermaceae	<i>Cissampelos mucronata</i> A. Rich.	LC	LC	
Menispermaceae	<i>Stephania abyssinica</i>	LC	LC	
Moraceae	<i>Antiaris toxicaria</i> (Rumph.ex Pers.) Lesch.	LC	LC	
Moraceae	<i>Artocarpus heterophyllus</i>	LC	LC	
Moraceae	<i>Ficus</i> (small)	LC	LC	
Moraceae	<i>Ficus brachypoda</i>	LC	LC	
Moraceae	<i>Ficus lutea</i>	LC	LC	
Moraceae	<i>Ficus mucuso</i> Fichalo	LC	LC	
Moraceae	<i>Ficus polita</i>	LC	LC	
Moraceae	<i>Ficus sur</i>	LC	LC	
Moraceae	<i>Ficus thonningii</i>	LC	LC	
Moraceae	<i>Ficus brachypoda</i>	LC	LC	
Moraceae	<i>Milicia excelsa</i> (Welw.) C.C.Berg.	NT	EN	
Myrtaceae	<i>Eucalyptus spp.</i>	LC	LC	
Nyctaginaceae	<i>Boerhaavia coccinea</i>	LC	LC	
Olacaceae	<i>Ximenia americana</i>	LC	LC	
Orobanchaceae	<i>Striga asiatica</i> (L.) Kuntze	LC	LC	Invasive
Pedaliaceae	<i>Sesamum angustifolium</i> (Oliv.) Engl.	LC	LC	Invasive
Pedaliaceae	<i>Sesamum indicum</i> L.	LC	LC	Cultivated
Phyllanthaceae	<i>Hymenocardia acida</i>	LC	LC	
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i> L.	LC	LC	
Poaceae	<i>Andropogon gayana</i>	LC	LC	
Poaceae	<i>Aristida adscensionis</i>	LC	LC	
Poaceae	<i>Brachiaria brizantha</i> (A. Rich.) Stapf	LC	LC	
Poaceae	<i>Chloris gayana</i>	LC	LC	
Poaceae	<i>Cynodon dactylon</i> (L.) Pers.	LC	LC	
Poaceae	<i>Digitaria abyssinica</i> (Hochst. Ex A.Rich.) Stapf	LC	LC	
Poaceae	<i>Echinochloa hapclada</i>	LC	LC	
Poaceae	<i>Eleusine indica</i> (L.) Gaertn.	LC	LC	
Poaceae	<i>Eragrostis aspera</i> (Jacq.) Nees	LC	LC	
Poaceae	<i>Eragrostis ciliaris</i>	LC	LC	

Poaceae	<i>Eragrostis exasperata</i>	LC	LC	
Poaceae	<i>Eragrostis racemosa</i>	LC	LC	
Poaceae	<i>Eragrostis tenuifolia</i>	LC	LC	
Poaceae	<i>Heteropogon contortus</i> (L.) Roem. & Schult.	LC	LC	
Poaceae	<i>Hyparrhenia diplandra</i> A. Rich.	LC	LC	
Poaceae	<i>Hyparrhenia filipendula</i> (Hochst.) Stapf	LC	LC	
Poaceae	<i>Hyparrhenia rufa</i> (Nees) Stapf	LC	LC	
Poaceae	<i>Hyperthelia dissoluta</i> (Nees ex Steud.) Clayton	LC	LC	
Poaceae	<i>Imperata cylindrica</i> (L.) Pal.	LC	LC	
Poaceae	<i>Leersia hexandra</i> Sw.	LC	LC	
Poaceae	<i>Loudetia arundinacea</i>	LC	LC	
Poaceae	<i>Melinis repens</i> (Willd.) Zizka	LC	LC	
Poaceae	<i>Oxytenanthera abyssinica</i> (A. Rich.) Munro	LC	LC	
Poaceae	<i>Panicum duestum</i> Thunb.	LC	LC	
Poaceae	<i>Panicum maximum</i> Jacq.	LC	LC	
Poaceae	<i>Panicum repens</i> L.	LC	LC	
Poaceae	<i>Panicum trichocladum</i> K.Schum.	LC	LC	
Poaceae	<i>Pennisetum polystachion</i> (L.) Schult.	LC	LC	
Poaceae	<i>Pennisetum purpureum</i> Schumach	LC	LC	
Poaceae	<i>Rottboellia cochinchinensis</i> (Lour.) W.D. Clayton	LC	LC	
Poaceae	<i>Setaria verticillata</i> A. Rich.	LC	LC	
Poaceae	<i>Setaria homonyma</i>	LC	LC	
Poaceae	<i>Setaria pumila</i> Roem. & Schult.	LC	LC	
Poaceae	<i>Setaria sphacelata</i> (Schumach.) Moss	LC	LC	
Poaceae	<i>Sorghum arundinaceum</i> (Desv.) Stapf	LC	LC	
Poaceae	<i>Sorghum vulgare</i> Pers.	LC	LC	Cultivated
Poaceae	<i>Sporobolus pyramidalis</i> Beauv.	LC	LC	
Poaceae	<i>Themeda triandra</i> Forssk.	LC	LC	
Poaceae	<i>Urochloa panicoides</i>	LC	LC	
Poaceae	<i>Zea mays</i> L.	LC	LC	Cultivated
Polygalaceae	<i>Securidaca longipedunculata</i> Fresen	LC	LC	
Polygonaceae	<i>Polygonum setulosum</i>	LC	LC	
Rununculaceae	<i>Clematis hirsute</i>	LC	LC	
Rhamnaceae	<i>Ziziphus abyssinica</i> Hochst.	LC	LC	
Rubiaceae	<i>Gardenia ternifolia</i>	LC	LC	
Euphorbiaceae	<i>Hymenocardia acida</i> Tul.	LC	LC	
Rubiaceae	<i>Oldenlandia herbacea</i> (L.) Roxb.	LC	LC	

Rubiaceae	<i>Pavetta crassipes</i>	LC	LC	
Rubiaceae	<i>Spermacoce prince</i>	LC	LC	
Sapindaceae	<i>Blighia unijugata</i> Bak.	LC	LC	
Sapindaceae	<i>Cardiospermum halicacabum</i> L.	LC	LC	
Sapindaceae	<i>Pappea capensis</i> Eckl. & Zeyh.	LC	LC	
Rutaceae	<i>Toddalia asiatica</i> (L.) Lam.	LC	LC	
Sapotaceae	<i>Chrysophyllum albidum</i> G.Donn	LC	LC	
Sapindaceae	<i>Paulinia pinnata</i> Linn.	LC	LC	
Malvaceae	<i>Sterculia setigera</i> Del.	LC	LC	
Simaroubaceae	<i>Harrisonia abyssinica</i> Oliv.	LC	LC	
Solanaceae	<i>Solanum aethiopicum gilo</i> group	LC	LC	
Sapotaceae	<i>Vitellaria paradoxa</i> C. F. Gaertn.	VU	VU	
Solanaceae	<i>Solanum incanum</i> L.	LC	LC	
Solanaceae	<i>Solanum mauritianum</i> Scop.	LC	LC	
Solanaceae	<i>Solanum melongana</i> L.	LC	LC	
Solanaceae	<i>Solanum nigrum</i> L.	LC	LC	
Malvaceae	<i>Dombeya rotundifolia</i>	LC	LC	
Malvaceae	<i>Grewia trichocarpa</i> Hochst.ex A.Rich.	LC	LC	
Malvaceae	<i>Okra (Hibiscus)</i>	LC	LC	Vegetable
Verbanaceae	<i>Lantana camara</i> L.	LC	LC	Invasive
Verbanaceae	<i>Triumfetta rhomboidea</i> Jacq.	LC	LC	
Vitaceae	<i>Cissus petiolata</i> Hook.f.	LC	LC	
Vitaceae	<i>Cyphostemma adenocaula</i> Wild. & Drum.	LC	LC	
Vitaceae	<i>Rhoicissus tridentata</i>	LC	LC	
	Unid 1			
	unid 2			

ANNEX 6: AMPHIBIAN AND REPTILIA SPECIES IDENTIFIED IN THE PROJECT AREA

Annex 6(a): Amphibian Fauna Richness of Nyagak WSS

Order	Species	Common name	Listing
Hyperoliidae	<i>Afrivalus quadrivittatus</i>	Four-lined Spiny Reed Frog	LC/LC
Pyxicephalidae	<i>Amietia nutti</i>	Nutti's River Frog	LC/LC
Arthroleptidae	<i>Arthroleptis cf. poecilonotus</i>	Mottled Squeaker	LC/LC
Arthroleptidae	<i>Arthroleptis cf. schubotzi</i>	Schubotz's Squeaker	LC/LC
Hemisotidae	<i>Hemisus guineensis</i>	Guniea Piglet Frog	LC/LC
Dicroglossidae	<i>Hoplobatrachus occipitalis</i>	Crowned Bullfrog	LC/LC
Microhylidae	<i>Phrynomantis microps</i>	West African Rubber Frog	LC/LC
Hyperoliidae	<i>Hyperolius cinnamomeoventris</i>	Cinnamon-bellied Reed Frog	LC/LC
Hyperoliidae	<i>Hyperolius kivuensis</i>	Kivu Reed Frog	LC/LC
Hyperoliidae	<i>Hyperolius viridiflavus</i>	Common Reed Frog	LC/LC
Hyperoliidae	<i>Kassina senegalensis</i>	Senegal Land Frog	LC/LC
Arthroleptidae	<i>Leptopelis oryi</i>	Oryi's Tree Frog	LC/LC
Arthroleptidae	<i>Leptopelis viridis</i>	Green Tree Frog	LC/DD
Phrynobatrachidae	<i>Phrynobatrachus cf. acridoides</i>	East African Puddle Frog	LC/LC
Phrynobatrachidae	<i>Phrynobatrachus cf. bullans</i>	Bubbling Puddle Frog	LC/DD
Phrynobatrachidae	<i>Phrynobatrachus mababiensis</i>	Mababe Puddle Frog	LC/LC
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Natal Dwarf Puddle Frog	LC/LC
Ptychadenidae	<i>Ptychadena anchietae</i>	Anchietae's Ridged Frog	LC/LC
Ptychadenidae	<i>Ptychadena nilotica</i>	Nile Grass Frog	LC/LC
Ptychadenidae	<i>Ptychadena oxyrhynchus</i>	Sharp-nosed ridged Frog	LC/LC
Ptychadenidae	<i>Ptychadena porosissima</i>	Grassland Ridged Frog	LC/LC
Bufo	<i>Sclerophrys maculata</i>	Flat-backed Toad	LC/LC
Bufo	<i>Sclerophrys regularis</i>	African Common Toad	LC/LC
Pipidae	<i>Xenopus mulleri</i>	Muller's Clawed Frog	LC/DD
Pipidae	<i>Xenopus victorianus</i>	Victoria Clawed Frog	LC/LC

Annex 6(b): Reptilian Fauna Richness of Nyagak WSS

Order	Family	Species	Common Name	IUCN Status
Chelonia	Pelomedusidae	<i>Pelomedusa neumanni</i>	Neuman's Marsh Terrapin	LC/LC
Chelonia	Testudinidae	<i>Knixys belliana</i>	Bell's Hinge-back Tortoise	NE/VU
Squamata	Agamidae	<i>Agama finchi</i>	Malaba Rock Agama	LC/LC
Squamata	Agamidae	<i>Agama lionotus</i>	Kenyan Rock agama	LC/LC
Squamata	Chamelionidae	<i>Chamaeleo gracilis</i>	Gracile Chameleon	LC/LC
Squamata	Chamelionidae	<i>Chamaeleo laevigatus</i>	Smooth Chameleon	LC/LC
Squamata	Gekkonidae	<i>Hemidactylus brookii</i>	Brook's Gecko	LC/LC
Squamata	Gekkonidae	<i>Hemidactylus mabouia</i>	Tropical House Gecko	LC/LC
Squamata	Gekkonidae	<i>Lygodactylus guttularis</i>	Chevron-throated Dwarf Gecko	LC/LC
Squamata	Lacertidae	<i>Nucras boulengeri</i>	Boulenger's Scrub Lizard	LC/LC
Squamata	Scincidae	<i>Lygosoma sundevalli</i>	Sundevall's Writhing Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis brevicollis</i>	Short-necked Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis maculilabris</i>	Speckled Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis perroteti</i>	Orange-flanked Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis quinquetaeniata</i>	Five-lined Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis striata</i>	Common Striped Skink	LC/LC
Squamata	Scincidae	<i>Trachylepis varia</i>	Variable Skink	LC/LC
Squamata	Varanidae	<i>Varanus niloticus</i>	Nile Monitor Lizard	LC/LC
Squamata	Colubridae	<i>Philothamnus battersbyi</i>	Battersby's Green Snake	LC/LC
Squamata	Colubridae	<i>Hapsidophrys smaragdina</i>	Emerald Snake	LC/LC
Squamata	Colubridae	<i>Psammophis mossambicus</i>	Olive Sand Snake	LC/LC
Squamata	Colubridae	<i>Psammophis sudanensis</i>	Northern Stripe-bellied Sand Snake	LC/LC
Squamata	Elapidae	<i>Naja subflava</i>	Forest Cobra	LC/LC
Squamata	Viperidae	<i>Bitis arietans</i>	Puffadder	LC/LC
Squamata	Viperidae	<i>Bitis gabonica</i>	Gaboon Viper	VU/VU
Squamata	Pythonidae	<i>Python sebae</i>	African Rock Python	NT/VU

ANNEX 7: LIST OF BIRD'S SPECIES IDENTIFIED IN THE PROJECT AREA

Annex 7(a): List of bird's Species as identified during assessment in the project area

ATLAS No.	COMMON NAME	SCIENTIFIC	Observations												
			Intake	Powerhouse	Forebay	Penstock	Anyrivu Tank	Goli Tank	Inde Tank	Ogoko Tank	Ndiriba Tank	Paribu Tank	Ajai Wildlife Reserve	Pawor Tank	Water Treatment Plant
ATLAS No.	COMMON NAME	NAME													
518	Abyssinian Ground-Hornbill	<i>Bucorvus abyssinicus</i>		•				•	•		•		•		
347	African Mourning Dove	<i>Streptopelia decipiens</i>	•		•								•	•	
1133	African Yellow White-eye	<i>Zosterops senegalensis</i>					•						•		•
1144	Black Bishop	<i>Euplectes gierowii</i>	•	•	•	•	•	•	•						
138	Black Kite	<i>Milvus migrans</i>	•												
1265	Black-and-white Mannikin	<i>Spermestes bicolor</i>	•		•							•			
513	Black-and-white-casqued Hornbill	<i>Bycanistes subclindricus</i>	•								•	•	•		•
1230	Black-crowned Waxbill	<i>Estrilda nonnula</i>	•					•			•		•		•
27	Black-headed Heron	<i>Ardea melanocephala</i>	•	•				•			•		•		•
1165	Black-headed Weaver	<i>Ploceus melanocephalus</i>				•		•			•		•		•

466	Malachite Kingfisher	<i>Alcedo cristata</i>			•		•					•			
1107	Mariqua Sunbird	<i>Cinnyris mariquensis</i>		•			•					•	•		
934	Northern Black-Flycatcher	<i>Melaenornis edolioides</i>	•					•					•		
995	Pied wagtail	<i>Motacilla aguimp</i>	•				•	•							
350	Red-eyed Dove	<i>Streptopelia semitorquata</i>			•			•							
346	Ring-necked Dove	<i>Streptopelia capicola</i>		•			•								
771	Sooty Chat	<i>Myrmecocichla nigra</i>	•											•	
459	Speckled Mousebird	<i>Colius striatus</i>	•	•											
869	Stout Cisticola	<i>Cisticola robustus</i>	•							•			•		
639	White-headed Sawwing	<i>Psalidoprocne albiceps</i>	•	•		•			•	•		•	•		
447	White-rumped Swift	<i>Apus caffer</i>	•	•				•		•		•	•		
479	White-throated Bee-eater	<i>Merops albicollis</i>	•			•				•		•			
548	Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>		•						•		•			
555	Yellow-throated Tinkerbird	<i>Pogoniulus subsulphureus</i>	•			•	•		•		•			•	

Annex 7(b): List of bird's Species identified in the project area

SPECIES+S2:W48	IUCN	HABITANT SPECIALIZATION	Atlas Number	Migration
Abyssinian Ground-Hornbill <i>Bucorvus abyssinicus</i>	LC	NF	518	RB
African Mourning Dove <i>Streptopelia decipiens</i>	LC	NF	347	RB
African Yellow White-eye <i>Zosterops senegalensis</i>	LC	NF	1133	RB
Black Bishop <i>Euplectes gierowii</i>	LC	NF	1144	RB
Black Kite <i>Milvus migrans</i>	LC	NF	138	RB, PM
Black-and-white Mannikin <i>Spermestes bicolor</i>	LC	f	1265	RB
Black-and-white-casqued Hornbill <i>Bycanistes subclindricus</i>	LC	NF	513	RB
Black-crowned Waxbill <i>Estrilda nonnula</i>	LC	NF	1230	RB
Black-headed Heron <i>Ardea melanocephala</i>	LC	NF	27	RB
Black-headed Weaver <i>Ploceus melanocephalus</i>	LC	NF	1165	RB
Blue-headed Coucal <i>Centropus monachus</i>	LC	NF	404	RB
Blue-spotted Wood Dove <i>Turtur afer</i>	LC	NF	355	RB
Bocage's Bush- Shrike <i>Malaconotus bocagei</i>	LC	w	1013	RB
Bronze Mannikin <i>Spermestes cucullatus</i>	LC	NF	1266	RB
Common Bulbul <i>Pycnonotus barbatus</i>	LC	NF	732	RB
Common Quail <i>Coturnix coturnix</i>	LC	NF	165	WV, AfM/B
Common Sandpiper <i>Actitis hypoleucos</i>	LC	w	252	RB
Eastern Plantain-eater <i>Crinifer zonurus</i>	LC	NF	376	RB
Green-backed Camaroptera <i>Camaroptera brachyuran</i>	LC	A/f	889	RB
Grey Kestrel <i>Falco ardosiaceus</i>	LC	NF	147	RB
Grey-backed Fiscal <i>Lanius excubitoroides</i>	LC	NF	1032	RB
Grey-headed Sparrow <i>Passer griseus</i>	LC	NF	1207	RB
Hadada Ibis <i>Bostrychia hagedash</i>	LC	NF	51	RB
Helmeted Guineafowl <i>Numida meleagris</i>	LC	F/S/G	190	RB
Laughing Dove <i>Streptopelia senegalensis</i>	LC	NF	351	RB
Little Egret <i>Egretta garzetta</i>	LC	w	36	RB
Little Green Sunbird <i>Anthreptes seimundi</i>	LC	F	1121	RB
Little Swift <i>Apus affinis</i>	LC	NF	443	RB
Little Weaver <i>Ploceus luteolus</i>	LC	NF	1172	RB
Lizard Buzzard <i>Kaupifalco monogrammicus</i>	LC	NF	129	RB
Long-tailed Cormorant <i>Phalacrocorax africanus</i>	LC	NF	17	RB
Malachite Kingfisher <i>Alcedo cristata</i>	LC	w	466	RB
Mariqua Sunbird <i>Cinnyris mariquensis</i>	LC	f	1107	RB
Northern Black-Flycatcher <i>Melaenornis edolioides</i>	LC	NF	934	RB
Pied wagtail <i>Motacilla aguimp</i>	LC	NF	995	
Red-eyed Dove <i>Streptopelia semitorquata</i>	LC	NF	350	RB
Ring-necked Dove <i>Streptopelia capicola</i>	LC	NF	346	RB
Sooty Chat <i>Myrmecocichla nigra</i>	LC	NF	771	RB
Speckled Mousebird <i>Colius striatus</i>	LC	NF	459	RB
Stout Cisticola <i>Cisticola robustus</i>	LC	f	869	RB

White-headed Sawwing <i>Psalidoprocne albiceps</i>	LC	NF	639	RB,Af/NB
White-rumped Swift <i>Apus caffer</i>	LC	NF	447	RB
White-throated Bee-eater <i>Merops albicollis</i>	LC	f	479	AfM/NB, FB, PM
Yellow-rumped Tinkerbird <i>Pogoniulus bilineatus</i>	LC	NF/W	548	RB
Yellow-throated Tinkerbird <i>Pogoniulus subsulphureus</i>	LC	F	555	RB

Annex 7(c); classification of birds according to their habitat requirements

Category	Description	Abbreviation
Forest	<ul style="list-style-type: none"> ➤ Forest specialists ➤ Cannot survive outside the primary forest 	FF
	<ul style="list-style-type: none"> ➤ Forest Generalists. ➤ They can live in the forest and at the forest edge or a degraded forest 	F
	<ul style="list-style-type: none"> ➤ Don't live in the forest ➤ They come to the forest as 'visitors' 	f
Water	<ul style="list-style-type: none"> ➤ Species restricted to wetlands/open waters ➤ They cannot survive outside an aquatic environment 	W
	<ul style="list-style-type: none"> ➤ Non-specialist water birds often found near water ➤ Facultative water birds 	w
Grassland & Agricultural Cultivation	<ul style="list-style-type: none"> ➤ They live in grassland habitats ➤ They are generally widely spread in all habitats but tend to avoid forests ➤ They are species that can be found in cultivated areas like gardens, fallow lands and settlements 	NF
Least Concern	<ul style="list-style-type: none"> ➤ Bird species that are listed to be of least concern according to the IUCN red list of threatened species 	LC
Vulnerable	<ul style="list-style-type: none"> ➤ Bird species whose populations are listed to be of vulnerability according to the IUCN red list of threatened species 	VU
Near threatened	<ul style="list-style-type: none"> ➤ Bird species that are listed to be nearly threatened numbers according to the IUCN red list of threatened species 	NT
Endangered	<ul style="list-style-type: none"> ➤ Bird species that are listed to be endangered in numbers according to the IUCN red list of threatened species 	EN
Globally critical	<ul style="list-style-type: none"> ➤ Bird species whose populations are listed to be globally critical according to the IUCN red list of threatened species 	G-CR
Regionally critical	<ul style="list-style-type: none"> ➤ Bird species whose populations are listed to be regionally critical according to the IUCN red list of threatened species 	R-CR

Category	Description	Abbreviation
Globally vulnerable	➤ Bird species whose populations are listed to be globally vulnerable according to the IUCN red list of threatened species	G-VU
Regionally vulnerable	➤ Bird species whose populations are listed to be regionally vulnerable according to the IUCN red list of threatened species	R-VU
Globally lower-risk, near threatened	➤ Bird species that are listed to be globally lower-risk, near threatened according to the The Bird Atlas of Uganda	G-LR/nt
Regionally Near threatened	➤ Bird species that are listed to be regionally near threatened according to the The Bird Atlas of Uganda	R-NT
Globally Endangered	➤ Bird species that are listed to be globally endangered in numbers according to the The Bird Atlas of Uganda	G-EN
Regionally Endangered	➤ Bird species that are listed to be regionally endangered in numbers according to the The Bird Atlas of Uganda	R-EN
Globally range-restricted	➤ Bird species that are listed to be globally range-restricted according to the The Bird Atlas of Uganda	G-RR
Species of regional responsibility	➤ Bird species that are listed to be of regional responsibility according to the The Bird Atlas of Uganda	R-RR
Breeding	➤ Occasional breeder	OB
	➤ Resident breeder (Species that are residents and breed from within their permanent locality)	RB
	➤ Resident, breeding not proved but likely	R(B)
	➤ Former breeder	FB
Migrant Species	➤ Migrant breeder	MB
	➤ Migrant, breeding not proved (but likely)	M(B)
	➤ Intra-African migrant, breeding	AfM/B
	➤ Intra-African migrant, breeding not proved (but likely)	AfM/(B)
	➤ Intra-African Migrant, not breeding	AfM/NB
	➤ Regular passage migrant	PM
	➤ Regular Winter Visitor	WV
	➤ Resident non-breeder	RN
	➤ Occasional Winter Visitor	OW
➤ Accidental Visitor or vagrant	AV	
Introduced species	➤ These are species that are not indigenous to Africa(Uganda) but were just introduced	I
Not Evaluated	➤ Bird species whose population status has not yet been evaluated.	NE

ANNEX 8: LIST OF BUTTERFLIES' SPECIES IDENTIFIED IN THE PROJECT AREA

Species	EcoType	Intake	Treatment	Ndiriba	Anyiribu	Goli	Paribu	Ajai WR	Pawor	Ogoko	Inde
<i>Acraea acerata</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Acraea alicia</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Acraea encedon</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Acraea eponina</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Acraea natalica</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Acraea neobule</i>	W	0	1	0	0	1	0	1	0	0	1
<i>Acraea pharsalus</i>	f.	1	1	1	1	1	1	1	1	1	1
<i>Acraea pseudegina</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Acraea zetes</i>	W	0	1	0	0	1	0	1	0	0	1
<i>Amauris niavius</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Amauris tartarea</i>	f.	1	0	1	1	0	1	0	1	1	0
<i>Anthene amarah</i>	O	1	1	1	1	1	1	1	1	1	1
<i>Anthene definita</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Anthene lunulata</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Appias epaphia</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Appias sabina</i>	F	1	0	1	1	0	1	0	1	1	0
<i>Azanus jesous</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Belenois aurota</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Belenois creona</i>	M	1	0	1	1	0	1	0	1	1	0
<i>Belenois solilucis</i>	O	0	1	0	0	1	0	1	0	0	1
<i>Belenois subeida</i>	f.	1	1	1	1	1	1	1	1	1	1
<i>Belenois thysa</i>	f.	1	1	1	1	1	1	1	1	1	1
<i>Bicyclus anynana</i>	O	0	1	0	0	1	0	1	0	0	1
<i>Bicyclus safitza</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Bicyclus vulgaris</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Borbo fallax</i>	O	1	1	1	1	1	1	1	1	1	1
<i>Borbo perobscura</i>	O	1	0	1	1	0	1	0	1	1	0
<i>Byblia anvata</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Catopsilia florella</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Charaxes brutus</i>	F	1	0	1	1	0	1	1	0	1	1
<i>Charaxes candiope</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Charaxes etesipe</i>	f.	1	1	1	1	1	1	1	1	1	1

Species	EcoType	Intake	Treatment	Ndiriba	Anyiribu	Goli	Paribu	Ajai WR	Pawor	Ogoko	Inde
<i>Charaxes eupale</i>	F	1	0	1	1	0	1	1	0	1	1
<i>Charaxes jasius</i>	O	0	1	0	0	1	0	0	1	0	0
<i>Charaxes numenes</i>	f.	1	1	1	1	1	1	1	1	1	1
<i>Charaxes varanes</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Charaxes zoolina</i>	O	0	1	0	0	1	0	0	1	0	0
<i>Coeliades forestan</i>	W	1	0	1	1	0	1	1	0	1	1
<i>Colotis antevippe</i>	O	1	0	1	1	0	1	1	0	1	1
<i>Colotis aurigineus</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Colotis auxo</i>	W	1	0	1	1	0	1	1	0	1	1
<i>Colotis danae</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Colotis eucharis</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Colotis evagore</i>	M	0	1	0	0	1	0	1	0	0	1
<i>Cupidopsis cissus</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Danaus chrysippus</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Dixeia pigea</i>	W	0	1	0	0	1	0	1	0	0	1
<i>Eicochrysops hippocrates</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Eretis lugens</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Euchrysops malathana</i>	O	1	1	1	1	1	1	1	1	1	1
<i>Eurema brigitta</i>	M	1	0	1	1	0	1	0	1	1	0
<i>Eurema hecabe</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Eurema regularis</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Eurytela dryope</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Freyeria trochylus</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Gnophodes bestimena</i>	F	1	1	1	1	1	1	1	1	1	1
<i>Hamanumida daedalus</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Henotesia perspicua</i>	O	0	1	0	0	1	0	1	0	0	1
<i>Hypolimnas misippus</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Junonia chorimene</i>	O	1	0	1	1	0	1	0	1	1	0
<i>Junonia oenone</i>	W	0	1	0	0	1	0	1	0	0	1
<i>Junonia orithya</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Junonia sophia</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Junonia terea</i>	W	0	1	0	0	1	0	1	0	0	1
<i>Leptosia alcesta</i>	W	1	0	1	1	0	1	0	1	1	0

Species	EcoType	Intake	Treatment	Ndiriba	Anyiribu	Goli	Paribu	Ajai WR	Pawor	Ogoko	Inde
<i>Leptosia nupta</i>	F	1	0	1	1	0	1	0	1	1	0
<i>Leptotes pirithous</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Melanitis leda</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Metisella Midas</i>	S	1	1	1	1	1	1	1	1	1	1
<i>Mylothris rubricosta</i>	S	1	1	1	1	1	1	1	1	1	1
<i>Nepheronia buqueti</i>	O	1	0	1	1	0	1	0	1	1	0
<i>Neptidopsis ophione</i>	f.	1	1	1	1	1	1	1	1	1	1
<i>Neptis saclava</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Neptis serena</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Papilio bromius</i>	f.	0	1	0	0	1	0	1	0	0	1
<i>Papilio dardanus</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Papilio demodocus</i>	M	1	0	1	1	0	1	0	1	1	0
<i>Papilio nireus</i>	f.	0	1	0	0	1	0	1	0	0	1
<i>Pelopidas mathias</i>	M	1	1	1	1	1	1	1	1	1	1
<i>Phalanta phalanta</i>	O	1	1	1	1	1	1	1	1	1	1
<i>Sarangesa maculata</i>	O	0	1	0	0	1	0	1	0	0	1
<i>Spialia spio</i>	O	1	0	1	1	0	1	0	1	1	0
<i>Tirumala petiverana</i>	M	1	0	1	1	0	1	0	1	1	0
<i>Tuxentius cretosus</i>	O	1	1	1	1	1	1	1	1	1	1
<i>Ypthima asterope</i>	O	1	0	1	1	0	1	0	1	1	0
<i>Ypthima doleta</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Zizeeria knysna</i>	W	1	1	1	1	1	1	1	1	1	1
<i>Zizina antanossa</i>	W	1	0	1	1	0	1	0	1	1	0
<i>Zizula hylax</i>	W	1	1	1	1	1	1	1	1	1	1
Total = 89											

ANNEX 9: LIST OF MAPS

Annex 9(a): Map showing villages affected by Eyau WSS

Annex 9(b): Map showing the general administrative setup of the project area

Annex 9(c): Map showing general land cover of the project area

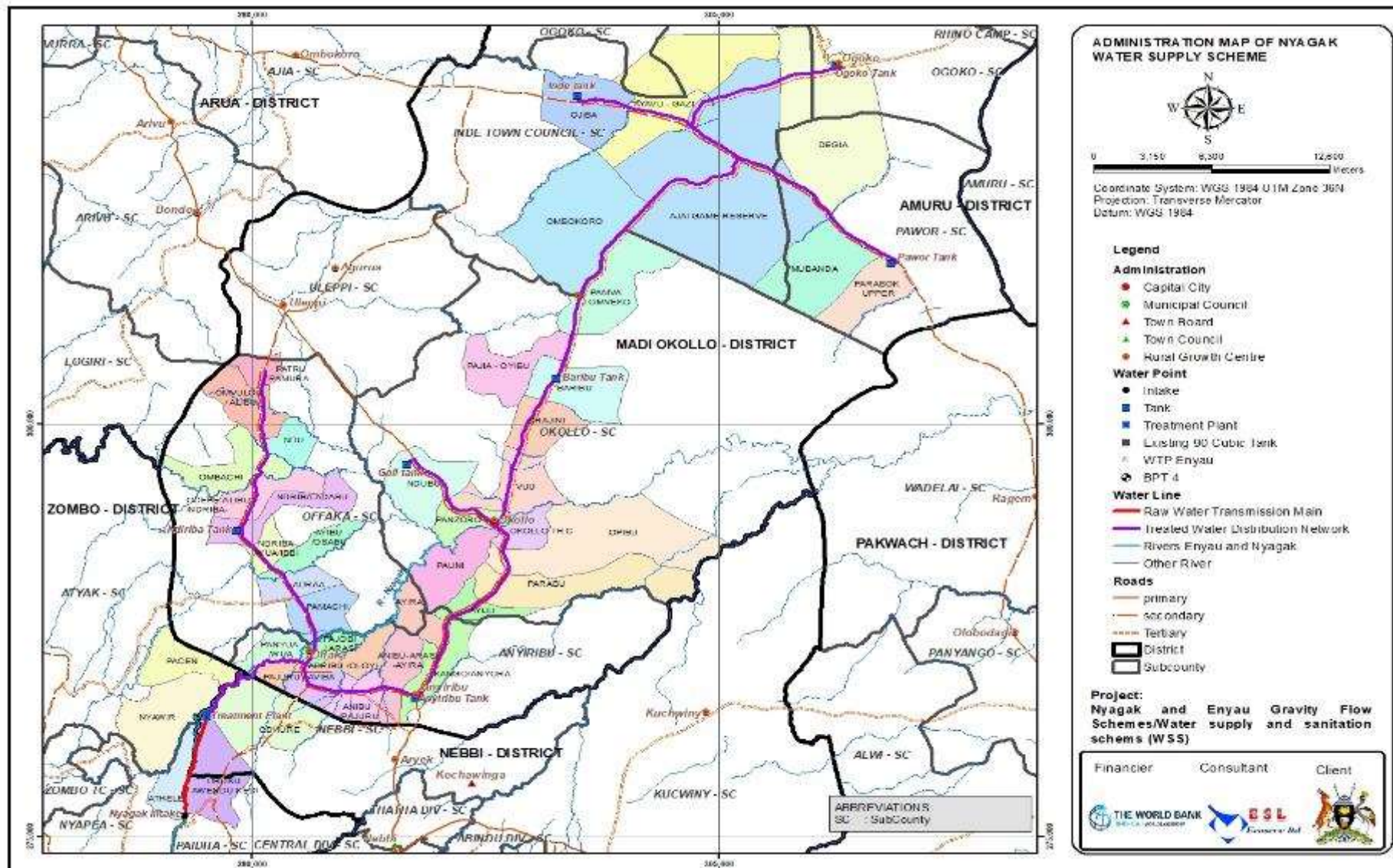
Annex 9(d): Map showing the geology of the project area

Annex 9(e): Map showing the soils of the project area

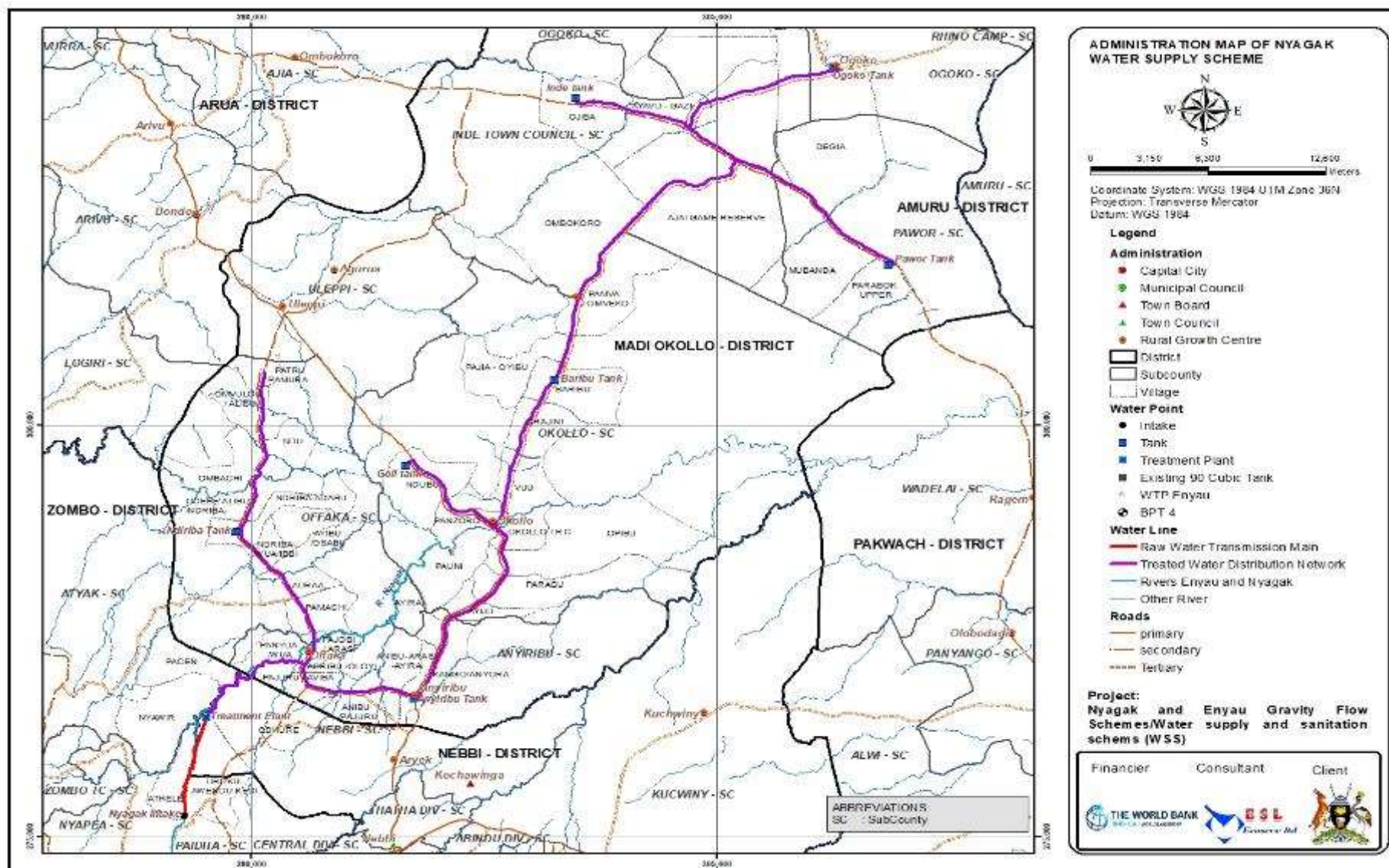
Annex 9(f): Map showing the rainfall distribution in the project area

Annex 9(g): Map showing the topography of the project area

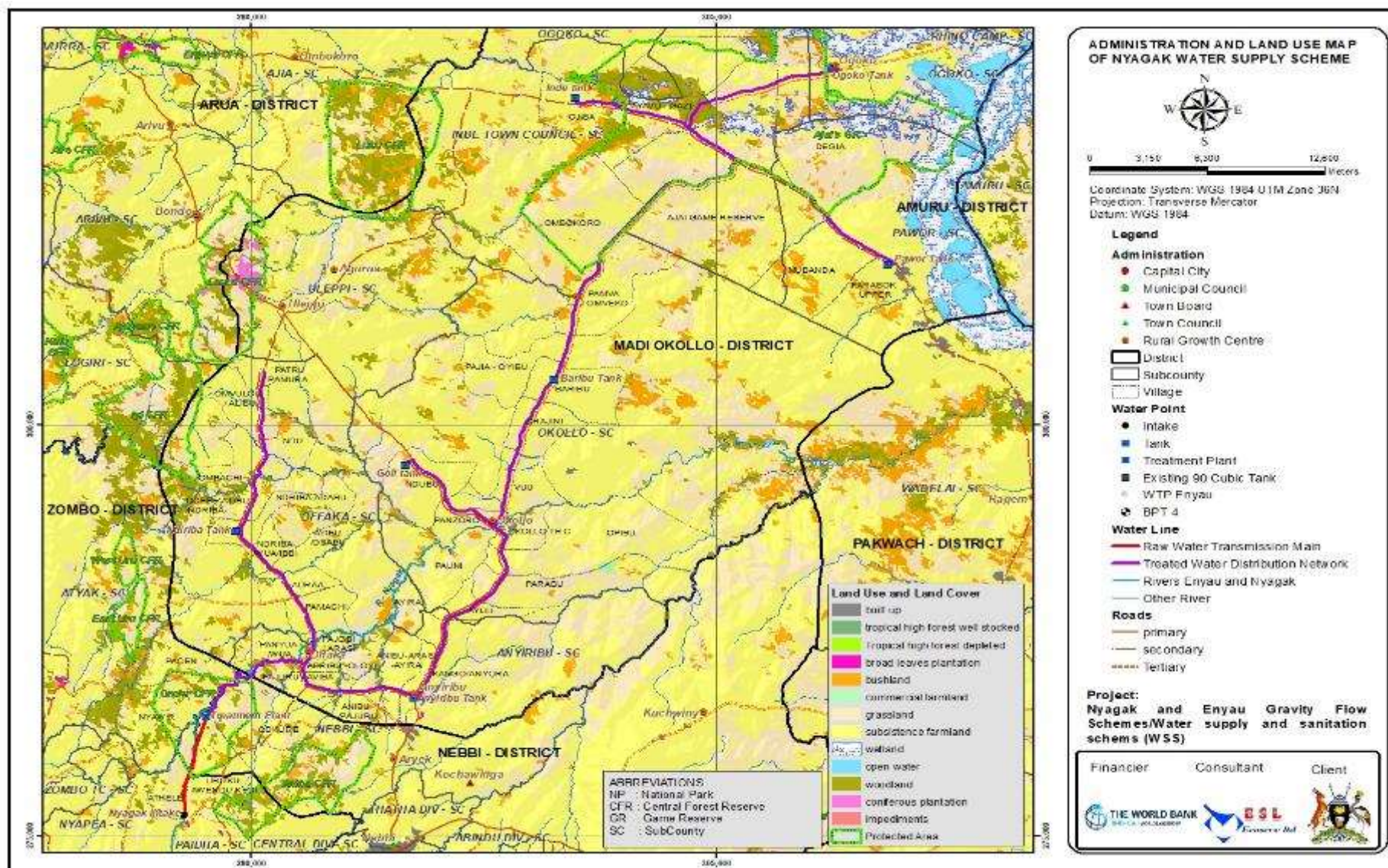
Annex 9(a): Map showing villages affected by Eyau WSS



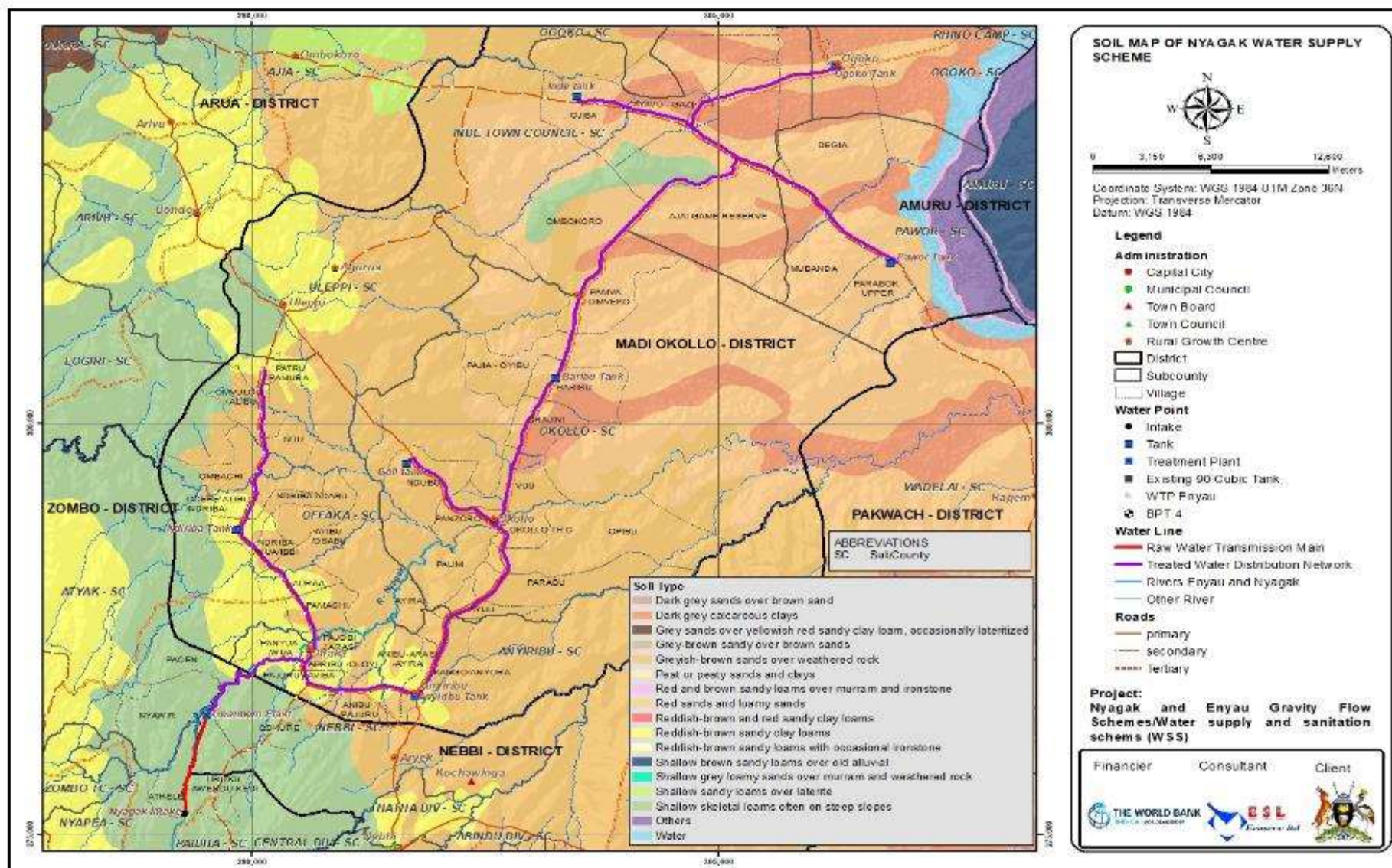
Annex 9(b): Map showing the general administrative setup of the project area



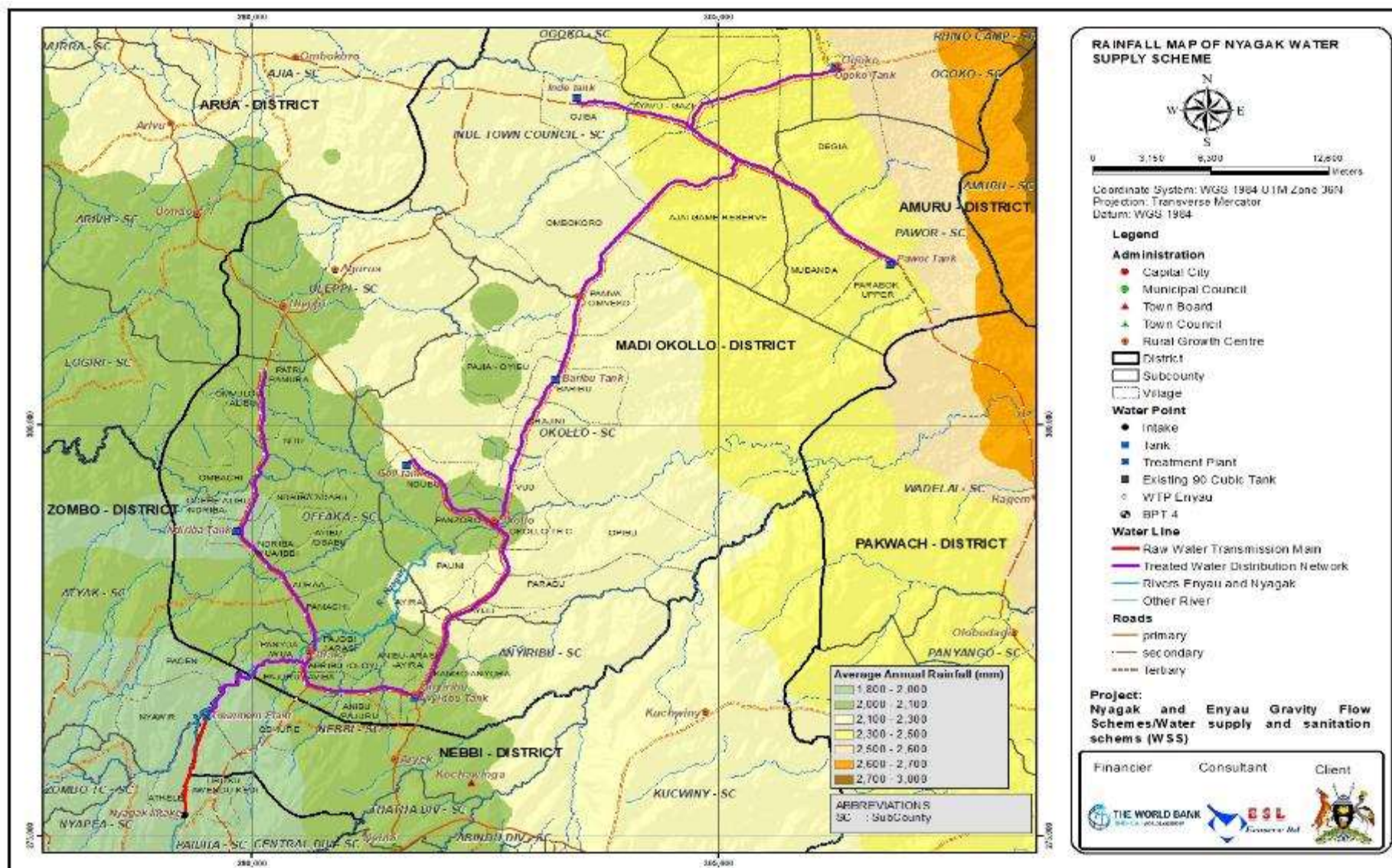
Annex 9(c): Map showing general land cover of the project area



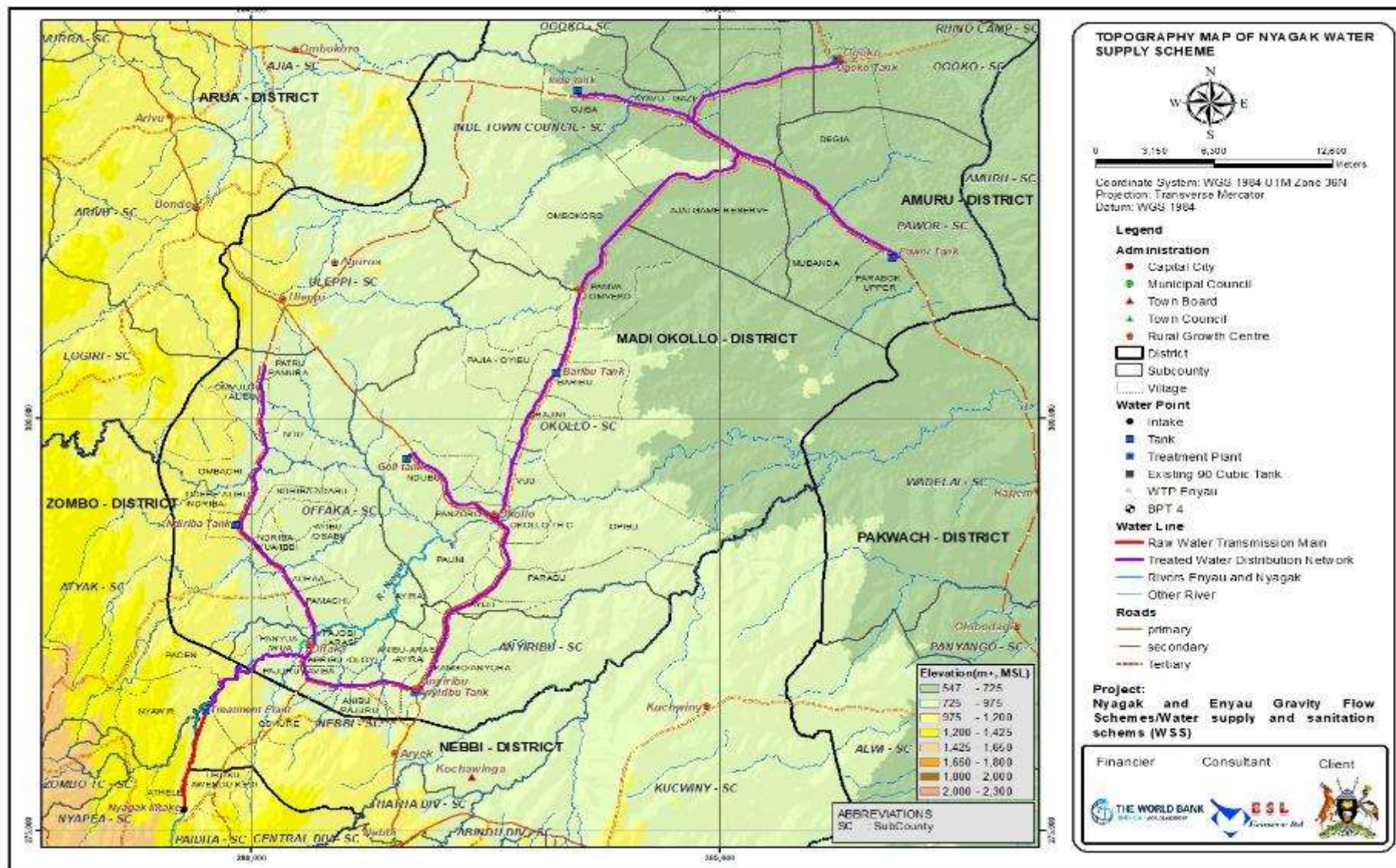
Annex 9(e): Map showing the soils of the project area



Annex 9(f): Map showing the rainfall distribution in the project area



Annex 9(g): Map showing the topography of the project area



ANNEX 10: NEMA APPROVED TORS



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY (NEMA)

NEMA House
Plot 17, 19 & 21, Jinja Road,
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Tel: 256-414- 251064, 251065, 251068
342758, 342759, 342717
Fax: 256-414-257521 / 232680
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Website: www.nemaug.org

NEMA/4.5

8th February, 2023

The Permanent Secretary,
Ministry of Water and Environment,
P. O. Box 200226,
KAMPALA.

Tel: +256 414 505942

Email: ps@mwe.go.ug

RE: SCOPING REPORT AND TERMS OF REFERENCE FOR UNDERTAKING AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ALA-ORA WATER SUPPLY AND SANITATION SYSTEM OF NYAGAK GFS IN REFUGEE HOST DISTRICTS OF MADI OKOLLO, ZOMBO AND NEBBIE (EIATOR 10014)

This is in reference to the Terms of Reference (TOR) for carrying out an Environmental and Social Impact Assessment (ESIA) for the Ala-Ora Water Supply and Sanitation System of Nyagak GFS in Refugee Host Districts of Madi-Okollo, Zombo and Nebbi which was submitted to this Authority for consideration for approval. This Authority has finalized the review and grants formal **APPROVAL** of the said TOR.

Please note that the approval of the TORs does not constitute permission to start implementing any of the proposed project activities, as this is not a Certificate of approval.

In addition to the scope of work detailed in the TOR, the ESIA team should consider the key aspects below during the conduct of the Environmental and Social Impact Study and the preparation of the report.

- (i) Make reference to the updated regulatory frameworks for environmental management. In particular, the National Environment (Waste Management) Regulations, 2020, the National Environment (Standards for Discharge of Effluent into Water or Land), Regulations, 2020, the National Environment (Environment

and Social Assessment) Regulations, 2020 and the National Environment (Audit) Regulations, 2020. Uganda has not yet developed standards for air quality, however, reference can be made to the East African Standard: Air Quality Specification (EAS 751:2010). The project should be designed and planned to meet the standards and requirements set out in the respective pieces of legislation.

(ii) Undertake comprehensive hydrological studies of the respective catchment areas, should therefore be undertaken as part of the ESIA process. The report should provide details of the respective hydrological systems and identify issues that may need to be addressed to minimize potential impacts on surface and ground water resources. Efforts should be made to avoid disturbing the critical areas or core of the catchment systems, and areas with a relatively high water table or undisturbed wetland.

(iii) Identify and map (including providing GPS coordinates) community water sources within the project sites or their surroundings. Assess potential impacts on such water sources and mitigation measures in this regard.

(iv) Clearly detail the quality assurance and quality control measures that will be implemented to ensure health and safety for the proposed disposal options of treated faecal sludge from the sanitation systems.

(v) Provide site specific baseline information on the soils, water, air quality and existing activities at the respective sites and their surroundings, including maps and images where appropriate. In particular, provide baseline characteristics of water quality within the respective project sites and their surroundings.

(vi) Ensure that the project alternatives are clearly be documented and appropriate justification provided for the selected options. This shall include options for the safe disposal of treated sludge and effluent from the respective Plants.

(vii) Consider any other critical environmental concerns that were not initially foreseen during the preparation of the Scoping Report and TOR, and include an evaluation of such concerns, in the ESIA report

(viii) Carry out comprehensive stakeholder consultations involving, among others, the Madi-Okollo, Zombo and Nebbi District Local Government Authorities,

the concerned local communities in the different Town Councils and other relevant stakeholders and, ensure that their **views/ concerns are well-documented and included in ESIA report.**

(ix) Append to the ESIA report **authentic copies of land acquisition and ownership documents.**

(x) Indicate the actual total project (investment) cost including costs of works, machinery/equipment and land where applicable; and these should be submitted by a certified valuer and valuation certificate attached to the ESIA report.

(xi) In line with Regulation 49(2) of the National Environment (Environmental and Social Assessment) Regulations S.I. No. 143/2020 pay a non-refundable administrative fee of thirty percent (30%) of total fees payable on submission of the Environmental and Social Impact Statement

This is therefore, to recommend that you proceed with carrying out the ESIA for the **Ala-Ora Water Supply and Sanitation System of Nyagak GFS in Refugee Host Districts of Madi Okollo, Zombo and Nebbi.** We look forward to your cooperation and receipt of comprehensive copies of the respective ESIA reports, for our further action.



Waiswa Ayazika
For: EXECUTIVE DIRECTOR

ANNEX 11: HANDLING OF CHEMICALS AND OTHER POTENTIALLY HARMFUL MATERIALS

Chlorine, a harmful and toxic chemical, will be employed at the WTP during project operation. Thus, it must be safely handled to prevent any accidents, including health and safety issues. The following chemicals that are associated with this project shall be handled as follows;

Design and Management of Chlorination Storage and Dosing Areas

The following special storage and handling features should be utilized and maintained during the WTP operation.

- i. Storage and equipment rooms be equipped with doors, opening outward to the outdoors complete with panic hardware;
- ii. Viewing window into chlorine storage and equipment rooms for operator security;
- iii. Visual and audible emergency alarms at the chlorine room entrance;
- iv. Exhaust fans with a typical rating to air changeover every minute;
- v. A chlorine gas leak detector to generate alarms and attendant ammonia bottle to help locate a leak;
- vi. A drench shower located where it is easily accessible in case of emergency, with single turn (butterfly valve) water tap;
- vii. An emergency kit to repair leaking containers.

For systems that use gas chlorination:

- i. Install alarm and safety systems, including automatic shutoff valves, that are automatically activated when a chlorine release is detected;
- ii. Install containment and scrubber systems to capture and neutralize chlorine should a leak occur;
- iii. Use corrosion-resistant piping, valves, metering equipment, and any other equipment coming
- iv. in contact with gaseous or liquid chlorine, and keep this equipment free from contaminants, including oil and grease;
- v. Store chlorine away from all sources of organic chemicals, and protect from sunlight, moisture, and high temperatures.

Handling of Chlorine during Operation

Chlorine reacts violently with hydrogen, acetylene gases and solvents creating heat (EPA, 2011b). The reaction of chlorine with ammonia can create explosive compounds and gases that are toxic to breathe. Chlorine also reacts with metals. In the presence of water, chlorine can create a highly corrosive and dangerous acid mist. Therefore:

- i. Prepare and approve standard operating procedures for its storage and handling.
- ii. Never store chlorine gas and ammonia in the same building or area.
- iii. Keep chlorine isolated and in different rooms from the chemicals that it reacts with.

- iv. Chlorine storage areas, storage containers and process equipment and lines should be properly.
- v. Labelled and appropriate hazard warning should be posted in accordance with site specific operating procedures.
- vi. Gas containers should be stored in separate or divided rooms separately from flammable materials and other chemicals such as ammonia and sulphur dioxide, if used elsewhere in the installation.
- vii. Containers should be stored and used above ground level and always in a vertical position.
- viii. Chlorine gas containers should be stored in marked areas shielded from external heat sources.
- ix. The protective hood should be kept secure on all unused containers and should only be taken off only when the container is being used. All containers in use should be secured in position by chains or other methods as appropriate. Gas containers should only be lifted with suitably rated and tested equipment and never by their protective hoods. Empty cylinders should be clearly marked and segregated from unused cylinders.

Storage and Handling of Alum during Operation

- i. Prepare and approve standard operating procedures for its storage and handling as the products Data Sheet.
- ii. Alum is readily soluble but the solution is corrosive to aluminum, steel and concrete so tanks of these materials need protective linings.
- iii. Though a weak acid, avoid all unnecessary contact with it, as a matter of good working practice. Wear rubber or PVC boots, apron and overclothing as necessary depending on the condition of handling. The occupational exposure limit is 2 mg per cubic meter for an 8-hour reference period.
- iv. Apply cold water to affected skin and eye areas. Move to fresh air, loosen clothing and seek medical attention in case of inhalation. Immediate medical attention should be sought for a person who has ingested the chemical and vomiting should not be encouraged.

Storage and Handling of Lime during Operation

- i. Prepare and approve standard operating procedures for its storage and handling as the products Data Sheet.
- ii. Ensure that bulk supplies of lime are pneumatically transferred to storage silos to prevent lime dust.
- iii. Delivery and use of bags of slaked lime can give rise to severe dust problems if care is not taken. The occupational exposure standard is 5 mg per cubic meter for an 8-hour reference period. Ensure that workers wear protective gears.
- iv. Enclose slurry storage tanks to avoid dust.

- v. The pump and feed lines should be emptied of all lime by rodding if necessary and flushed with clean water. This should be done when the lime dosing plant is taken out of use, say when a change of duty pump is made.

Storage and Handling of Polyelectrolytes during Operation

- i. Prepare and approve standard operating procedures for its storage and handling as the products Data Sheet.
- ii. Polyelectrolytes are not acutely toxic but care should be taken to avoid swallowing, contact with the eyes or prolonged contact with the skin. Always consult the Safety Data Sheet for the product in use for details of any health hazards involved.
- iii. Polyelectrolyte powder, dropped on a wet floor turns into a tough slippery jelly which is dangerous and difficult to clean up. Powder, if spilled, should be collected as dry material as far as possible before the area is washed liberally with (if possible) warm water.
- iv. Some polyelectrolytes may contain a small proportion of acrylamide for which the occupational exposure limit is 0.3 mg per cubic meter for an 8 - hour reference period.

ANNEX 12: CHANCE FIND PROCEDURE

The following procedural guidelines should be considered in the event that previously unknown heritage resources are exposed or found during the life of the project.

12.1.1 Initial Identification and/or Exposure

Heritage resources may be identified during construction or may be accidentally exposed. The initial procedure when such sites are found aim to avoid any further damage. The following steps and reporting structure must be observed in both instances:

1. The person or group (identifier) who identified or exposed the burial ground must cease all activity in the immediate vicinity of the site;
2. The identifier must immediately inform his/her supervisor of the discovery;
3. The supervisor must ensure that the site is secured and access is controlled; and response time/scheduling of the Field Assessment is to be decided in consultation with MWE and the environmental consultant.

The Field Assessment could have the following outcomes:

- If a human burial, the appropriate authority is to be contacted. The find must be evaluated by a human burial specialist to decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an archaeological context, an archaeologist must be contacted to evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in a palaeontological context, the palaeontologist must evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.

12.1.2 Rescue Excavation

Rescue Excavation refers to the removal of the material from the “design” excavation. This would apply if the amount or significance of the exposed material appears to be relatively circumscribed and it is feasible to remove it without compromising contextual data. The time span for Rescue Excavation should be reasonable rapid to avoid any undue delays, e.g. one to three days and definitely less than one week. In principle, the strategy during the mitigation is to “rescue” the fossil material as quickly as possible. The strategy to be adopted depends on the nature of the occurrence, particularly the density of the fossils. The methods of collection would depend on the preservation or fragility of the fossil and whether in loose or in lithified sediment. These could include:

- On-site selection and sieving in the case of robust material in sand; and
- Fragile material in loose sediment would be encased in blocks using Plaster-of-Paris or reinforced mortar.

If the fossil occurrence is dense and is assessed to be a “Major Find”, a carefully controlled excavation is required.

12.1.3 Major Finds

A Major Find is the occurrence of material that, by virtue of quantity, importance and time constraints, cannot be feasibly rescued without compromise of detailed material recovery and contextual observations.

Management options for major finds

In consultation with MWE and the environmental consultant, the following Options should be considered when deciding on how to proceed in the event of a Major Find.

Option 1: Avoidance

Avoidance of the Major Find through project redesign or relocation. This ensures minimal impact to the site and is the preferred option from a heritage resource management perspective. When feasible, it can also be the least expensive option from a construction perspective. The find site will require site protection measures, such as erecting fencing or barricades. Alternatively, the exposed finds can be stabilised and the site refilled or capped. The latter is preferred if excavation of the find will be delayed substantially or indefinitely. Appropriate protection measures should be identified on a site-specific basis and in wider consultation with the heritage and scientific communities. This option is preferred as it will allow the later excavation of the finds with due scientific care and diligence.

Option 2: Emergency Excavation

Emergency excavation refers to the “no option” situation where avoidance is not feasible due to design, financial and time constraints. It can delay construction and emergency excavation itself will take place under tight time constraints, with the potential for irrevocable compromise of scientific quality. It could involve the removal of a large, disturbed sample by an excavator and conveying this by truck from the immediate site to a suitable place for “stockpiling”. This material could then be processed later. Consequently, the emergency excavation is not the preferred option for a Major Find.

12.1.4 Exposure of Fossil Shell Beds

Response of personnel

The following responses should be undertaken by personnel in the event of intersection with fossil shell beds:

Action 1: The site foreman and Environment Consultant (EC) in charge must be informed;

Action 2: The responsible field person (site foreman or EC) must record the following information:

- Position (excavation position);
- Depth of find in hole;
- Digital image of the hole showing the vertical section (side); and
- Digital images of the fossiliferous material.

Action 3: A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;

Action 4: The Environmental Consultant is to inform MWE who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The Environmental Consultant is to describe the occurrence and provide images via email.

Response by Palaeontologist

The palaeontologist will assess the information and liaise with MWE and the Environmental Consultant and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

12.1.5 Exposure of Fossil Wood and Peats

Response of personnel

The following responses should be undertaken by personnel in the event of exposure of fossil wood and peats:

Action 1: The site foreman and Environmental Consultant must be informed;

Action 2: The responsible field person (site foreman or Environmental Consultant) must record the following information:

- Position (excavation position);
- Depth of find in hole;
- Digital image of the hole showing the vertical section (side); and
- Digital images of the fossiliferous material.

Action 3: A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;

Action 4: The Environmental Consultant is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The Environmental Consultant is to describe the occurrence and provide images via email.

Response by Palaeontologist

The palaeontologist will assess the information and liaise with the developer and the Environmental Consultant and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

12.1.6 Monitoring for Fossils

A regular monitoring presence over the period during which excavations are made, by either an archaeologist or palaeontologist, is generally not practical. The field supervisor or foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the Environmental

Consultant. The Environmental Consultant will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

- The field supervisor or foreman who is going to be most often in the field;
- The EC for the project;
- The Project Manager

Should the monitoring of excavations be stipulated in the Archaeological Impact Assessment and/or the Heritage Impact Assessment, the contracted Monitoring Archaeologist (MA) can also monitor for the presence of fossils and make field assessment of any material brought to attention. The monitoring for fossils is usually sufficiently informed to identify fossil material and this avoids additional monitoring by a palaeontologist. In shallow coastal excavations, the fossils encountered are usually in an archaeological context. The monitoring for fossils then becomes the responsible field person and fulfils the role of liaison with the palaeontologist and coordinates with the developer and the Environmental Consultant. If fossils are exposed in non-archaeological contexts, the palaeontologist should be summoned to document and sample/collect them.

12.1.7 Chance Find Procedures (Burial Ground and Grave-BGG)

In the event that previously unidentified BGG are identified and/or exposed during construction or operation of the Nyagak WSS, the following steps must be implemented subsequent to those outlined under “Initial Identification and or Exposure” above.

1. The Project Manager (MWE) and/or the HRM Unit must immediately be notified of the discovery in order to take the required further steps:

i. The Uganda Police will be notified on behalf of MWE;

ii. MWE in association with the Environmental Consultant will deploy a suitably qualified specialist to inspect the exposed burial and determine in consultation with Uganda police;

- The temporal context of the remains, i.e.:
 - a. forensic,
 - b. authentic burial grave,
 - c. archaeological (older than 100 years); and
- If any additional graves may exist in the vicinity.

2. Should the specialist conclude that the find is a heritage resource, MWE shall notify the Department of Museums and Monuments in the Ministry of Culture who may require that an identification of interested parties be done through adequate consultations in order to relocate the grave.

12.1.8 Major institutions to contact while dealing with Chance Finds

Under Secretary,
Commissioner Uganda Museum
The Department of Museums and Monuments
Kira road, Kamwokya, Kampala

+256 772485624

The Senior Environment Officer
Ministry of Water and Environment
Tel +256 417 889 400

ANNEX 13: SITE DISCIPLINARY COMMITTEE (SDC)

S.No	Designation at Site	Position in the SDC
1	Site Manager	Chairperson
2	HSE Officer	Secretary
3	Site Nurse	Member
4	Caterer	Member
5	Security Officer	Member
6	Site Foreman	Member
7	Village-Representative	Member
8	Workers' Representative (Male)	Member
9	Workers' Representative (Female)	Member

ANNEX 14: PRIMARY SURVEY QUESTIONNAIRE SAMPLE

ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT (ESIA) PRIMARY SURVEY QUESTIONNAIRE

Project

Names of Enumerator..... Date...../...../ 2022

Location and Demographic Information

1) District	2) Sub-County/Division	3) Parish/Ward	4) Village / LC I	5) Telephone Contact

6) Project Affected Person Names...	7) Age [Years]	8) Sex 1=Male 2=Female	9) Marital Status 1= Married 2=Single 3= Divorced 4=Widower 5=Widow	10) Highest level of Education 1= Primary 2=Secondary 3= Tertiary 4=University 5=Illiterate 6= Other	11) Religious affiliation 1= Roman Catholic 2=Anglican 3= Pentecostal 4=Islam 5=Other [Specify]	12) Relationship with Head of H/H 1=Household Head 2=Husband 3= Wife 4=Son 5= Daughter 6=Brother	13) Ethnicity/Tribe 1. Alur 2. Lugbara 3. Kakwa 4. Madi 5. Acholi 6. Langi 7. Baganda 8. Other (specify)	14) Next of Kin [Friend] [Give Name & Contact Details] Name: Relationship 1=Husband 2= Wife 3=Son 4= Daughter 5=Brother 6=Sister 7=Relative [Specify] 8=Other (Specify)

						7=Sister 8=Relative [Specify] 9=Other (Specify)		Contact:

15) How Many People live in the House Hold [H/H]?	16) How many Children are going to school?	17) How many are in Primary level?	18) How many are in Secondary Level?	19) How many are in Tertiary Institutions?	20) How many are at University?	21) Does the HH head know how to read and write in English?		22) Any local language?	
						1= Yes	2= NO	1= Yes	2= No

23) No of Persons with disability in the H/H	24) Type of Disability Identified	25) Can the Enumerator describe in detail, the kind of Disability that the Person has.	26) Can the Enumerator establish if the HH is Vulnerable?	27) Can the Enumerator describe in detail the status of the HH considered to be Vulnerable.
	1=Crippled[Lame] 2= Blind 3=Deaf 4= Slow Growth 5=Other [Specify]		1= Yes 2= Not Vulnerable	1= Old 2= Sickly 3=Widow/widower 4= Very poor 5= Child headed Household 6=Handicapped 7= Indigenous 8=Other [Specify]

Health, Welfare & Water Sources							
28) Has any member of the household been ill in the last 3 months?	29) If yes what were they suffering from?	30) Where do you get treatment from?	31) What is distance to Nearest Public Health Centre/Unit?	32) Which of these do you have in working condition in your household?	33) What is your main source of domestic water?	34) What is the distance to your preferred water source?	35) What problems do you encounter with the water source? (multiple responses accepted)
1= Yes 2= No	1=Malaria 2=Diarrhea 3= Coughs/RTI 4=Worms 5=HIV/AIDS	1=Hospital/Heath IV 2= Health Centre III 3= Health Centre II 4=Clinic	1= 0 – 1km 2= 1 – 2km 3= 2 – 3km 4=3 – 4km 5= Over 4 km	1= Bicycle 2=Motorcycle 3=Car 4= TV 5=Radio	1=Protected Well 2= Borehole 3= River/swamp 4=Un protected Well	1=0 – 1km 2= 1– 2km 3= 2– 3km 4=3– 4km 5= Over 4 km	1= Too steep 2= Expensive 3= It dries up 4= Long distance 5= Contaminated

	6= Hernia 7= Others [Specify]	5= Traditional Healer/Herbalist 6=Self treatment 7= Others[Specify]		6= Mobile Phone 7=Pit latrine 8= Flash Toilet\8 9=Private Water source	5=Piped water at Home 6=Piped water at public stall 7= Rain water 8= others[Specify]		6= Shared with animals 7= other (specify)

Land ownership							
36) What is your status in relation to the Land ownership?	37) How did you acquire this land?	38) Do you possess any land ownership document?	39) For how long have you been on this affected land/plot?	40) Is there any encumbrances on this land like;	41) If yes to 40 specify the kind of encumbrance	42) What is land Tenure system?	43) How would you describe your housing type? ***
1= Owner 2= Licensee 3= Tenant 4= Co-owner 5= Co-Tenant 6= Others[Specify]	1= Bought 2= Renting 3= Inherited 4= Given as a gift. 5= Just settled 6= Public land 7=Others (Specify)	1= Land Title 2=Agreement 3=Tenancy 4= No	1= Since birth. 2= 0-10 years 3=10-20 years 4=20-30 years 5= Over 30 years	1= Yes 2= No	1= Claim by: Family Members. 2= Mortgage/loan. 3= Dispute with neighbour 4= I don't know 5= Others[Specify]	1= Mailo 2= Communal 3= Leasehold 4= Customary 5= Kibanja 6= Other[Specify]	1=Permanent 2=Semi-Permanent 3=Temporary
44) Do you own the house in which you live?		45) Which Utility Services do you have in your house?		46) How long have you lived in this house?		47) What is the purpose of the affected structure?	
1= Yes 2= No		1= Electricity [Hydro] 2= Water [NWSC] 3= Solar Energy 4= Telephone Lines 5= Others [Specify]		1= 1-5 years 2= 6 – 10years 3= 11 – 15 years 4=16 – 20 years 5=Over 20 years		1=Residential 2= Commercial 3= Rent 4=Livestock 5=Residential/Commercial 6=Other [Specify]	

*Permanent means burnt brick with mortar walls, iron/tiled roof cemented/tiled floor with or without exterior finishing

*Semi-permanent means burnt or un-burnt brick walls without mortar, mud and wattle with or without plaster with iron roof

*Temporary means mud and wattle walls with grass, banana fiber or polyethene roof

Livelihood Sources					
48) What is the main (Primary) Source of income of the Household:	49) What is the other (Secondary) Source of income of the Household:	50) If engaged in Business, how would you describe it?	51) If engaged in farming, what are the types of crops grown by this House hold?	52) What Food crops do you have on your land?	53) What Cash crops do you have on your affected land?
1= Farming 2= Formal Employment 3= Casual labour 4= Trading 5= Service provision (hotel, mobile money, salon, transport) 6= Student 7= Rent collection 8= Remittance 9= Fishing 10= Brickmaking 11= Welding 12= Carpentry 13= Other (specify	1= Farming 2= Formal Employment 3= Casual labour 4= Trading 5= Service provision (hotel, mobile money, salon, transport) 6= Student 7= Rent collection 8= Remittance 9= Fishing 10= Brickmaking 11= Welding 12= Carpentry 13= Other (specify	1=Individual Business 2= Family Business 3= Partnership with Others 4=Limited Company 5=Other [Specify]	1=Seasonal Crops 2= Perennial Crops	1=Banana 2= Sweet Potatoes 3= Cassava 4=Maize 5=Irish Potatoes 6=Yams 7= Beans 8=Ground nuts 9= Millet 10= Sim sim 11= Sun flower 12= Sorghum 13= Vegetables 14= Others[Specify]	1=Coffee 2= Cotton 3= Pineapples 4=Vegetables 5= Maize 6= Forestry 7= Fruits 6= Pine trees 7= Others [Specify]

Income of Affected Household						58) Expenditure of Affected Households		
54) What are the types of Animals & Birds Kept by this H/H? State No. Of Each	55) Where do you sell your produce?	56) No	Activity	Total income Per Year	57) What would you estimate to be the total income for this HH (per month)		Item	Total per year
1= Cows - ---- 2= Goats ---- 3= Sheep --- 4= Pigs --- 5= Chicken --- 6= Ducks --- 7= Turkeys --- 8= Other [Specify] ---	1= Local trading center 2= Local produce buyer 3= Farm gate 4= Cooperative 5= Market 6= Others (specify)	1.	Crop farming		1= <100,000/= 2=100,001– 300,000/= 3=300,001 –500,000/= 4=500,001 –800,000/= 5=800,001 – 1,500,000/= 6=1,500,000- 2,000,000/= 7= 2,000,001-3,000,000 8= Above 3,000,000	1.	House hold basics (Food, Salt, Soap etc.)	
		2.	Paid employment			2.	Water	
		3.	Business			3.	Energy [Electricity, Gas, Charcoal]	
		4.	Livestock trade			4.	Transport [Including Fuel]	
		5.	Rentals			5.	Education [Tuition Fees]	
		6.	Professional / Consulting			6.	Communication	
		7.	Service provision			7.	Clothing	
		8.	Other (Specify)			8.	Medical	
						9.	Rent	
						10.	Others (Specify)	
			Totals				Total	

Gender roles			
59) Among the household members, whose primary responsibility is it to			
Codes: 1.Woman 2.Man 3.Both man and woman 4.Boy child 5.Girl Child 6. All household Members			
House hold activities	Person Responsible (Multiple response allowed)	b) Community Roles/activity	Person Responsible (Multiple response allowed)
1= Do domestic chores		1= Sports	
2= Take care of children daily		1= Cleaning the well	
3= Farming		2= Attending village meeting	
4= Livestock rearing		3= Helping at funerals (specify)	
5= Working for outside income		4= Helping at weddings	
6= Attending village meetings		5= Cultural roles	
7= Owning land		6= Road maintenance	
8= Owning livestock		7= Construction of community centre	
9= Owning durable household assets		8= Other (specify)	
10= Marketing produce			
11= Using financial resources			
12= Buying basic necessities			
13= Buying durable household assets			
14= Other (Specify)...			
Domestic violence			

61) How would you rate the prevalence of domestic violence in this area?	62) What are common abuses in this community? (Multiple response)	63) Who are the main victims?	64) Who are the perpetrators of the abuses?	65) Where are cases of gender and domestic abuses normally reported/referred?
1= None 2= Very rear 3= Relatively common 4= Rampant 5= Don't know	1= Battering/beating 2= Burning 3= Verbal abuses/insults 4= Attempted murder 5= Forced sex 6= Marrying off girls early 7= Threatening violence 8= Use of proceeds/money without spouse consent 9= Preventing spouse from owning property 10= Preventing spouse from using family land 11= Stop spouse from talking/community meetings 12= Engaging children in work instead of school 13= Not economically supporting family 14= Locking spouse or children out of house 15= Other (specify)	1= Girls 2= Married women 3= Boys 4= Men 5= Children 6= Maids	1= Male spouse 2= Female spouse 3= Other relative 4= Clan elder 5= Community leader 6= Stranger 7= Employer 8= Teacher 9= Community member 10= Armed personnel 11= Other (Specify)	1= Police 2= LC/community leaders 3= Religious leader 4= Clan leader 5= NGO/CBO 6= CDO/Probation 7= Courts of law 8= Head-teacher 9= Health worker 10= Media 11= Others

Resettlement &Relocation Options of Affected Household			Dispute resolution	
66) Would you prefer cash compensation or relocation to another place?	67) If you have to move, how much time do you need?	68) Do you have a Bank Account?	69) Who is responsible for settling disputes at household level?	70) What structures are available for resolving conflicts at community level?
Cash Compensation Relocation I don't know	1= Immediately 2= 3 months 3=6 months 4= Will not move [State Reason]	1=Yes 2= No	1= Police 2= Elders 3= Religious leaders 4= cultural leaders 5= L.Cs 6= Others	1= Police 2= Elders 3= Religious leaders 4= cultural leaders 5= L.Cs 6= Others
71) What are the common sources of information?	72) Do you anticipate any impacts related to the project?	73) What are the anticipated positive impacts (List them)	74) What are the anticipated negative impacts?	75) Suggest any mitigation measures for the identified impacts
1= Radio 2= Newspapers 3= Mobile phone 4=Community radio 5=LC meetings 6= Places of worship 7= IEC materials (posters, brochures, newsletter etc)	1= Yes 2= No		1= Fear of loss of households land 2=Displacement 3=Destruction of burial ground 4=Loss of source of income 5= Lack of information about the project 6= Inadequate compensation 7= Does not perceive any project benefit	

8= Sensitization workshops 9= Others (specify)			8= Influx of migrant workers 9= Threat to local morals 10= Increase work load 11= Other (specify)	
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Signature of Respondent..... (Optional) Signature of Interviewer.....

THANK YOU